# Writing Analytics: Broadening the Community



Welcome to Volume 3 of *The Journal of Writing Analytics*.

This issue contains two invited articles, four research articles, six research notes, and a special section featuring research presented at a U.S. humanities conference. As was the case with Volume 2 in 2018, our 2019 authors continue to advance a remarkable research range. And, as now seems to be the norm for our journal, the authors continue to come from diverse fields.

We begin by introducing the research of our colleagues and then turn to a reflection on the developments we see in their work.

## 1.0 Invited Articles

Volume 3 begins with an invited article by our publisher, Mike Palmquist. In "Directions in Writing Analytics: Some Suggestions," Palmquist examines the emergence of the term writing analytics, the connection of that term to learning analytics, and potential directions for an expanded understanding of writing analytics. Palmquist also considers how work in writing analytics (a new research specialization) and learning analytics (one more established) might achieve greater complementarity. In proposing an agenda for writing analytics research—including targets ranging from enhancing teacher effectiveness to deepening our understanding

of genre, context, and purpose—he reminds us that we should identify a program of research "that reflects the values and goals that have long characterized the field of writing studies" (p. 6). In his well-considered vision of the future, needs will be twofold: attention to new tools, methods, and assumptions; and a framework for scholars desirous of studying writing as part of larger learning analytics efforts.

In an extension of Palmquist's vision, Susan Lang, Laura Aull, and William Marcellino offer an enactment framework. In "A Taxonomy for Writing Analytics," they identify a coherent and relevant analytics research agenda, including commitment to reflection, evidence-based propositions, and multidisciplinarity. Comprehensively, they offer a history of analytics, principles for theorization implementation paradigms, and core principles for data management. They also situate writing analytics in terms of digital environments, analytic processes and uses, assessment, ethical considerations, and ongoing challenges. As the authors note, the taxonomic approach yields clarity around different categories of real-world practices associated with writing analytics. In association to the four programs of research identified in Volume 1 of *Analytics* (Moxley et al., 2017, Figure 1, p. x)—educational measurement, massive data analysis, digital learning ecologies, and ethical philosophy—the taxonomy outlines practice areas by attending concurrently to methods and their contexts. Far from a tale of triumph, the authors conclude by identifying ongoing challenges that will continue to shape the current research environment: overemphasis on methodology and applications, need for a pipeline of scholars within writing studies itself, and processes for recruiting new stakeholders devoted to multidisciplinary research.

## 2.0 Research Articles

Of the four research articles in Volume 3, the first examines research attainment disparity, the next one forwards innovative methodologies and models, and the final two focus on writing analytics applications to science, technology, engineering, and mathematics (STEM) disciplines.

In "Understanding Attainment Disparity: The Case for a Corpus-Driven Analysis of the Language used in Written Feedback Information to Students of Different Backgrounds," U.K. scholars Siân Alsop and Sheena Gardner attend to relationships that occur between group performance and feedback. While the factors of differential educational attainment are varied, their focus on investigating feedback patterns given to different groups of students allows a granular exposition of the micro-variables contributing to disparity. Using a small pilot corpus, the authors find that it is possible to model and differentiate the nature of the feedback—including engagement—based on contextual variables. In studies now in progress, their feedback framework will allow sociodemographic and academic variables of students to be mapped to feedback comments. As they conclude, analyzing authentic data enables researchers and policy makers to understand in more detail the complex relationship among ethnicity, attainment, fairness, and social justice.

In another type of modeling, Rianne Conijn, Menno van Zaanen, Mariëlle Leijten, and Luuk Van Waes focus on keystroke error to present a nuanced analysis of fluency and revision.

Working from Dutch copy task data, these researchers from the Netherlands and University of Antwerp characterize typographical errors and their revision and use machine learning to create a process-based model of typographic error. To further refine the model, keystroke data was then obtained from additional source-based tasks representing another genre. In terms of error, the results indicate that substitutions were found as the most common typographic errors and that they were also most often revised. In terms of process, timing of keystrokes and bigram properties before and after a typographic error can be used to predict a typographic error. However, the model did not hold when source-based tasks were used. Typographic errors in the copy task, for example, were revised fairly quickly; however, errors in the source-based writing task were sometimes only revised after more than ten characters. As the authors conclude, classification models such as those they have developed might be used in writing instruction and feedback by automatically assessing the revision process.

The next two research articles are by U.S. researchers, both focusing on writing in STEM settings. In "Peer Review in Biology: Of Novices, Experts, and Disciplines," Christiane Donahue and Lynn Foster-Johnson examine peer feedback for postsecondary entry-level and advanced biology courses. In their study, they examine key terms used in chemistry peer review as well as terms identified as high-quality by writing experts. The authors classify theirs as an extension study in their use of a methodology by Anson, Anson, and Andrews (in press) extended to writers in biology classes. As Donahue and Foster-Johnson find, there is disjuncture between the comments provided in chemistry peer review and the comments of writing experts. STEM writers, for instance, often use terms that are not high-quality, writing-related terms but, rather, terms that are essential to the subject matter, discipline, and assignment (such as evaluation of figures). As the researchers conclude, individuals providing feedback are engaging with the writing and considering the context in their feedback in terms of specific genre. The pedagogical implications, they find, are significant: The assignment task and the peer review rubric can be traceably linked to the review in terms of specific language use, and attention is needed in order to help students transition from peer review in first-year writing to peer review in STEM.

Ian G. Anson, Cary Moskovitz, and Chris M. Anson also focus on genre in "A Text-Analytic Method for Identifying Text Recycling in STEM Research Reports." Text recycling—the reuse of an author's own textual materials from one document to another—is a common, debated, and unsettled practice in peer-reviewed journal articles. In their study, the authors describe the processes they used to create a system for identifying text recycling and then use non-discursive sentence-level string-distance lexical methods to refine and test the system. The corpora included five grants from a variety of disciplines, resulting in 10 pairwise comparisons per grant and 50 total comparisons. As the authors conclude, results demonstrate that the algorithm is a good predictor of true instances of text recycling, best used for comparative purposes. Such analyses can extend our understanding of writers' constructs instantiated in specific genre, as well as the cultural norms and disciplinary practices that govern text recycling.

## 3.0 Research Notes

Distinct from research articles, research notes identify under-reported investigations, pose queries on these areas, and propose further investigation through principled analysis. In "Tracing Fan Uptakes: Tagging, Language, and Ideological Practices in *The Legend of Korra* Fanfictions," Cara Marta Messina demonstrates the value of this research genre by advocating for the inclusion of fanfiction genres in writing analytics. Fanfictions—texts written by fans of a particular cultural material in which the fans themselves reimagine the characters and their narratives—provide an ideal way to understand anticipated and unanticipated genre responses. To study critical uptake, Messina collected 3,759 fanfictions associated with *The Legend of Korra* (a U.S. animated television series) published from 2011–2015 on the digital repository Archive of Our Own. Pairing publishing dates in the corpus with dates on which important events in the series were first aired highlights specific trends from the corpus with events that can be targeted for analysis. Canon complicit, implicit-explicit, and canon resistant uptake enactment, the author finds, relate directly to the ways in which the fans reimagine the original cultural material. As the author concludes, tracing and analyzing critical uptakes provides researchers with the opportunity to describe, in great detail, how writers embed value-based ideologies in their rhetorical choices.

In a second new corpora study, "Seniority in Writing Studies: A Corpus Analysis," William Marcellino uses lexical analysis, lexicogrammatical analysis, and auto-clustering on an edited collection devoted to seniority in writing studies. Following the organization of the collection, the author uses the U.S. Classification of Instructional Programs—a taxonomy of academic disciplines—to divide writing studies into four areas: general writing; creative writing; professional, technical, business, and scientific writing; and rhetoric and composition. Keyness testing, for example, reveals that concern for identity are conspicuously overrepresented in keywords such as *black, identity*, *African*, *negro*, and *racism* in chapters grouped under rhetoric and composition. In this classification, lexicogrammatical analysis reveals that terms such as *voices* are paired with *self*, suggesting the importance of reflection as central to the creation of voice. Auto-clustering reveals that rhetoric and composition scholars often position historical occurrences as the pursuit of positive values. As Marcellino concludes, the benefits of working with genre-specific corpora using targeted language approaches are becoming increasingly clear.

Turning to pedagogy, Laura A. Palmer provides a study in which new information is provided on an under-reported area of U.S. post-secondary instruction: the ways that students learn to create content at the intersection of algorithmic functions, rhetorical constructs in digital spaces, and user engagement. Using a case study approach in "Introducing Undergraduate Students to Writing and Algorithms: Understanding Analytics and Measuring Content on Personal Capstone Websites," the author identifies five key pedagogical areas important for teaching students to develop content for digital platforms: terminology/vocabulary development; proficiency in reading HTML and understanding its function; using simple tools to conduct site audits, while developing search engine optimization-leveraged content for public-facing pages and HTML; and deploying and learning Google Analytics. Challenges nevertheless remain.

Baseline assessment of student competencies reveals that while they understand the importance of learning such analytics, most have no exposure to hands-on implementation. Ultimately, the author concludes, we are only now beginning to understand what students need to know for their workplace digital careers.

In a second pedagogical study, "Perusall: Harnessing AI Robo-Tools and Writing Analytics to Improve Student Learning and Increase Instructor Efficiency," Allison S. Walker turns her attention to a social reading and annotation platform that automatically scores student annotations. As Walker recognizes, in an environment of increased class sizes and millennial student populations accustomed to instant feedback, robo-tools have the potential to be allies in a quest to improve student writing. Using data from a case study of 125 undergraduate students in two U.S. sophomore-level English classes, the author found higher final grades of statistically significant difference for students who were given access to Perusall than those who were not. Relationships were also identified between lower Perusall scores and lower final course grades, and further qualitative evidence was from a reflective narrative survey conducted in the experimental group. The study provides new evidence to support the use of Perusall in undergraduate classrooms.

In another scoring study, Lisa Rourke and Xuchen Zhou complicate the concept of statistically significant differences in single case pre- and post-score studies. In "When Scores Do Not Increase: Notes on Quantitative Approaches to Writing Assessment," the authors examine the scores given to writing samples obtained from 405 incoming students before and after they complete a university writing seminar in a U.S. postsecondary institution. Scores on the rubric, designed to capture both trait and holistic scores, revealed either no improvement or a decline in scores at statistically significant levels. While the authors identify methodological challenges—unknown differences in pretest and posttest tasks, issues with rubric design, absence of attention to writing processes, and construct representation in task and rubric—they conclude that commonly used pre- and post-score studies will not yield useful information for assessment stakeholders. Rather, they conclude, fine-grained lexical analyses based on student corpora have the potential to provide actional information on curricular goals such as transfer.

Our research notes conclude with a study of score variation by U.K. researcher Lee McCallum. In "Modelling Score Variation in Student Writing with a Big Data System: Benefits, Challenges, and Ways Forward," McCallum complicates common uses of general linear modeling. When multiple linear regression is used on dependent variable data points, she observes, researchers run the risk of obtaining statistically significant correlations between variables that are, in fact, false positives due to failure to account for random variation from moderating, or intervening, variables, that arise from the corpus hierarchy. In place of this common modeling, she recommends the use of mixed-effects modelling, especially in the case of writing assessment in which the multidimensional nature of scoring includes score, task, and rater variables. The use of mixed-effects modelling allows us to conceptualize language assessment as an effort acknowledging multifactorial relationships.

## 4.0 Special Section

In Volume 2, the editors stated their belief that *Analytics* is in a unique position to advance research due to its web-based, open application format and its dedication to publish research within a year after it is presented. As editors, we remain alert to conferences featuring sessions on writing analytics so that state-of-the-art research can be published within a very short time of its presentation. Such was the case in the special section of Volume 2 featuring research presented on April 14, 2018, at a Coordinated Symposium hosted by the National Council on Measurement in Education entitled *What Writing Analytics Can Tell Us About Broader Success Outcome*s.

In Volume 3, we are delighted to present another special section—this time, drawing on scholarship from the humanities. On January 5, 2019, the Modern Language Association (MLA) held its annual meeting in Chicago and featured a session (529) sponsored by the Council of Writing Program Administrators. Papers from the session "Textual Transactions: A Review of the Empirical Tradition in Writing Studies" are presented by Anne Ruggles Gere, Mya Poe, Diane Kelly-Riley, and Ellen Cushman.

Presiding over the session in her role as 2018 president of the MLA, Gere introduces the session and the resulting papers as meditations on knowledge creation. After providing an overview of each of the papers and their themes of editorial ethos, location, and theory-based approaches, Gere turns to critical questions facing the new research specialization of writing analytics at a time when perspectives and practices are just now taking shape. While she believes that writing analytics holds the potential to offer tools useful in developing local programs of writing assessment, she reminds us that the challenge will be to use them in ways that do not perpetuate dominant discourses through algorithms that reinforce reductive language ideologies. Turning to examples from corpus analysis, she demonstrates ways that writing analytics can be used at the local level to learn more about student writers and advance their opportunity to learn. As she concludes from the examples she provides, writing analytics research can lead to significant site-based pedagogical contributions, can help instructors understand more fully the ways their students understand written communication, and can expand the meaning of assessment by moving beyond reductive single scores to more complex representations of student learning.

In the first paper from the session, Mya Poe traces shifting debates about methods over more than 50 years in *Research in the Teaching of English*, the flagship research journal of the National Council of Teachers of English. She documents ways the journal reflected methodological shifts in the field of writing studies over that time period, as well as the significant influence of editors in advancing research methodologies. In the early years of the journal, she identifies a reductionist methodological combination of normative scientific philosophy and disregard of social changes present in other areas of educational research. That reductionism, she concludes, led to a structural bias in research on writing that remains uncorrected today. However, other methodological trends, especially the sociocultural turn in writing studies, would lead to new directions that, in the 21st century, resulted in limited claims

and expanded qualifications. Reductionist methodologies were challenged by other methodologies designed to address situated language development across sociocultural groups. Today, the journal is characterized by methodological pluralism. The application of her history to writing analytics is implicit: While methodological trends are deeply related to their historical context, the intentional role of journal editors must not be forgotten. At the end of the day, editors advance research ethos.

In the second paper, Diane Kelly-Riley explores the ways humanistic traditions facilitate a framework of localism developed by *The Journal of Writing Assessment*, the leading U.S. peer-reviewed writing assessment forum. Using two case studies from the journal, she demonstrates the value provided by efforts to link technically focused concerns for evidence of validity and reliability with the complex social contexts, backgrounds, and lived experiences of students and faculty at specific institutional sites. Focusing on assessment studies of moral philosophy and educational pathways published in the journal, the author illustrates the need for socially situated language perspectives, multiple instructional needs, and meaningful outcomes. Kelly-Riley makes two explicit applications of her study of localism in *The Journal of Writing Assessment* to *Analytics*: Researchers in writing analytics need to adopt a perspective of pluriversality to enable its theories and methodologies to dwell in borders where unique knowledge, languages, histories, and practices exist; and, the unlikely combination of humanities-based study, writing assessment-situated research, and writing analytics can yield a body of scholarship that is both technically and contextually rigorous, weaving together traditions of humanistic and empirical inquiry.

In her response to the two articles, Ellen Cushman deliberates on both through the lens of a critical question: For whom do we make knowledge and why? As she keenly observes, in answering this question, fairness and justice are at stake. In terms of knowledge inclusion and value, she believes that decolonial theories allow researchers to understand that validity evidence is normative, establishing itself even as it seeks to construct a baseline. Decolonial heuristics allow us to investigate the ways in which knowledge production creates epistemic hierarchies and creates alternatives to these epistemic hierarchies. In terms of knowledge creation, Cushman emphasizes the role of audience: Even when diverse researchers and well-designed sampling plans are in play, the studies and their impact may not be taken up by audiences. Teachers and students are also stakeholders who are obliged to shift their everyday curricular practices. In terms of the aims of knowledge, she turns again to the individual agent. Within institutions, individual scholar-teachers and scholar-administrators—whose everyday practices make up these institutions—can be decolonial in their praxis. As Cushman concludes, as a nascent and rapidly growing area of study, researchers in writing analytics are well positioned to take up axiological questions at the inception of research programs in order to epistemically delink their planned methodologies and forthcoming inferences from existing imperial systems of knowledge creation—and to create the decolonial praxis that makes possible pluriversal alternatives *to* these systems and methods of knowledge construction. Together, she concludes, we are starting down a good path.

## 5.0 Reflection

We agree with Cushman: The path seems promising. It is difficult not to be impressed at the contributions of our authors, Board of Reviewers, and Editorial Team in the brief time since Joe Moxley and Norbert Elliot met with Mike Palmquist in late June of 2016, at the International Writing Across the Curriculum Conference, held at the University of Michigan, to plan the journal. (Dave Eubanks could not attend but was part of the planning process from the start.) We recall Kelly-Riley's particular phrase "unlikely combination" of fields of study (p. 347)—and research within those fields—that have come together to form writing studies as conducted in the pages of this journal.

As we noted in Volume 2 (Moxley et al., 2018), research related to both generalization inferences and inferences regarding fairness continues. Volume 3 features research related to generalization in the STEM research of Donahue and Foster-Johnson and fairness in the attainment disparity study of Alsop and Gardner. In Volume 3, we also see new areas of research that are consistent with the theme of broadening the community featured at the 7th International Conference on Writing Analytics. Classified by area of investigation, we have been able to bring forward research on these areas: theorization in the MLA special section; methodological design in the research of Rourke and Zhou and McCallum; corpora development in that of Anson et al., Messina, and Marcellino; and pedagogy in the work of Palmer and Walker. Even at a glance, the usefulness of the taxonomy developed by Lang et al. is immediately apparent.

As we prepare Volume 3 for release, we are also preparing for The 9th International Conference on Writing Analytics. The conference will explore expanding the body of knowledge in writing analytics, with special attention to defining programs of research. As has been the case in the past, the call for proposals is an extension of research we hope to see in future issues of the journal:

- **Data**: How is data identified, acquired, transformed, or stored? How should databases be constructed and managed?
- **Digital Environments**: How should learning management systems and allied software be designed, implemented, studied, and assessed?
- **Analytics Processes**: How do we use exploratory, descriptive, predictive, and prescriptive analytics?
- **Assessment**: How do writing analytics and writing assessment diverge and converge? How can writing analytics improve learning assessment? What are the relationships between information use in writing assessment and writing analytics?
- **Ethics**: How can aggregate analytic data be protected and individual data remain private? What procedures should be used to ensure ethical conduct of research? What does it mean to apply analog standards of privacy in a digital world? What

intersections exist between technological innovation in language measurement and philosophical systems determining obligation?

- **Implementation**: How can locally-developed writing analytics tools be implemented? What collaborations foster these implementations? What commercial partnerships and software platforms are used to implement writing analytics tools? How are research results communicated?
- **Pedagogy**: How may writing analytics research be used to design curricula in which writing plays a critical role?

It is our hope that resonance between the conference and the journal will continue.

## 6.0 Recognition

Since the publication of Volume 2, colleagues Christian Rapp, Otto Kruse, and Noah Bubenhofer at Zurich University of Applied Sciences hosted the 8th International Conference On Writing Analytics, at Winterthur, Switzerland, on September 5-6, 2019. The taxonomy for writing analytics by Susan Lang et al. was presented there, as was the study on text recycling by Ian. G. Anson et al. and the model for typographic error revision by Rianne Conijn et al. We are hopeful for greater international collaboration in the future in terms of conference planning and publication in *Analytics*.

On October 14, 2019, John Seabrook published "The Next Word: Where Will Predictive Text Take Us?" in *The New Yorker*. In that article, he referenced the work of Aoife Cahill, Martin Chodorow, and Michael Flor in Volume 2 of *Analytics* on the design of advisory flags for texts intended to stump automated writing assessment scoring systems. It is good to see that research from our colleagues is gaining national attention. We are also pleased to report that research from Genie N. Giaimo, Joseph J. Cheatle, Candace K. Hastings, and Christine Modey on writing center session notes was nominated for best article from the International Writing Centers Association.

We were also delighted to be included among the journals discussed by Douglass Hesse in his retrospective *College English* article. In discussing the time frame covered in his analysis, Hesse (2019) writes of the recent origin of *Analytics*: "On the other end of the spectrum, while publications like *The Journal of Writing Analytics* may be premature because at the time I'm writing, only a single issue has appeared, I've included it because it has a significant editorial board, well-articulated focus, and reasonably safe home in the WAC Clearinghouse" (p. 370).

## 7.0 Acknowledgements

Hesse is certainly correct: The success of our journal is due to the support and encouragement of our publisher, Mike Palmquist. At each part of our journey, Mike has been deeply involved, and our success is surely due to his faith that *Analytics* serves an important research need.

Hesse is equally correct in the value found in our Board of Reviewers, presented in Table 1 with the area of manuscripts each specialist reviewed. Because the journal uses a

policy of desk rejection of manuscripts not fully developed or not directly related to the mission of the journal, reviewers know that the editors are committed to publishing the studies under review. As manuscripts are reviewed twice—and often three times by Board members—detailed advice is provided on how to strengthen work that is already well considered. Our board members are significant indeed, and we are thankful for their highly focused critical review.

Table 1

*Journal of Writing Analytics Board of Reviewers and Review Specialization, Volume 3, 2019*

| Reviewer | Affiliation | Review Specialization |
|---|---|---|
| Chris M. Anson | North Carolina State University | Rhetoric and Composition |
| Ian G. Anson | University of Maryland, Baltimore County | Electronic Forecasting |
| Laura Aull | University of Michigan | Corpus Linguistics |
| Ryan Baker | University of Pennsylvania | Learning Analytics |
| Duncan Buell | University of South Carolina | Computer Science |
| Hugh Burns | Texas Woman's University and US Air Force Academy | Computational Rhetoric |
| Scott Crossley | Georgia State University | Applied Linguistics |
| Irvin R. Katz | Educational Testing Service | Cognitive Psychology |
| David Kaufer | Carnegie Mellon University | Digital Textual Analysis |
| Andrew Klobucar | New Jersey Institute of Technology | Digital Humanities |
| Suzanne Lane | Massachusetts Institute of Technology | Writing in the Disciplines |
| Djuddah A.J. Leijen | University of Tartu, Estonia | English Language Learning |
| Collin F. Lynch | North Carolina State University | Intelligent Tutoring Systems |
| William Marcellino | The RAND Corporation | Analytic Toolsets |
| Mya Poe | Northeastern University | Writing Assessment |
| Valerie Ross | University of Pennsylvania | Critical Writing |
| Alex Rudniy | Farleigh Dickinson University | Educational Data Mining |
| David Slomp | University of Lethbridge | Qualitative Research |
| Erica Snow | SRI International | Artificial Intelligence |
| Swapna Somasundaran | Educational Testing Service | Sentiment and Discourse Analysis |

We are also thankful for the support of the Department of English at the University of South Florida and the chair of that department, Laura Runge.

## 8.0 Editorial Team Transitions

With Volume 3, we welcome two new developmental editors and a book review editor. These are new posts, and we have been fortunate to recruit talented colleagues for each. Developmental Editor Jessica Nastal joins us from Prairie State College, where she serves as Associate Professor of English and Chair of the Department of English. Developmental Editor Alaina Tackitt joins us from the University of South Florida, where she serves as Associate Director of First-Year Composition. Serving as Assistant Professor of English at Washington State University, Johanna Phelps joins us as Book Review Editor.

We would like to welcome Susan Lang of The Ohio State University as our Associate Editor for Volume 3. Susan is Director of the Center for the Study and Teaching of Writing and Associate Professor of English at The Ohio State University. As a distinguished researcher, her scholarship examines aspects of writing program administration, writing analytics, and technical communication. With Volume 4, Susan will assume role of Editor-in-Chief of the journal.

With this volume, Norbert Elliot ends his three-year term as Editor-in-Chief of the journal. He would like to thank his colleagues who have worked so effectively to identify a role for the new research specialization writing analytics. He would also like to say that working on *Analytics* has been among the most important roles in his career. He is deeply thankful to have had the opportunity to learn so much from so many.

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