

International Journal of **Education Research**

VOLUME 18 NUMBER 1 WINTER 2023

Contents

- Teaching Ethics in Business Education and Finance: Challenges and Concerns** 1
Mark Farley and Lajuan Davis
- Using Writing Support Software to Improve Student Composition Outcomes: Empirical Study** 16
Kelly Fish, Melodie Philhours, and Paula Ruby
- An Exploratory Investigation of Teaching Styles and Student Motivational Orientations:
Insights From India** 32
Suresh Gopalan, Moula Cherikh, Susita Asree Carroll, and Mak Khojasteh
- An Investigation of Adverse Impact in State -Level Six- Year College Graduation Rates from
2002 to 2018 for Black And Hispanic Students** 52
Charles J. Hobson, Andrea E.C. Griffin, John M. Novak, Jana Szostek, and Mary Beth Mitchell
- Student Reactions to Academic Dishonesty: A Qualitative Analysis of Five Stages of Grief and
Suggested Strategies** 66
Stanley W. Self, Tonjua McCullough, Cathy Hochanadel, Kristen Swisher, and Aaron Hochanadel



USING WRITING SUPPORT SOFTWARE TO IMPROVE STUDENT COMPOSITION OUTCOMES: EMPIRICAL STUDY

Kelly Fish
Melodie Philhours
Paula Ruby
Arkansas State University

ABSTRACT

To explore the improvement of student writing skills, the authors of this study employ a writing support software, CorrectEnglish (now known as IntelliWriter), in various classes during two consecutive semesters in a university setting. Some students use the software to assist them in writing while others choose not to use it; student essay scores provide comparisons across the groups. The findings show students using the software improved their writing skills while the students who did not use the software showed no improvement. The authors conclude that this writing support software is effective in helping students author essays.

Keywords: Writing support software, student writing, CorrectEnglish, AB experimental design

INTRODUCTION

The labor market demand for fundamental skills, including writing, is on the rise, even in the technology-driven era. Writing is ranked in the *top ten skills* in demand growth within occupations (Kochhar, 2020), and it is one of the best ways to remain consistently employable in any profession (Solomon, 2018). Employees spend about a third of their time reading and writing emails, communicating in writing messages ranging from quick reminders to complex status reports and to persuasive storytelling. Even in highly analytical data-driven occupations, the ability to not only find meaning in complex data sets, but to communicate these findings meaningfully to the intended audience is a highly sought after skill in marketing, finance, accounting, information systems, and all areas of business transactional, form” (Brandt, 2005) and nowhere is this more evident than in these areas (Duxbury & Lanctot, 2016).

The growth of Omni channel marketing, shoppable social media, influence marketing, and all real and yet-to-be-imagined communication and commerce vehicles calls for clear, concise, cogent, and persuasive *writing skills*. Indeed, writers put knowledge in tangible, and thereby transactional, form (Brandt, 2005) and nowhere is this more evident than in these areas (Duxbury & Lanctot, 2016).

Business students need to be able to communicate effectively in writing. Most AACSB (Association to Advance Collegiate Schools of Business) accredited business schools include written communication as a student learning outcome and as such map the inclusion of writing in courses throughout the curriculum. Assessment of student writing skills frequently reveals a gap between desired and actual skill that is difficult to bridge. The ubiquitous pressures of large class sizes, fewer faculty, and the post-pandemic modalities of traditional, online, and hybrid course offerings facing higher education today make teaching and coaching writing, or indeed simply grading essays and papers, a significant challenge. The National Commission on Writing opined that the motto, students learn to write by writing more, is not quite right; but practice makes

permanent is correct. Schools with students who do well write every day and are provided with timely and regular, positive feedback may very well be the key to quality writing (2003). The ubiquitous pressures of large class sizes, fewer faculty, and the post-pandemic modalities of traditional, online, and hybrid course offerings facing higher education today make teaching and coaching writing, or indeed simply grading essays and papers, a significant challenge (note to editor, this is a well-known fact, it needs no citation).

Given this historical, current, and growing need for writing skills in the labor market, the current situation in higher education, and the pedagogical efficacy of frequent, timely, and positive feedback, technology presented a possible solution. Artificial intelligence (AI) tools have become an affordable means of providing immediate feedback for writers and, in doing so, offers scalable augmentation to professor response. CorrectEnglish is an artificial intelligence tool that evaluates written documents and coaches' writers in areas of weakness to include not only the mechanics of grammar, spelling, and punctuation, but also writing style and organization (Reference). While there are a number of both free and paid versions of writing support software, we evaluate the use of CorrectEnglish by Vantage Learning in this study.

BACKGROUND OF THIS STUDY

This study was conducted in response to business school assessment data collected in compliance with AACSB and Higher Learning Commission (HLC) standards. In repeated college-wide assessments of writing skill among graduating business students, performance lagged in mechanics, such as word usage, sentence structure, spelling, punctuation, and capitalization. Weakness was also noted in style, like overuse of simple sentences, slang, wordiness, lack of variety of vocabulary, awkwardness, and organizational issues such as logical sequencing, paragraphs, and headings. Business students had been directed to the university writing center for a decade (note to editor, this is our experience for a decade, it needs no citation).

For almost as long, the business school had an embedded writing tutor available to business students. Significant resources and promotional efforts were deployed to encourage faculty to prescribe and students to use these tutoring services with little college-wide change. Couple these somewhat lackluster results with more online classes, larger sections, and fewer faculty, a scalable solution had to be identified that would allow faculty to assign more writing without the very significant burden of providing feedback on grammar and writing issues. The authors wanted to explore if CorrectEnglish offered such feedback.

The CorrectEnglish feedback on essay organization' structure, style, focus and content are provided by an embedded system based on the IntelliMetric scoring engine. As a result, our literature review begins with discussion of automated essay scoring. Project Essay Grade (PEG) was the first automated scoring (AS) system developed in the 1960s (Page, 1968, as cited Cahill & Evanini, 2020). In the 1980s Educational Testing Service (ETS) criterion, writer's work bench, and write-to-learn were developed to provide intermediate feedback for students' writing. Additionally in the 1980s student graders such as grammar, revision assistant, feedback studio and writing mentor, which is a Google Doc's add-on became available (Burstein et al., 2018).

AS capacity and acceptance became widely developed when computing resources became readily available in the 1990s. AS is currently being used in K-12 standardized tests, in higher education classrooms, on the Graduate Management Admission Test (GMAT), Test of English as a Foreign Language (TOEFL), Graduate Record Exam (GRE), and for professional certifications. Specific to higher education, ETS' TOEFL and GRE tests use automated scoring of essays with

an AS engine, e-rater, with a human scorer. e-rater computes the independent features of writing conventions, discourse structure, and vocabulary (Yan, Rupp, & Foltz, 2020, p. 81). e-rater also computes the task-dependent features of argumentation, narrative quality, and use of source materials (Cahill & Evanini, 2020). For an in-depth review of the literature in this field the reader is referred to Zupanc and Bosnic (2015) or Cahill and Evanini (2020). As the AS engine used by Correct English, the authors expand upon the development and specific features of IntelliMetric in the following section.

INTELLIMETRIC SCORING

Development of IntelliMetric by Vantage Learning as a scoring engine began in the 1980s (Mikulas & Kern, 2006). Since 1998, it has been used to successfully score open-ended essay type questions. IntelliMetric copies many processes human scorers perform when assessing writing. It can “analyze more than 300 semantic, syntactic, and discourse level features.” (Shermis, Burstein, & Bursky, 2013). This scoring engine is a “brain-based” or “mind-based” model which means its goal is to identify features of higher scored essays and copy the results of human raters. Naturally, the IntelliMetric engine has to be trained with previously scored responses from human raters. These train the system to learn the system (Schultz, 2013). The IntelliMetric scoring rubric is based on the following:

- **Focus and Meaning**
The extent to which the response establishes and maintains a central or controlling idea, an understanding of purpose and audience, and completion of the task.
- **Content and Development**
The extent to which the response develops ideas fully and artfully using extensive, specific, accurate, and relevant details (facts, examples, anecdotes, details, opinions, statistics, reasons, and/or explanations).
- **Organization**
The extent to which the response demonstrates a unified structure, direction, and unity, paragraphing, and transitional devices.
- **Language use, voice and style**
The extent to which response demonstrates an awareness of audience and purpose through effective sentence structure, sentence variety, and word choice that create tone and voice.
- **Mechanics and Conventions**
The extent the response demonstrates control of conventions, including paragraphing, grammar, punctuation, and spelling (Schultz, 2013).

Four key principles guide IntelliMetric:

- It is modeled on the human brain and its ability to synthesize discrete information.
- It is a learning engine and learns by evaluating writing based on examples that have been scored by expert scorers.
- It is inductive. It makes judgments inductively rather than deductively. This means rule-governed protocols are not followed.
- It uses multiple judgments based on multiple mathematical models (Schultz, 2013).

IntelliMetric works because thousands of models have been developed and validated. The grades are at accuracy levels or better than expert humans (Mikulas & Kern, 2006). In January of 2006 the Graduate Management Admission Council (GMAC) tested IntelliMetric to see if it could replace the e-rater scoring engine currently used. Their findings include the following:

1. IntelliMetric produced superior perfect and adjacent agreement statistics for GMAT essays.
2. IntelliMetric was able to identify “copied” essays.
3. IntelliMetric is far superior to simple word counts or simple probability modeling.
4. Very few essays would need to be adjudicated if IntelliMetric were to be used to verify human ratings (Rudner et al., 2005).

The salient difference between CorrectEnglish and other writing assistance software such as Grammarly and the review features in Word is the embedding of the IntelliMetric engine into the software. While all of these software packages help with grammar, punctuation, spelling, word choice, potential for plagiarism, word count and reading level; only CorrectEnglish offers feedback on the underlying structure of the essay i.e., focus, meaning, content and development, as well as organization. In addition, CorrectEnglish lends itself to a cloud-based writing lab approach as it provides for professor-student interaction and feedback via sharing. It also supports feedback and provides writing environments in nine languages.

While the functional features of CorrectEnglish and the IntelliMetric essay scoring package were appropriate for our needs, the attractive price made these tools a low-risk financial investment. CorrectEnglish is 5 USD per student per 12-month period (unlimited use) with an additional charge of 2 USD for the IntelliMetric essay scoring package used for this study. Our university paid these costs for this pilot program and research.

THE CONDUCTED STUDY

Procedure

The study took place over the “fall and spring semesters” of the 2020-21 academic year at a regional university in the midsouth of the USA. The 200 students involved took a survey of management information systems (MIS) class in the business school. Assignments requiring a major writing component constituted 80% of each student’s final grade – two essay exams at 25% each, a term paper at 25%, and two developmental essays at 2.5% each. During both semesters the classes were taught online due to COVID-19 restrictions. All sections of the classes were taught in an identical fashion for *both fall and spring semesters* as in all assignments, grading weights, time frames, lectures, and class meetings remained the same for both semesters.

The *two developmental essays* were scored using IntelliMetric with the other assignments being professor-graded. Students were required to deal with MIS concepts in the essay exams and term papers but not in the developmental essays. Since the developmental essay scores dealt inherently with just writing composition and not MIS concepts, they provided results that did not come with a student’s understanding of MIS fundamentals. With the essay exams, students could write a well-developed essay but if they could not explain certain MIS concepts then they would not score well. This was not the case with the developmental essays as they required students to write based on personal experiences and/or opinions. Both developmental essay prompts are shown in Table 1.

Table 1
Developmental Essay Prompts

Developmental Essay 1

Before success comes in any man's life, he is sure to meet with much temporary defeat and, perhaps, some failures. When defeat overtakes a man, the easiest and most logical thing to do is to quit. That is exactly what the majority of men do." -Napoleon Hill

Many successful men and women would agree with this quote from Napoleon Hill. Those who become successful are not in the majority who quit when defeat "overtakes" them.

In a well-developed essay, relate the importance of not quitting when facing challenges as illustrated by the life of someone successful, and as experienced in your own life. Include details from both lives to support your discussion.

As you write, remember your essay will be scored based on how well you:

- develop a multi-paragraph response to the assigned topic that clearly communicates your thesis/controlling idea to the audience;
- support your thesis/controlling idea with meaningful examples, reasons, and/or information;
- organize your essay in a clear and logical manner, including an introduction, body, and conclusion;
- use transitional strategies to connect your ideas, sentences, and paragraphs;
- use well-structured sentences and appropriate language for your audience;
- edit your work to conform to the conventions of standard American English.

Developmental Essay 2

"Technology and the changes it brings can have a very big effect on our lives. Which technological change has had the largest effect on life in this country? Why?"

Write an essay explaining the technology you have chosen and how it has affected our lives.

Remember, your essay will be scored based on how well you:

- develop a multi-paragraph response to the assigned topic that clearly communicates your thesis/controlling idea to the audience;
- support your thesis/controlling idea with meaningful examples, reasons, and/or information;
- organize your essay in a clear and logical manner, including an introduction, body, and conclusion;
- use transitional strategies to connect your ideas, sentences, and paragraphs;
- use well-structured sentences and appropriate language for your audience;
- edit your work to conform to the conventions of standard American English.

Source: Vantage Learning / McCann Associates 2018

The authors used an AB experimental design as shown in Table 2. After all students completed Developmental Essay 1 (DE1), we allowed the students to self-select whether or not to use CorrectEnglish rather than randomly assigning them to groups as these assignments impacted

their class grade. Developmental Essay 1 becomes observation 1 and Developmental Essay 2 (DE2) became observation 2. The use of CorrectEnglish during the semester is the treatment.

Table 2
AB Experimental Design for the Study

Group A:	Observation A ₁		Observation A ₂
Group B:	Observation B ₁	Treatment	Observation B ₂

Users (Group B, the treatment group) are operationally defined as students who used Correct English on three writing assignments during the semester. Confirmation of usage was established by examination of user logs for correct English as it was cloud-based and required online login. Non-Users (Group A, the control group) are students who are not qualified as Users.

Developmental Essay 1 (DE1) occurred during the fifth week of the semester before the students were introduced and had access to CorrectEnglish. Therefore, no students used the software on DE1 which provided a baseline for comparison of writing skills. During the eighth week students were provided introductory material and instruction on CorrectEnglish. Subsequently, students had the opportunity to use the software on both essay exams, term paper, outside class assignments and Developmental Essay 2 (DE2) that took place near the end of the semester during the fourteenth week.

This research was approved by the University Institutional Review Board, FY20-21-70. All investigators in this study completed required training and certification through CitiProgram.org including the following courses required by the University Institutional Review Board (IRB): Social and Behavioral Research Course–Stage 1 and Social and Behavioral Responsible Conduct of Research–Stage 2. The student participants were provided IRB Consent forms. Students were not required to participate in the study and could end participation without penalty.

CORRECTENGLISH ENVIRONMENT AND ESSAY SCORING

CorrectEnglish is a cloud-based software-as-a-service model; once users login they are taken to an environment that has many similarities to Microsoft Word. Within CorrectEnglish, users work online after beginning a document or importing one. There are various tools to the right of the work palette beginning with a grammar check, tool for professor comments, a sharing feature for group work and an essay feedback feature that uses the IntelliMetric scoring technology. For a demo of the software, readers are referred to its YouTube video (<https://www.youtube.com/watch?v=gjalEujwX50&t=51s>).

In the developmental essays, students download their finished writing as a Word document from CorrectEnglish and upload it to another online site where it is scored using IntelliMetric. To score well students are required to use both the grammar and style module as well as the essay feedback module covering organization, style, focus, content and overall development. The IntelliMetric scoring engine has no way of knowing whether a student used CorrectEnglish, it is simply scoring an essay in a Word document.

Essay scoring was based on the rubric shown in Table 3-- Appendix 1. Students had access to the scoring rubric in advance of the essays and they received a score from 1 to 6 on each of the rubric's five constructs plus an overall score between 1 and 6. Therefore, a perfect score was 36

and each student's summed score out of 36 was converted to a 100-point scale for grading purposes.

THE RESULTS OF THIS STUDY

The results for both semesters' developmental essays are shown on Table 4. Only students who completed both essays were included as some students dropped the class subsequent to the first essay (DE1). Overall Class Average for each student is their final class average including all class assignments – developmental essays, essay exams, term paper, and online assignments.

Table 4
User and Non-User Averages

	Fall 2020		Spring 2021	
	Users Group B N = 51	Non-Users Group A N = 19	Users Group B N = 36	Non-Users Group A N = 18
DE 1	82.76	85.68	85.78	90.12
DE 2	90.03	85.08	90.55	87.96
Overall Class Average	85.68	84.67	85.72	83.06

For Fall 2020 data, we used a paired two-sample test to determine if the user's DE2 mean ($M = 90.03$) was larger than the DE1 mean ($M = 82.76$). The reported difference in means was found to be statistically significant ($p = 0.01$). We conclude that the mean improved almost by nine percent (8.8%; $M_s = 7.27/82.76$) for Users at 99% confidence level. The authors also wanted to discern if non-users scored higher on DE1 compared to DE2. The authors again used a paired two-sample test to determine if the DE1 mean ($M = 85.68$) is larger than the DE2 mean ($M = 85.08$). The reported difference in means was not found to be statistically significant ($p = 0.43$). The authors concluded that there was no evidence of change for this group. Additionally, to determine if one group had better baseline writing skills than the other, we used a two-independent sample t-test to assess if the non-users mean ($M = 85.68$) was larger than the User mean ($M = 82.76$) on DE1. The difference was not found to be statistically significant ($p = .19$) and we concluded that baseline writing skills for the groups are equivalent.

After using the software for two-thirds of a semester, to know if the users outperform the non-users, the authors again use a two independent sample t-test to check if the User mean ($M = 90.03$) is larger than the Non-User mean ($M = 85.08$) on DE2. The difference was found to be statistically significant ($p = .056$) and we concluded that Users outperformed Non-Users at 94% confidence level. To determine if any differences between Users and Non-Users groups could be attributable to overall scholastic achievement in the class, we used a two independent sample t-test to determine if Users Overall Class Average ($M = 85.68$) is larger than Non-Users - Overall Class

Average ($M = 84.67$). The difference was not found to be statistically significant ($p = .32$) and we could not conclude that any group outperformed the other on class scholastic achievement.

The authors used the same test hypotheses for the spring semester data with the following results:

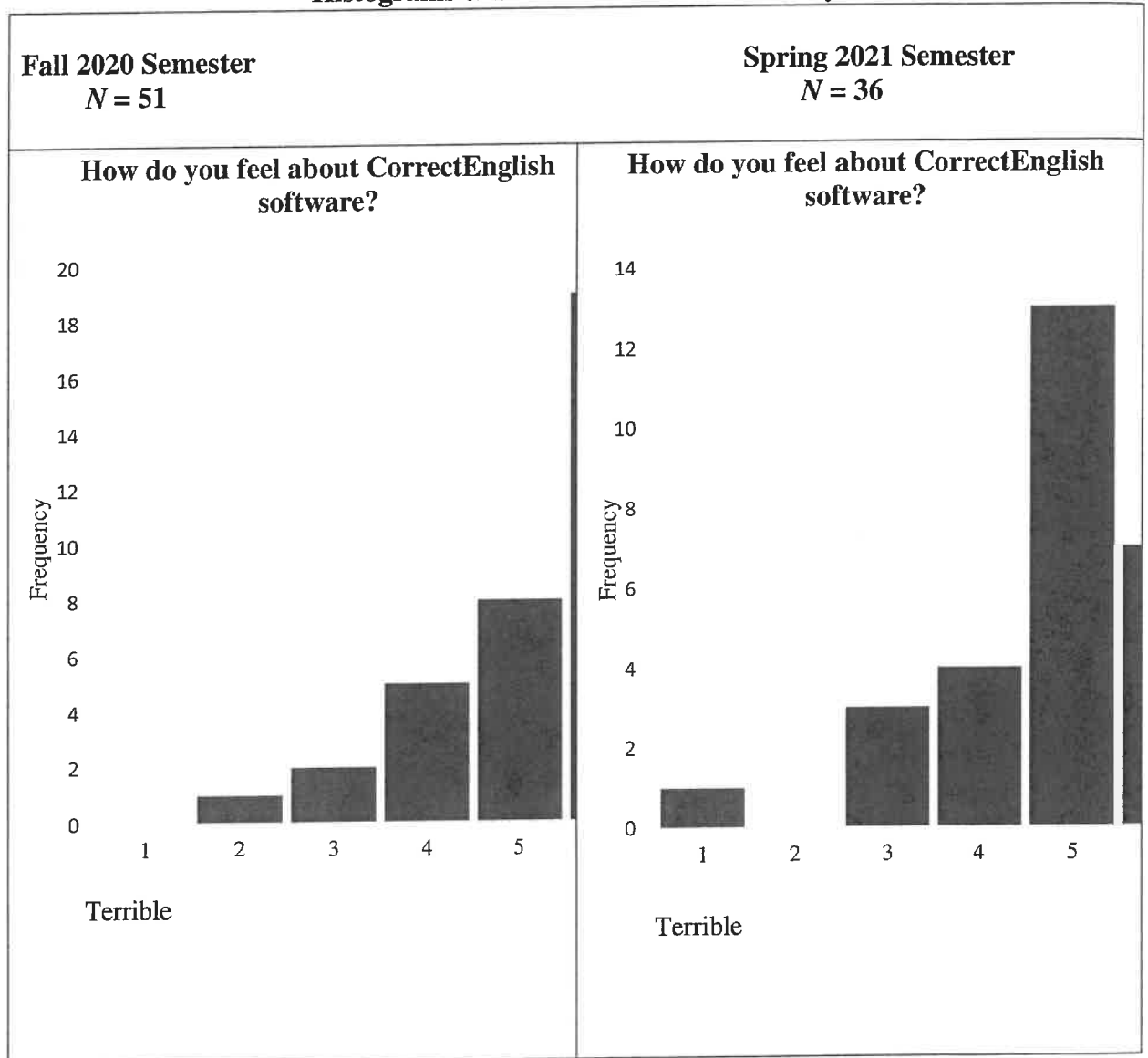
1. Paired two sample for means for Users – DE2 mean ($M = 90.55$) is larger than DE1 mean ($M = 85.77$) is found to be statistically significant ($p = 0.01$). We concluded that mean improved by over five percent (5.7%; $Ms. = 4.77/85.78$) for Users at 99% confidence level.
2. Paired two sample for means of Non-Users – DE1 mean ($M = 90.12$) is larger than DE2 ($M = 87.96$) is not found to be statistically significant ($p = 0.14$). We could not conclude any change in mean scores for Non-Users.
3. Two independent sample t-test – test if non-users mean ($M = 90.12$) is larger than Users mean ($M = 85.78$) on DE1 was found to be statistically significant ($p = .04$). We concluded that Non-Users had better baseline writing skills than Users as they outperformed Users on DE1 at 96% confidence level.
4. Two independent sample t-test – test if users mean ($M = 90.55$) is larger than Non-Users mean ($M = 87.96$) on DE2 was not found to be statistically significant ($p = .20$). We could not conclude that any group outperformed the other on DE2.
5. Two independent sample t-test – test if Users Overall Class Average ($M = 85.72$) is larger than non-users overall class average (83.06) was not found to be statistically significant ($p = .13$). We could not conclude that any group outperformed the other on Overall Class Average.

STUDENT SATISFACTION SURVEY

Because the authors are considering the use of Correct English across the core business curriculum, we are interested in learning student satisfaction with the software. In both semesters the users provided feedback using an online survey instrument based on the work of Westbrook (1980) in which the author finds empirical support for Andrews and Withey's (1976) single item Delighted-Terrible (D-T) scale. Additionally, we converted two items that had previously shown convergent validity with D-T scale in measuring satisfaction of a product or service (Westbrook 1980) resulting in a three item, seven-point Likert-like scale.

Histograms of each survey item for the respective semesters are shown in Figure 1. The "three-item scale" demonstrated excellent reliability. Using the same measure, the results of Fall 2020 revealed a Cronbach's alpha of 0.923 while Spring 2021 resulted in a Cronbach's alpha of 0.940.

Figure 1
Histograms of Student Satisfaction Survey



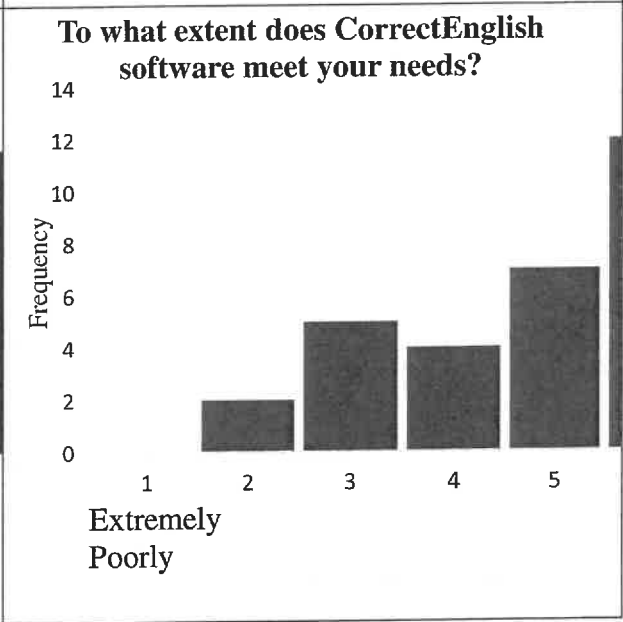
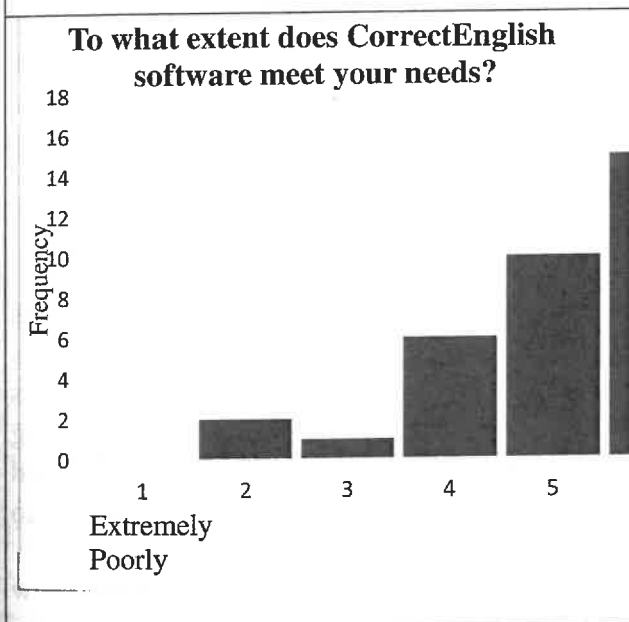
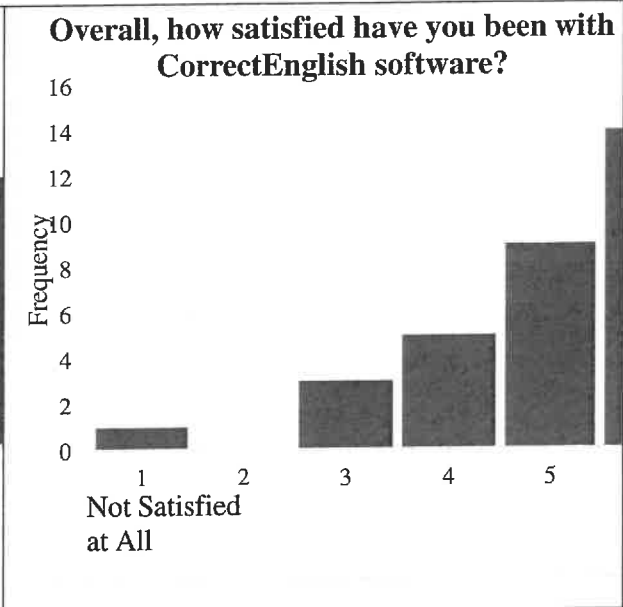
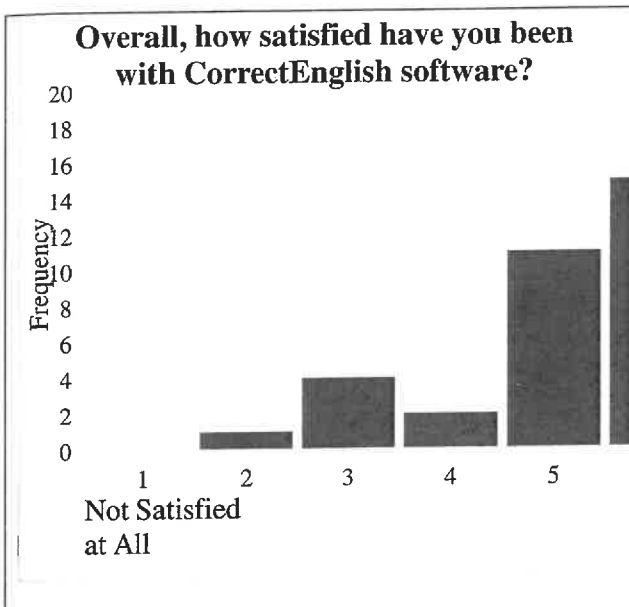


Table 5 shows the respective means for each scale item across both semesters. The subsequent t-tests show that the groups differ in satisfaction ratings. Although both groups show good levels of satisfaction with the software, the fall semester students are slightly more favorable in their ratings. The fall semester students also show higher agreement in their ratings as evidenced by an overall lower variance in scores than the spring semester students.

Table 5
User Satisfaction Survey Results

	<u>Fall 2020</u>	<u>Spring 2021</u>	<u>Sample t-tests</u>
	N = 51	N = 36	P(T<=t) one-tail
How do you feel about <i>CorrectEnglish</i> software?	$\bar{x} = 5.76$ $\sigma^2 = 1.50$	$\bar{x} = 5.25$ $\sigma^2 = 1.96$.04
Overall, how satisfied have you been with <i>CorrectEnglish</i> software?	$\bar{x} = 5.74$ $\sigma^2 = 1.71$	$\bar{x} = 5.19$ $\sigma^2 = 1.76$.03
To what extent does <i>CorrectEnglish</i> software meet your needs?	$\bar{x} = 5.68$ $\sigma^2 = 1.73$	$\bar{x} = 5.11$ $\sigma^2 = 2.21$.03

CONCLUSION

The two independent semester field studies yield results that appear promising for this approach to improving student writing. During the fall semester, the Users and Non-Users groups began with equivalent writing skills based on DE1 results. By the end of the semester the Users scored higher on DE2 than the Non-Users. Additionally, the Users improved their writing performance by almost nine percent (8.8%) from DE1 to DE2 while the Non-Users remained unchanged. There was no evidence that this improvement in performance can be attributed to differences in scholastic achievement.

During the spring semester the results were slightly different, yet they still show improvement by students who used *CorrectEnglish* software. Here the Non-Users have a higher baseline set of writing skills than the students who became Users. This is evidenced by DE1 Non-Users average (90.12) versus Users (85.78). Yet by end of the semester, the User students appear to have caught-up with the Non-User students as there was no statistically significant difference in DE2 performance. During the semester the Users performance improved by over five percent (5.7%) while the Non-Users performance does not change. This improvement cannot be attributed to higher scholastic improvement by the Users.

The performance improvement by the Users is likely attributable to the feedback that they received on the underlying structure of their essays. Non-Users had access to grammar and spell checking provided by Word or Grammarly, but they did not have access to *CorrectEnglish*'s feedback regarding style, organization, focus, content and overall development. That feedback mechanism functions with a similar philosophy as a human writing center tutor – it tells the student what is lacking and provides ideas on how to correct it, but it does not rewrite the paper for the

student. It is up to the student to rewrite along the given guidelines and ideas provided by CorrectEnglish. It is this iterative process of reworking and receiving feedback that results in the student developing a fundamentally sound essay.

The students who used the AI software appear to be favorably disposed towards it given the results of the satisfaction survey. There appears to be strong agreement that most liked it as they skewed toward the Delighted end of the scale. Additionally, the classes skewed toward the Completely Satisfied end, and most felt that it met their needs evidenced by skewing towards the Extremely Well end of the scale.

RECOMMENDATION FOR FUTURE RESEARCH

Given the positive results of this pilot study, the use of CorrectEnglish was deployed in key core courses in the business school curriculum. A follow-up assessment could be conducted to determine the overall effectiveness of CorrectEnglish in improving student writing over time. Future research could include assessment data comparisons with and without CorrectEnglish use as well as indirect assessment of student perception of learning based on the use of CorrectEnglish. In addition, future research could focus on the efficacy of the various language environments, particularly for students writing in a second language (e.g., native Spanish speakers are required to write essays in English).

REFERENCES

- Andrews, F. M., & Withey S.B. (1976). *Social Indicators of Well-Being*. New York: Plenum.
- Brandt D. (2005). Writing for a Living: Literacy and the Knowledge Economy. *Written Communication*, 22(2), pp.166-197. Retrieved from:
<https://doi:10.1177/0741088305275218>
- Burstein, J., Elliot, N., Beigman Klebanov, B., Madnani, N., Napolitano, D., Schwartz, M., Houghton, P., & Molloy, H. (2018). Writing Mentor: Writing Progress Using Self-Regulated Writing Support. *Journal of Writing Analytics*, 2, 285-313.
- Cahill, A., & Evanini, K. (2020). Natural Language Processing for Writing and Speaking. In D. Yan, A. A. Rupp & P. W. Foltz (Eds.), *Handbook of Automated Scoring: Theory Into Practice*. (pp.69-92). CRC Press.
- Duxbury, A., & Lanctot, A. (2017, April 20). *Carleton Study Finds People Spending a Third of Job Time on Email*. Carleton Newsroom. Retrieved from:
<https://newsroom.carleton.ca/archives/2017/04/20/carleton-study-finds-people-spending-third-job-time-email/>
- Kochhar, R. (2020, January 30). *In a Technology-Driven Era, Social and Fundamental Skills Still Reign Supreme Within Occupations*. Pew Research Center. Retrieved from:
<https://www.pewresearch.org/social-trends/2020/01/30/in-a-technology-driven-era-social-and-fundamental-skills-still-reign-supreme-within-occupations/>
- Mikulas, C., & Kern, K. (2006, April). *A Comparison of the Accuracy of Automated Essay Scoring Using Prompt-Specific and Prompt-Independent Training* [Conference presentation]. The American Educational Research Association Annual Meeting, San Francisco, CA, United States.
- National Commission on Writing in America's Schools, and Colleges. (2003, April). *The Neglected "R": The Need for a Writing Revolution*. Retrieved from:
https://archive.nwp.org/cs/public/download/nwp_file/21478/the-neglected-r-college-board-nwp-report.pdf?x-r=pcfile_d
- Rudner, L. M., Garcia, V., & Welch, C. (2005, October 26). *An Evaluation of IntelliMetric Essay Scoring System Using Responses to GMAT® AWA Prompts*. GMAC Research Reports, RR-05-0. Retrieved from:
https://www.gmac.com/~media/Files/gmac/Research/research-report-series/RR0508_IntelliMetricAWA.pdf
- Schultz, M. T. (2013). The IntelliMetric Automated Essay Scoring Engine – A Review and an Application to Chinese Essay Scoring. In M. D. Shermis & J. Burstein (Eds.) *Handbook of Automated Essay Evaluation: Current Applications and New Directions*, 89-98, Routledge.

Solomon, G. (2018, August 9). *Why Mastering Writing Skills can help future-proof your career*. Forbes. Retrieved from: <https://www.forbes.com/sites/gretasolomon/2018/08/09/why-mastering-writing-skills-can-help-future-proof-your-career/?sh=79926b805831>

Vantage Learning. (2018). My Access! Efficacy Report. Yardley, PA.

Westbrook, R. A. (1980). A Rating Scale for Measuring Product/Service Satisfaction. *Journal of Marketing*, 44(4), 68-72.

Yan, D., Rupp A., & Foltz, P., Eds. (2020). *Handbook of Automated Scoring: Theory Into Practice*. (pp.69-92). CRC Press.

Zupanc, K., & Bosnic, Z. (2015). Advances in the Field of Automated Essay Evaluation. *Informatica*, 39(4), 383-395.

About the Authors:

Kelly E. Fish is Professor of Information Systems & Business Analytics at Arkansas State University. The research interests of Dr. Fish are in applications of artificial intelligence, exporting and, global leadership.

Melodie Philhours is Associate Professor of Marketing at Arkansas State University. The research interests of Dr. Philhours are in advertising, non-profit marketing and assessment of learning.

Paula D. Ruby is Professor of Information Systems & Business Analytics at Arkansas State University. The research interests of Dr. Ruby are in learning styles, note taking skills and, learning transfer.