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# A Correlation Study of Blackboard Microengagement, Formative Assessment, and College Writing Achievement

John R. Ziegler  
*CUNY Bronx Community College*

Edward Lehner  
*CUNY Bronx Community College*

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**A correlation study of Blackboard microengagement, formative assessment,  
and college writing achievement**

**Abstract**

Set in a freshman composition course using Blackboard for all assessments, this study investigated whether there is a relationship among formative assessment variables related to the development of college writing skills. The study's population was linguistically diverse students enrolled in a community college in a large northeastern city. The research design employed a multivariate data analytic framework to examine associations and predictive relationships among final class average, total user activity, total user activity in hours, and final quiz average as measures of formative assessment and college writing achievement. Results of Pearson correlation analysis indicated six significant associations among microengagement, formative assessment, and college writing achievement. One significant regression model resulted where microengagement, time on task, and formative assessment predicted 57% of college writing achievement.

*Keywords:* college writing achievement, linguistically diverse students (LDs), microengagement, predictor equation

## **Introduction**

Currently, a significant portion of college-level courses are Web enhanced in some way, and composition courses are no exception. Web enhancement at least potentially creates a range of quantitative data regarding student writing practices and performance. This is especially true when a course management system (CMS) such as Blackboard is employed by the course instructor. However, much of the data that systems like Blackboard capture often go unused in assessment, pedagogy, and research. Lang and Baehr (2012, 175) noted that empirical research has only ‘sporadically’ appeared in leading composition journals in recent years. They also noted that a data mining and analysis approach—looking for significant patterns or associations within large data sets—holds ‘promise for a variety of research goals’ for a range of stakeholders in composition studies (Lang and Baehr 2012, 173). The Web-enhanced elements of writing-intensive courses can be configured to maximize the amount of student-generated data: Many types of assessment-related interactions, for example, from rubric scores to the average number of hours on a given day of the week that a student spends logged in to a course’s Blackboard content, can be recorded by Blackboard itself. These records provide a way to operationalize such concepts as student engagement, thereby opening additional avenues for analysis. In addition to offering new perspectives in composition research, an advantage of using a data analytics approach is that it can be scaled up to eventually allow analysis and comparisons at different investigative levels, including the individual student, course, department, campus, and beyond.

### **College writing, social reproduction, and the linguistically diverse population**

Ethnicity, race, and social class can play a determining factor in students’ preparedness for college-level writing. Beyond ethnic, racial, and social class barriers, Williams (2009, 2012)

noted that financially disadvantaged students are often culturally unacquainted with the academic demands of higher education. Students unaccustomed to the role that writing plays in the culture of higher education are often at risk for underachievement. In this study, linguistically diverse students (LDs) are the dominant population. According to the college's statistics, 70% of the student body are nonnative English speakers, and the vast majority of nonnative speakers enroll in developmental courses. When these same students matriculate into nondevelopmental composition courses, many of them are underprepared for a variety of reasons. Ninety percent of the students are identified as first-generation college students. Latino/as<sup>1</sup> (Acevedo-Gil, Santos, Alonso, and Solarzano 2015) and students of the African diaspora are the main population of the class. To a lesser degree, African American and Southeast Asian students participated in this study.

Hodara's (2012) conception of the academic problems that LDs face in their academic careers importantly informs this work. De Kleine and Lawton (2015) described the LDs as living in households in which the dominant language spoken is not English. As mentioned briefly above, LDs are Latino/as, students of the African diaspora, or members of a smaller immigrant group. Lehner (2007) described African diaspora students as first- and second-generation Africans from various countries. Generally, in community college classrooms, these students are seen as African Americans, and often this occurs even if they are Spanish speakers. The City University of New York classifies such students as Black, almost regardless of ethnicity. Each student of the African diaspora represents a distinct culture, possesses different learning dispositions, and often is learning English while in college. For this reason, African diaspora students and Southeast Asian students should clearly be considered LDs.

LDs are engaged in a complex form of cultural acquisition once they are immersed in the college classroom environment. LDs have unique learning concerns, yet they are often grouped into larger categories, such as ‘students of color.’ Iacovino and James (2016) expertly defined the notion of students of color; however, in cities like New York, terms like ‘students of color’ have little descriptive meaning, since they serve primarily as a critique of White hegemony. In this work, LDs are different from their African American peers even as they are assimilating into the broader urban culture, which is deeply influenced by African Americans.

We employed Lehner, Thomas, Shaddai, and Hernen’s (forthcoming) notion of LDs because it disaggregated the larger grouping of students of color into a more meaningful description of students. Lehner et al. also analyzed how the term African American is not accurate when working with students from the African diaspora. In large cities, African immigrants are largely categorized as Black or African American. However, these descriptors carry little value. Before examining the intersection of LDs and college writing, we need to explain that our population of LDs is both broad and complex. We acknowledge that, to date, there is too little scholarship that accurately describes the ethnic, racial, and social class complexities of our student population. Explanations of our students’ complex heritages often do not easily conform to the ethnic and racial models provided by institutions of higher learning.

### ***LDs and college writing***

Proficiency in composition remains a core component of social reproduction for many students. Lehner (2006, 2007, 2010, 2017) and Ziegler and Lehner (2016, 2017a, 2017b) noted that a fundamental driver of academic underachievement often resides in teachers’ inability to successfully acculturate students into the given practices of their respective fields. Macleod (2010) underscored the complexities that students from poverty and the working class face while

attempting to pursue career aspirations outside of their given social class. And, relevant to the juncture of ethnicity and social class in this work, Kao and Thompson (2003) detailed the intersection of ethnicity, class, and immigration status related to educational achievement.

More recently, and specific to college-level writing, Perun (2017) described how first-generation college students struggle to learn the dispositions and practices of college writing. Callahan and Chumney (2009) highlighted the significance that social class plays in the development of underachieving freshman college writers. Graff (2008) noted how the practices of college-level writing are unnecessarily obfuscated, often encumbering students' learning processes rather than acculturating them to academic writing. To date, the literature on freshmen college writing highlights that writing is the conduit by which students enter the academic conversation. Callahan and Chumney expertly noted that while college writing is the discourse of college achievement, writing underachievement precludes students from the advantages of college success.

If students enter college with underdeveloped writing skills, it is likely that they will continue to reproduce a type of writing underachievement. Borrowing an idea from Merton's (1968) seminal work on social reproduction, Stanovich (1986) labeled this underachievement the 'Matthew effect.' Wollscheid, Sjaastad, and Tømte (2016) noted that Stanovich's conception of the Matthew effect prominently applied to the development of reading skills. Wollscheid et. al. (2016, 20), in reviewing the literature at the intersection of writing instruction and neuroscience, asserted that 'in line with scholars focusing on the importance of early writing, we argue that early writing skills are a prerequisite for further learning and academic achievement, particularly in the digital age.' Wollscheid et al. noted, as Stanovich did over 30 years ago, that the development of writing skill is complexly interwoven with social class, prior writing history, and

types of academic writing instruction taken. The work of Stanovich and Wollscheid et al. shares the theme that the economically disadvantaged underperform both in writing and reading tasks and that this underperformance, in spite of remediation, tends to grow over time compared to that of their middle-class, upper middle-class, and wealthy peers.

If taught poorly, as Perun (2014) noted, community college composition courses may inadvertently enact a form of social reproduction. Perun extensively examined how community college writing courses may, paradoxically, exacerbate writing difficulties. Frequently, the anticipation is that community college composition courses will equip students for future writing accomplishment. Still, LDs often fare poorly in developing better writing skills. Callahan and Chumney (2009) highlighted that college writing underachievement may result from the complex interplay between decontextualized teaching methods and the intricacies of social reproduction. Shaughnessy (1979) contended that college writing is a complex acculturation progression that can be hastened by quality instruction. Shaughnessy's fundamental propositions, in various forms, have been established in the composition literature by Barhoum (2016), Bartholomae (1985, 1993), Bizzell (1986), Carter (2006), Fox (1990), Perun (2017), Pratt (1991), and Soliday (1996). The sum of the research, covering both the community college composition classroom and community college developmental writing, highlights the need for quality instruction.

### ***Data analytics and college writing achievement***

Confronting the complexity of LDs' underperformance in college composition and unique social reproduction factors related to this population, composition researchers continue to eschew investigative methods that may provide any type of quantitative insight. Lang and Baehr (2012) noted that college composition research continues to be dominated by primarily

qualitative studies, and quantitative research often meets resistance in a field where the primary research mode is ethnography. Thus, researchers and instructors in composition not infrequently depend on observation or ‘lore, anecdotal evidence, or studies relying on small sample sizes to defend our assertions’ (Lang and Baehr 2012, 173-174). Lang and Baehr’s critique of the avoidance of quantitative techniques should not, however, be viewed as a call for only positivistic and quantitative methods. Ziegler and Lehner (2016, 2017a, 2017b) reviewed Denzin and Lincoln’s (2011) scholarly assessment of positivism in the social sciences but did not altogether understand how such critiques apply to LDs’ learning of composition skills. Ziegler and Lehner noted that qualitative methodologies, although erudite, may impede advancements in classroom pedagogy because the theoretical framework becomes a heuristic that obscures students’ ontological realities.

As a result, as Lang and Baehr (2012, 176) noted, ‘One of the most substantial contributions to research that computers are capable of making to research—their ability to assist with the mining and analysis of quantitative and qualitative data—has to this point been underserved in research in rhetoric and composition.’ The availability of large quantitative data sets within the Blackboard CMS offers an analytical approach to teaching and assessment of college writing that may constitute an initial step toward remedying this deficiency (Dixon and Moxley 2013; Griffin and Minter 2013; Miller 2014). In addition, further research is needed to assess measures of microengagement and college writing achievement amid classroom complexities of social reproduction (Lehner 2007) and power discourses to identify and develop effective responses to institutionalized patterns that create unintended consequences, especially for LDs student populations (Lehner 2017; Wilson and Lehner 2016; Ziegler and Lehner 2016, 2017a, 2017b).

In this study, formative assessment refers to a range of diagnostic and skill-building assignments, including short, repeatable quizzes; scaffolding for student papers; and revisions of both scaffolding and final products of written assignments. Data analytics, or data mining, is ‘loosely defined as the process of finding interesting information in large amounts of data’ (Lang and Baehr 2012, 176). We understand the learning-to-write process as a leveled progression toward full engagement in college writing. Micro-level engagements are writing practices, measured via Blackboard, that are engaged learning actions but result in poor enactments of college-level writing. Examples of micro practices include accessing Blackboard assessments but not completing the assessment, handing in poorly developed writing, and specifically spending fewer than 2 hours per week on writing-development activities. Meso-level displays are writing practices that are conducive to creating writing skills and that demonstrate individual commitment to learning the writing skills. Instances of meso-level learning performances include student-initiated learning strategies as well as extended time on Blackboard. Micro and meso forms of learning are conceptualized as essential gateways to macro-level enactments of learning culture (Li 2015; Li and Huang 2014; Li et al. 2013).

The purpose of this research was to examine relationships among measures of college writing and microengagement using numeric data from Blackboard to quantitatively assess teaching of writing and writing course competency. The use of data analytic frameworks is a growing trend in composition research (Miller 2014); it can be used to examine possible connections and predictors among various data points, which can lead to new directions for scholarship, assessment, and pedagogical practice (Lang and Baehr 2012). More specifically, this study, while acknowledging the importance of large sample sizes for data-driven analysis,

established significant foundational results for continued inferential analysis of CMS-generated data in composition studies.

This research demonstrates how data analysis can be brought to bear on studying the use and effectiveness of online formative assessments in teaching writing. Online formative assessment is a particularly significant area of study because, as Gikandi, Morrow, and Davis (2011, 2344) argued, it ‘can foster equitable education by providing diverse learning opportunities to students with a variety of individual needs. In our view, it facilitates responsive teaching and assessment that accommodate varying learning capabilities and styles, and supports progressive learning and development.’ Thus, understanding how best to structure and deploy online formative assessments can make a significant contribution to composition pedagogy. Doing so using quantitative data will provide for replicability and aggregation of the research, as this study demonstrates. Our results in this study, for example, suggest significant correlations among students’ microengagements, average time spent on task per week, completion of online formative assessments, and college writing achievement. This study will also serve as the basis for further investigations employing the techniques of data analytics more broadly in composition research.

### ***Operationalizing college writing conceptual frameworks***

It is difficult to understand how community college LDs become better writers. LDs often enact learning culture that may seemingly be opposed to other learning attempts, or even contradictory to other social actions. Tobin and Roth (2005) and Tobin (2006) underscored how learning culture is often enacted both with patterns of coherence and, at times, in stark contradiction to other learning actions. In this work, LDs often enact micro, meso, and macro writing culture in recursively related ways. Roth (2005) used a Sheffer stroke (|) to denote the

ways in which students appropriate learning resources. LDs' writing-learning practices should likely be viewed as recursively related. When LDs use their resources and microengage in writing practices, patterns of coherence emerge. We deploy Roth's use of the Sheffer stroke to help conceptualize the complexity that is occurring as students exercise their agency in learning writing skills.

To date, writing researchers have employed methodologies rooted predominantly in ethnographic work. To a degree, the application of primarily qualitative methods to understand the complexity of learning-writing culture may not provide enough insight into ameliorating the difficulties of LD students. Tobin and Roth's (2001) understanding that learning culture is enacted with patterns of coherence aligns well with a multivariate data analytic framework. Alongside understanding LDs' learning enactments recursively, researchers should glean the important insights that a multivariate data analysis and Blackboard data can provide. Thus, we examine the enactment of writing practices by studying the patterns of coherence, deploying SPSS as a tool, and analyzing Blackboard data to better understand LDs' writing culture.

Part of the complexity of learning-writing culture, and thus of the difficulty in studying it, is a preponderance of qualitative concepts that are significant yet difficult to measure. Finding ways to assign quantitative values to such concepts (student engagement among them) is crucial to better understanding how students acquire writing skills, as well as to testing those proposed understandings. Operationalizing constructs such as student engagement offers a means of analyzing their interaction with other variables in student learning-writing culture, both those that are easily or already quantified and those for which methods of operationalization must be devised.

## Literature review

The community college freshman composition literature is a complex intersection of disparate research concerns, involving the overlap of composition research, developmental education policies, and the variables that are attributed to the development of college-level writing skills. This literature review examines these two categories, with a specific emphasis on the ways college writing skill development has been conceptualized and studied. Specifically, we underscore that a salient gap in the literature centers on an under-examination of microengagement related to the relationship between formative assessments and the development of college-level writing skills.

Lauer (2006) and McLemee (2003) both underscored that first-year composition courses (FYCC) have struggled to define their role in the college curriculum. Coombs (2015) noted that FYCC lack a central curriculum. Continuing the critique, Coombs described FYCC as ambiguously structured and often lacking central aims. In terms of expected student outcomes, Sullivan (2006) examined how first-year college composition instructors often disagree on what are the established benchmarks for successful FYCC writing.

Beyond the concerns above, Perin and Lauterbauch (2016) represent a cross-section of composition research and the developmental practices represented in community colleges. Perin (2013), and other members of Columbia University's Community College Research Center, represent a growing trend of statistical mainstreaming predicated on the notion that developmental writing classes do not support student writing achievement (Bailey 2009; Bailey, Jeong, and Cho, 2010). Attewell, Lavin, Domina, and Levey (2006) are often credited with starting the statistical mainstreaming movement in community colleges that has been most readily represented by Bailey, Jaggars, and Jenkins (2013). The mainstreaming movement

inspired by Attewell et al. has influenced works that posit that college writing cannot be significantly improved, regardless of intervention.

Attewell et al. (2006), Bailey (2009), and Bailey et al. (2013) continue to influence, perhaps unwittingly, a cohort of researchers that tend to underemphasize the ability of students to improve their writing. For example, Oppenheimer et al. (2017, 21) performed a longitudinal study noting that students at four-year Rice University, regardless of major and gender, demonstrated only nominal writing improvements, increasing their performance scores ‘by about a half of a standard deviation’ over the course of their college study. The study further noted that, while students’ writing performance improved ‘on the whole,’ one third of the participants evinced no improvement, and almost 20% showed a decline (Oppenheimer et al. 2017, 22). The work of Oppenheimer et al. is still being vetted in the scholarly literature. Meanwhile, however, we must take care to view these studies and their results as evidence not that writing instruction cannot improve outcomes but that we must continue to research ways to improve instruction. Haswell (2000), for instance, found significant writing improvement in students between their freshman and junior years. Policies affecting writing instruction can dramatically impact students, especially at community colleges. They could, to take one example, dramatically impact aspiring LDs teachers whose writing abilities are profoundly connected to career entry due to exams like the EdTPA (An 2015; Singer, 2014). Progress toward such a career entry could also be affected by the influence of research critical of developmental writing practices. Bailey, Jaggars, and Scott-Clayton (2013), even while arguing that much of how remediation currently functions in higher education is ineffective, observed that Boatman and Long (2010) identified writing as the one area in which remediation improved grades in the first college-level course in the sequence and in which being placed in a lower-level remedial course produced positive

effects (although Bailey et al. [2013, 5, 9] also noted that Xu [forthcoming] found null effects). Bailey et al. (2013, 7) also cited Attewell et al. (2006) as showing a positive effect of passing writing remediation on community college graduation rates. We should view these researchers as demonstrating not the futility of college composition courses but an ‘ongoing need to examine multiple dimensions of writing’ in a way that accounts for ‘social and rhetorical situations, domain knowledge and conceptual strategies, knowledge of language use and conventions, and knowledge of writing process’ in order to ‘refine the analysis of outcomes in writing’ (Oppenheimer et al. 2017, 15).

### **Method**

Data analytic techniques rather than case studies were used to visualize data collected in possibly unexpected ways. As Lang and Baehr (2012, 179) observed, ‘Data mining can be inductive, and show relationships between seemingly unrelated data.’. Thus, quantitative analyses such as the one undertaken in our research will allow us to get a fuller picture of student practices regarding writing and learning about writing. Studies done in this way can also follow a ‘RAD (replicable, aggregable, and data-supported) approach’ (Lang and Baehr 2012, 176). Our analysis here and the approach that it represents allow for indefinite expansion of both individual data sets and the types of data sets included in the research. Gathering data in this way facilitates identifying and interpreting trends and associations within and across populations of students—a process that can in turn reinforce, synthesize, or challenge pedagogical and research assumptions in composition studies.

Investigating the relationships between completion of formative assessments, student engagement, and student learning outcomes via quantitative data revealed patterns and connections regarding student writing practices and outcomes that might otherwise go unnoticed.

It also provides a likely more objective, or at least complementary, picture of these writing and learning practices than does an ethnographic approach. Blackboard was used as the primary means of data collection because it included archived records gathered systematically for the amount and duration of user activity, as well as scores on formative assessments. It also allowed for instructional scores to be entered manually, and student writing and instructor feedback were preserved within the system.

### ***Research questions***

The specific pedagogical assumption that this study engages with is the effectiveness of online formative assessments in teaching composition. Because this project is in its very early stages, we focus here, for purposes of demonstration, on a small data set and a simple question: To what extent does student completion of online formative assessments correlate with the ability to produce critically sophisticated, college-level writing, as measured by rubrics evaluating critical reasoning and analysis, organization, and language use in students' writing?

In order to measure micro and meso levels of learning enactments, data for this research were gathered from a composition class that is part of the required core and the first in the nondevelopmental composition sequence. This class was selected both because of its focus on writing skills rather than content mastery and its substantial number of writing and revision assignments. Students, a portion of whom were nonnative speakers of English, entered the class with a wide range of analytical writing ability. The blended population included students enrolled in support programs for both high-achieving and academically disadvantaged students. The sample size at the beginning of the semester was 29 students, although not all of them completed the entire course.

The course was set up to quantitatively track as many aspects of the students' processes of writing and learning about writing as possible. Specifically, the course's integration of Blackboard was designed to generate a variety of data points. First, all student papers, drafts, and scaffolded assignments were submitted via the Turnitin module in Blackboard, and all instructor feedback on these submissions was provided within the same module. Second, students were required to complete 11 mobile-compatible quizzes in Blackboard that reviewed important grammar and composition concepts covered during class. These topics ranged from mechanical errors such as sentence fragments to more abstract skills and strategies like structuring paragraphs. Each quiz was paired with a link to a video, giving the opportunity for further reinforcement. Students were able to take each quiz an unlimited number of times. Finally, links were provided in Blackboard and in Turnitin comments to an ePortfolio site with written and video information arranged as a FAQ on the most common areas of student difficulty in grammar, composition, and documentation of sources. Because the majority of student work in the course—especially paper submission, feedback, and revision—was conducted electronically, the records of clicks and time spent viewing Blackboard content areas can be taken as a useful measure of engagement with coursework and specifically with formative assessments. Structuring the course in this way also creates the possibility for further study of formative assessments, papers, and feedback, because the data on and products of the students' work can be easily preserved electronically.

Three predictor variables and one criterion variable were operationalized from data analytics housed within Blackboard.

### *Microengagement*

Microengagement, the first predictor variable, was measured by activity (or clicks) within Blackboard content areas. In order to complete any formative or summative assessment (except timed, handwritten, in-class midterm, and final exam essays) or view instructor feedback on assessments, students needed to navigate within content areas.

### *Time on task*

Time on task was the second predictor variable and was measured by the average time in total hours spent by students per week on completing assessments and revisions.

### *Formative assessment*

The third predictor variable was formative assessment, measured by average student score on one category of online formative assessment: repeatable quizzes on grammar and composition concepts.

### *College writing achievement*

College writing achievement was the criterion variable, represented by student performance as measured by the student's class average. The class average was determined by all scores on rubrics for written assignments and online quizzes on writing skills and grammar concepts. Since 95% of the average derived from quizzes related to writing skills and from scaffolding, revision, and writing of essays, it is sufficiently representative of student demonstration of the writing-learning outcomes appropriate to an FYCC.<sup>2</sup>

Data for the four variables from a sample of 29 students enrolled in one section of a Composition and Rhetoric I class were retrieved from Blackboard, aggregated and organized, and imported into SPSS for correlation and regression analysis. Student data were collected via the Gradebook and Course Reports functions in Blackboard. All scores for formative and

summative assessments and attendance were recorded in Gradebook and converted to a spreadsheet. Course Reports for all user activity inside content areas, course activity overview, and overall summary of user activity provided data on student activity as measured in clicks within Blackboard content areas, time spent in content areas, and activity dates, times, and days of the week. Once harvested, data were organized in Microsoft Excel and imported into SPSS for analysis. Data were cleaned within SPSS and missing values were excluded for a final sample size of 29 student records.

## Results

All variables were found to be normally distributed based on visual inspection of histograms and Q-Q plots, including the assumption for homoscedasticity; assumptions for linearity were met by visual inspection of scatter plots. In addition, independence of errors was met via Durbin-Watson (1.96). Nonsignificant variables were excluded after a visual inspection of the tests noted above.

Results from Pearson correlation analysis indicated six significant relationships (see Table 1). Strong correlations were found between microengagement and time on task ( $r = .88$ ) and between microengagement and formative assessment ( $r = .79$ ); a moderate correlation was found between microengagement and college writing achievement ( $r = .68$ ); strong correlations were found between microengagement and formative assessment ( $r = .79$ ) and between time on task and formative assessment ( $r = .78$ ); and a moderate correlation was found between time on task and college writing achievement ( $r = .67$ ). All variables were carried into multiple regression analysis (see Table 3).

[Table 1 near here]

Multiple regression analysis was used to predict college writing achievement from microengagement, time on task, and formative assessment (see Table 3). One significant model (Table 2) emerged from multiple regression ( $p < .01$ ) whereby all three predictor variables—microengagement, time on task, and formative assessment—contributed to predict of 57% of college writing achievement.

[Table 2 near here]

[Table 3 near here]

### **Discussion and conclusion**

This research harvested Blackboard data to perform multivariate analysis on student microengagement related to college writing achievement. This work analyzed student completion of formative assessments and compared these metrics to students' abilities to produce college writing achievement. A Pearson correlation analysis highlighted six significant relationships between microengagement variables. The Pearson results, in total, underscore the significance of microengagement in its relationship to college writing achievement.

The moderate to strong correlations connote that there are significant relationships among the variables. In particular, microengagement is shown to be a predictive measure for college writing achievement. The strong correlations between microengagement and time on task and between microengagement and formative assessment scores suggest students who are engaged with the course material to a greater degree are more likely to spend the time appropriate to their needs and skill level to complete tasks such as formative assessments. This conclusion is supported by the strong correlation between time on task and formative assessment scores. The moderate correlation between time on task and college writing achievement implies that time

devoted to tasks does not in itself predict student outcomes; students who complete assessments more slowly do not necessarily complete them less well than speedier students. Because microengagement is strongly correlated with formative assessment scores, the moderate correlation between microengagements and college writing achievement can be interpreted as showing that the types of formative assessments used in this study (online, repeatable, tied to supplemental multimedia material for reinforcement) help students learn to write at the college level.

[discuss significant regression model and predictor equation]

Several of the limitations of the data in this study that must here be acknowledged. First is the small size of the sample population. Drawing firm conclusions from a single course presents the same problems as ethnographic or case-study approaches. However, despite the small size of the sample, an examination of these data still demonstrates the potential of our qualitative approach; its conclusions can be taken as suggestive rather than prescriptive, and it usefully points to avenues for further inquiry. The correlations may also be retested with a larger sample size to determine replicability of the results.

The second limitation is the possibility of inexactness in measuring student engagement by average number of hours per week logged into a Blackboard course. It is of course possible that students leave themselves logged in when they are not actively engaged with course materials or activities, but a few factors prevent this from measure from being invalid. First is that Blackboard will automatically log students out after a period of inactivity that varies by institution (generally two to four hours), limiting the effect of such occurrences on the average. Second is that potential inflation of this measure of engagement is counterbalanced to a degree by the fact that the easiest and most efficient way for students to interact with written feedback

on their assignments within the Turnitin module is to stay logged in through Blackboard, which makes it a significant measurement (even if not an irrefutably exact one) of engagement with one of most important points of student–teacher contact in teaching writing.

As we add data in the future, the increased sample size will reduce the significance of anomalies. As a final point, the data gathered so far do not seem to contain much suggestion of erroneous inflation of the time that students spend on course-related activities. According to the data gathered, most students fall into the recommended ranges for hours per week of engagement outside of class. It seems more likely that a seeming outlier, such as the student whose average was close to 30 hours per week, was struggling with the writing and revision processes, than that he or she was consistently logged in long enough every week to make the average (not total) hours per week so high.

Third is the fact that correlation, while significant, does not prove causation. The axes of cause and effect discussed here rest on interpretation of what the correlations may tell us about the relationships among the variables, which themselves exist within an extremely complex context. The conclusions that this study presents about one part of that nexus constitute first steps toward further qualitative work.

The statistically significant correlations discussed above provide quantitative support for the assertion that microengagements and completion of online formative assessments, which can be categorized as meso-level learning performances, contribute to improving LDs' learning outcomes. Much research in this area remains to be done. Oppenheimer et al. (2017, 23) highlighted the dearth of scholarship on students' writing contexts, process, and metacognition. By employing a data analysis approach to composition research, as the data set grows, one can rethink pedagogical approaches to writing on macro levels. Working to quantitatively identify

predictors of correlations and adding variables like feedback to the data set will begin to fill out the picture of the complex interrelationships among variables in teaching and learning college-level writing. Access to application programming interfaces of commercial learning platforms would significantly expand the data available to researchers. As the volume of data increases, the use of more sophisticated analytical tools can come into play, allowing for greater likelihood of inductive, replicable conclusions. Inferential analysis into the variables examined in this study is an important next step. Ultimately, pursuing such research will help to build effective instructional models and work to reduce the harmful social reproduction that often occurs in the college composition classroom.

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Table 1

*Pearson Correlation: Microengagement, Formative Assessment, and College Writing*

*Achievement*

Variable	P1	P2	P3	C
P1. Microengagement	–	.88*	.79*	.68*
P2. Time on task		–	.78*	.67*
P3. Formative assessment			–	.74*
C. College writing achievement				–

*Note.*  $N = 29$ .

\* $p < .01$ .

Table 2

*SPSS Model Summary*

Model	$R$	$R^2$	Adjusted $R^2$	Std. error	Change Statistics				Durbin- Watson	
					$R^2$ change	$F$ change	$df1$	$df2$		Sig. $F$ change
1	.757 <sup>a</sup>	0.573	0.522	18.97062	0.573	11.193	3	25	0.000	1.939

a. Predictors: (Constant), P1, Microengagement, P2, Time on Task, P3, Formative Assessment

b. Dependent variable: college writing achievement

The predictor equation reads as,  $\hat{Y} = a + b_1X_1 + b_2 + X_2$ .

In our example, the predictor equation is,

$$\hat{Y} = 28.62 + .08(\text{College Writing Achievement}) + .264 + 7.73.$$

Table 3

*Predictors of College Writing Achievement*

Variable	$\beta$	<i>SE</i>	<i>t</i>
P1. Microengagement	.18	.13	.61
P2. Time on task	.12	.64	.41
P3. Formative assessment	.51	3.43	2.26
$R^2$	.57*		
$F$	.00*		

*Note.*  $N = 29$ .

\* $p < .01$ .

## Endnotes

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<sup>1</sup> Latino/a is a politically contested term since its root word is Latin. Latino/a can thereby be viewed as rooting identity markers in colonialism. Mexicano/as, Chicano/as, and other Central and South American Spanish speakers strongly contest this phrasing. We knowingly use these contested terms, while understanding their complexity. We follow the simpler, but not necessarily better, rubric highlighted in our citation.

<sup>2</sup> The remaining 5% of the average derived from class attendance, itself arguably a measure of student engagement.