Effect of Student Readiness on Student Success in Online Courses

Leah A. Geiger, Daphne Morris, and Susan L. Subocz

College of Southern Maryland

Author Note

Leah A. Geiger, Distance Learning and Faculty Development Division, College of Southern Maryland; Daphne A. Morris, Business and Technology Division, College of Southern Maryland; and, Susan L. Subocz, Division of Academic Affairs.

Correspondence concerning this article should be addressed to Leah A. Geiger, Distance Learning and Faculty Development Division, P.O. Box 910, College of Southern Maryland, La Plata, MD 20646-0910. Email: LeahG@csmd.edu

Abstract

This research determined the effect of student readiness on student success in online courses.
The team hypothesized that student success in well-designed courses (those that meet the Quality
Matters standards) and that are taught by engaged faculty are most influenced by student
readiness factors including individual attributes (such as motivation), life factors,
comprehension, general knowledge, reading rate and recall, and typing speed and accuracy. A
goal of the study was to determine which of these factors correlated most closely to student
success. Through thorough research, other factors were eliminated that play a role in student
success - most notably the course design, the learning management system, and the level of
faculty engagement. This study constrained these latter-mentioned variables to allow for a closer
study of student readiness. This was achieved by controlling for the course design will be
considered high quality, as only courses which meet QM standards were utilized, the learning
management system being employed is industry-standard and is well-proven; finally, the faculty
participating in the study have a proven track record of student engagement, are highly trained in
the LMS, QM process (Master Reviewer level) and instructional design, and agree to abide by
certain "engagement standards" throughout the study.

Effect of Student Readiness on Student Success in Online Courses

This research stemmed from a recommendation in the study conducted by Jurgen Hilke (2010) for Maryland Online. He inquired why students withdraw from online classes. From his finding, he counseled that further investigation was needed into "an analysis of variables for inclusion into a potential regression model to predict online course retention" (Hilke, 2010, p. 9). This was followed by the suggestion that an area worthy of intervention would be in student orientation to distance learning (Hilke, 2010, p. 9). This research tapped this analysis of variables.

Additionally, the research described is an extension of the previous research conducted at Argosy University specifically for the SmarterMeasure instrument (SmarterServices, 2011). Argosy employed the SmarterMeasure data, comparing it to indicators of student readiness. Technical competency, motivation, availability of time, and retention were areas found to have statistical significance in student readiness (SmarterServices, 2011). Our research complimented that of Argosy; however, we collected data from courses that meet QM standards (defined as a well-designed class) that were taught by engaged faculty with a proven track record of student engagement, are highly trained in the LMS and instructional design, and agreed to abide by certain "engagement standards" throughout the study

Our findings offer direction for student remediation in order to better prepare students for online learning and enhance student success, while noting course design recommendations to enhance the quality of online learning andragogy and practice. The College of Southern Maryland (CSM) is committed to strengthening quality assurance provided to students, faculty, and the community in our efforts towards online education excellence, with specific focus on continuing to design and update our online courses to meet Quality Matters standards.

Method

Participants

We conducted this research for a Quality Matters grant studying different variables that are influenced by the QM rubric and the peer review process, as QM encourages the improvement of online learning. In this study, the QM rubric affected the control portion of the research.

CSM is a regionally accredited community college located in the mid-Atlantic, serving three counties of mixed social and economic classes. The data collected in this study occurred in 11 classes with a total of 200 students over the period of two semesters.

Materials and Procedure

Students were required to take the SmarterMeasure™ learning readiness indicator (SmarterMeasure) before beginning the substantive course work. This is a web-based tool, which assesses a learner's likelihood for succeeding in an online and/or technology rich learning program. SmarterMeasure indicates the degree to which an individual student possesses attributes, skills, and knowledge that contribute to academic success.[1]

SmarterMeasure data for six indicators was aggregated based on a percentage scale of 0% to 100%. The six indicators include On-screen Reading Rate and Recall; Typing Speed and Accuracy; Life Factors; Technical Knowledge; Reading Comprehension; and, Individual Attributes (including motivation, procrastination, willingness to ask for help). The final grades earned for the selected CSM courses was aggregated and rated by academic success. The study is considered quantitative as the findings were analyzed through Chi Square tests for statistical significance. At the end of the semesters, we conducted a statistical analysis to measure the

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[1] Details on SmarterMeasure are at http://www.smartermeasure.com/about/

relationships between SmarterMeasure scores and CSM measures of retention, grade distribution, and academic success. The study operated for two semesters.

For measures of control, faculty, in whose class this research took place were Quality Matters Master Reviewer trained, have had two or more classes that they designed meet Quality Matters Standards, and were active participants in CSM's student learning outcomes and assessment processes. Additionally, the courses employed in this research met quality standards as defined by Quality Matters certification.

Statistical Analysis

A Chi Squared analysis was conducted to search for statistical significance to the scores of the SmarterMeasure assessment compared to the final course grades the students earned in the selected course sections. The six SmarterMeasure indicators scores were aggregated and compared to the final grade the individual student earned in the course. SmarterMeasure scores rely on student answers, some being subjective (life factors and individual attributes) as well as objective measures.

The scores from the SmarterMeasure assessment are delivered as ranges being labeled blue for rates between 85-100%; labeled green for rates between 70%- 84%; and, labeled red for rates between 0%-69%. As we analyzed the data, we realized that (a) there were a number of small cells, and (c) there were "zero" cells.[2] Therefore, per acceptable social statistical analysis, the only practical alternative was to combine categories in such a manner as to eliminate these small and zero cells. The red cells were highly problematic in most of the cases; therefore, we combined the green and red labels (frequencies) to eliminate any biasing that the low red frequencies may have introduced into the analysis. Therefore, we used two SmarterMeasure

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[2] Note that a larger sample may eliminate these issues for future studies.

Indicator Rates - (a) students earning a rate from 85% to 100% (the blue labels), and, (b) students earning a rate from 0% to 84% (the green and red labels, combined).

The final grades for the class were measured as "successful" at the rate of 70% or higher, equating to a letter grade of C, B, or A. CSM policy supports this valuation, as 70% is the cut-off score for credit being earned for the course as well as its ability to be transferred to another school. In addition, the majority of student learning outcomes assessments at CSM use the benchmark of 70% or higher.

Results

At the 95% confidence level, two of the SmarterMeasure indicators (typing speed/accuracy and reading rate/recall) were statistically significant, thereby exerting significant influence on student success in the course. There is a high probability (at the 95% level) that the other SmarterMeasure indicators did not exert significant influence on student success. See Table 1 for the aggregate data.

SmarterMeasure Indicator, Reading Rate

The results for reading rate and recall indicate with a high degree of confidence that this indicator exerts an influence on student success. Specifically, 72 students were successful per the SmarterMeasure Indicator, while 62 ended up being successful in the course. The results are statistically significant, $\alpha = .05$. See Figure 1.
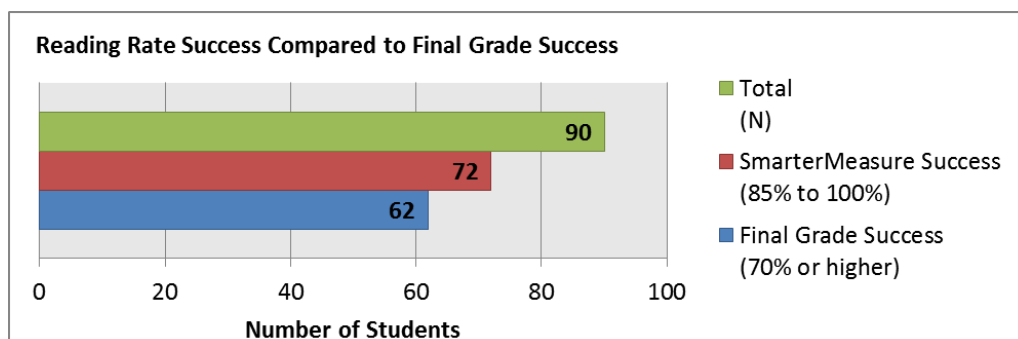
Figure 1

Table 1: *SmarterMeasure Indicators Compared to Final Grade Earned*

| Indicator Name	Final Grade Earned	Indicator Rate at 85% to 100%	Indicator Rate at 0% to 84%	Total (N)
Reading Rate*	Successful	62	12	74
	Not Successful	10	6	16
	Total	72	18	90
Typing Speed*	Successful	81	59	140
	Not Successful	7	14	21
	Total	88	73	161
Life Factors	Successful	49	122	171
	Not Successful	4	25	29
	Total	53	147	200
Technical Knowledge	Successful	95	74	169
	Not Successful	21	7	28
	Total	116	81	197
Reading Comprehension	Successful	144	26	170
	Not Successful	24	4	28
	Total	168	30	198
Individual Attributes	Successful	26	145	171
	Not Successful	5	24	29
	Total	31	169	200

Note. "Indicator Name" refers to the SmarterMeasure Indicators. "Successful" in the Final Grade Earned column is based on the Institutional benchmark of earning a 70% or higher (A, B, or C letter grade). "Not Successful" is based on the Institutional benchmark of earning a 69% or lower (D or F letter grade).

*Reading Rate and Typing Speed are statistically significant, α = .05, while the other SmarterMeasure Indicators are not statistically significant, α = .05

SmarterMeasure Indicator, Typing Speed

The results for typing speed and accuracy indicate with a high degree of confidence that this indicator exerts an influence on student success. Specifically, 88 students were successful per the SmarterMeasure Indicator, while 81 ended up being successful in the course. The results are statistically significant, $\alpha = .05$. See Figure 2.
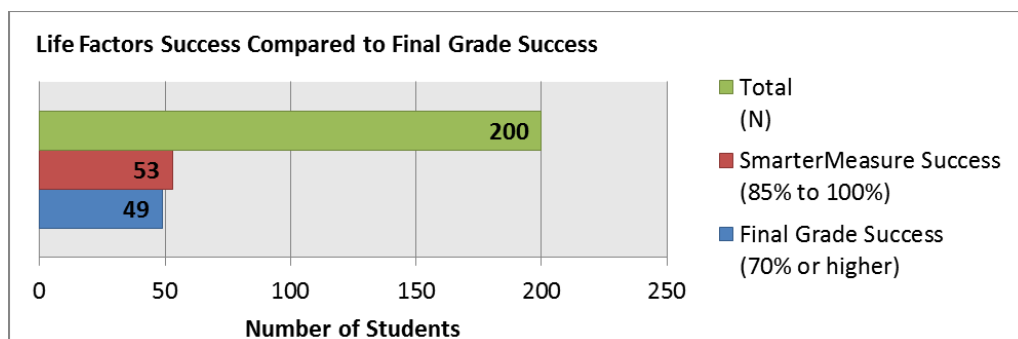
Figure 2
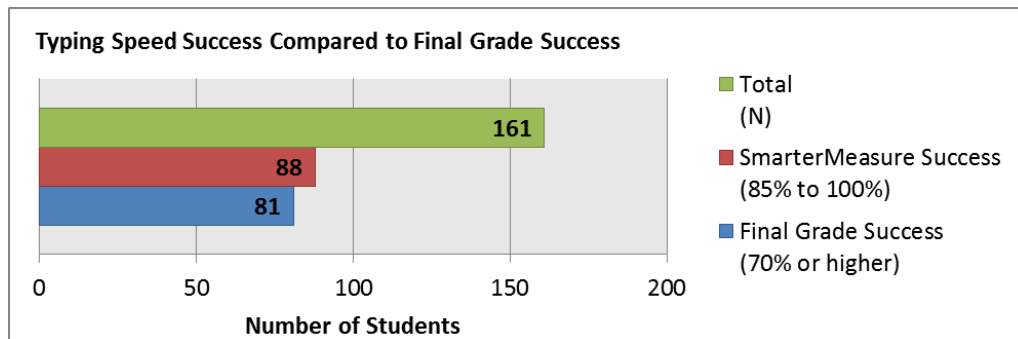
SmarterMeasure Indicator, Life Factors

The results for life factors do not show that this indicator exerts an influence on student success. The results are not statistically significant, $\alpha = .05$. (Note that there is a statistical significance only if you set the alpha at the .1 level.) See Figure 3.
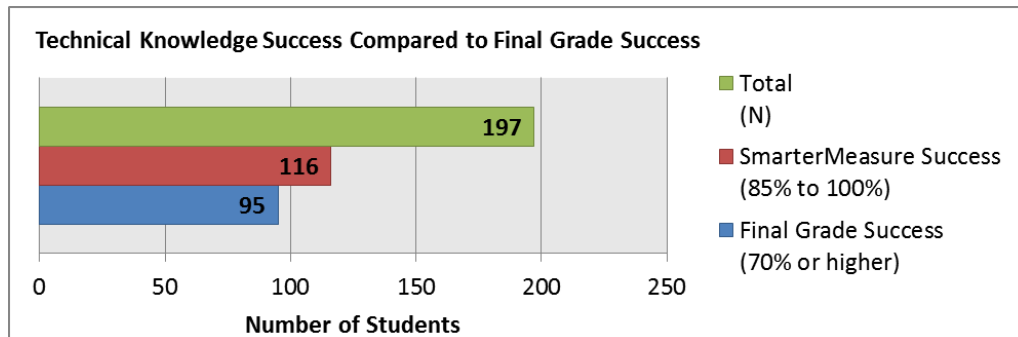
Figure 3

SmarterMeasure Indicator, Technical Knowledge

The results for technical knowledge do not show that this indicator exerts an influence on student success. The results are not statistically significant, α = .05. (Note that there is a statistical significance only if you set the alpha at the .1 level.) See Figure 4.
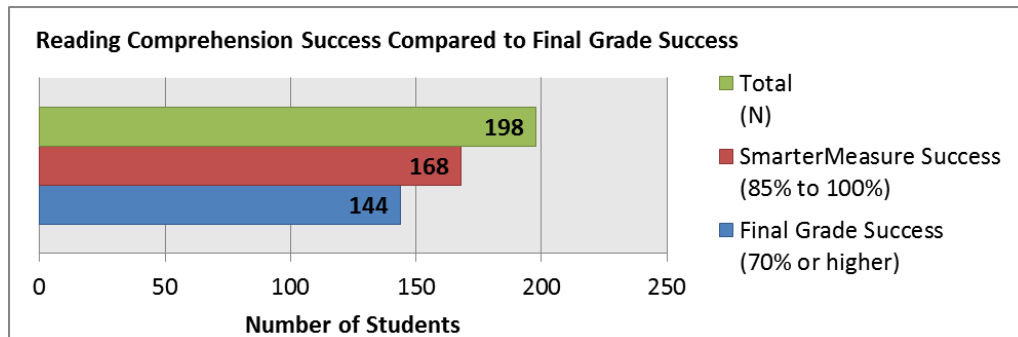
Figure 4

SmarterMeasure Indicator, Reading Comprehension

The results for technical knowledge do not show that this indicator exerts a significant influence on student success, as the results are not statistically significant, α = .05. See Figure 5.
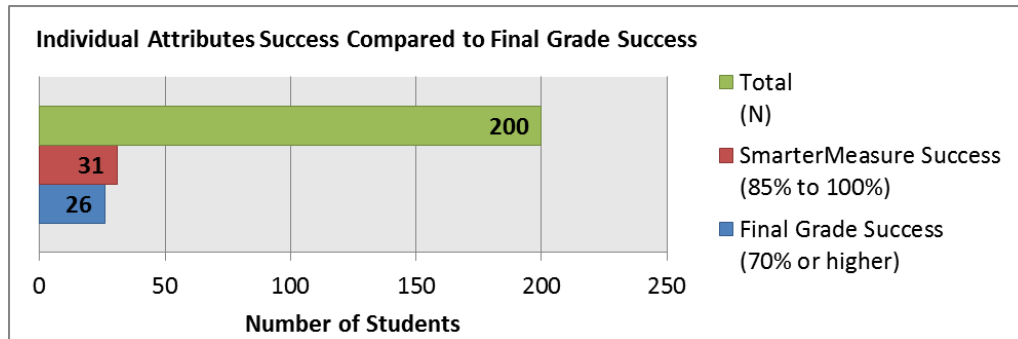
Figure 5

SmarterMeasure Indicator, Individual Attributes

The results for individual attributes do not show that this indicator exerts an influence on student success. The results are not statistically significant, α = .05. See Figure 6.

Figure 6

Discussion

The study was based on the hypothesis that student success in well-designed courses (those that meet QM standards) and that are taught by engaged faculty are most influenced by student readiness factors including individual attributes (such as motivation), life factors, learning styles, technical competency, technical knowledge, reading rate and recall, and typing speed and accuracy. Based on the results of the study, most of our hypothesis was not supported.

Only two of the SmarterMeasure indicators (Reading Rate and Typing Speed) were statistically significant, thereby exerting an influence on student success in the online courses. There are two limitations to consider. First, the sample size was small. Second, there can be alternative analyses for these results. For example, a higher typing speed with accuracy maybe indicative of a student's expertise with computer technology, thereby leading to a disproportionate number of these students taking the SmarterMeasure assessment. A higher typing speed with accuracy may also be indicative of a student's attention to detail, and it is the" attention to detail" factor that exerted an influence on student success.

Institutional policy changes to online course design should be considered when there is a large, statistically significant sample size where the results have been replicated. However, outside of policy changes, course design can focus on remediation in these two areas for students who do not rate highly for the Reading Rate and Typing Speed indicators. The institution could

recommend specific training (reading and typing) available online at no cost to the student. Those students who fall in the lower rating (possibly 84% or lower on the SmarterMeasure instrument) could then be directed to this training before or at the beginning of the online course. Another course design suggestion is for faculty to consider higher-level intellectual activities, as referenced on Bloom's Taxonomy, to design effective assignments that promote active learning and spend less time on providing basic information best learned through reading rate and recall.

The course design recommendations corroborates Hilke's proposition that research findings (such as this study) should be used as a foundation for creating a student orientation to distance learning (Hilke, 2011, p. 9). Based upon the statistically significant results of this research, it stands to reason that students could benefit from developing and solidifying reading rate/recall and typing speed/accuracy in order to enhance their ability to succeed in a course and in college.

Two indicators (Life Factors, Technical Knowledge) were not statistically significant unless the alpha level is lowered from $\alpha = .05$ to $\alpha = .01$. The last two indicators (Reading Comprehension and Individual Attributes) were not statistically significant. Note that the small sample size may have affected the results.

Our findings differ from the Argosy University study (SmarterServices). The Argosy study found the following SmarterMeasure indicators to have statistically significant impact on student success: technical competency, motivation, availability of time, and retention (SmarterServices). Two factors may have contributed to the different findings. First, our small sample size may have affected our results compared to the Argosy study. Second, our study controlled for the design variable compared to the Argosy study; therefore, our results may be more focused.

This study allow for a closer analysis of student readiness by eliminating the following variables: (a) the course design was considered high quality, as only courses meeting QM standards were used; (b) the learning management system (LMS) utilized is industry-standard and is well-proven; and, (c) the faculty participating in the study have a proven track record of student engagement, are highly trained in the LMS and instructional design, and agreed to abide by certain "engagement standards" throughout the study. We do not conclude that only typing speed/accuracy and reading rate/recall are important to the overall QM process.

Suggestions for Future Research

The sample size was small. The sample could be broadened to increase validity and reliability of results, thereby leading to institutional policy changes. The study can be easily replicated for extended statistical analysis using our experimental design or utilizing other designs, such as a matched pair design.

The study was purely quantitative. Qualitative information could be gathered and analyzed (1) to discover other "indicators" of student success and (2) to test alternative analyses. For example, students who completed the SmarterMeasure instrument maybe more likely to complete class work leading to student success compared to the students who did not complete the required SmarterMeasure instrument.

The study can be altered to include other standardized exams or instruments (e.g., Myers Briggs, SAT, Compass, IDEA Survey) or replace the SmarterMeasure instrument with another exam for further analysis.

The data for Life Factors and Individual Attributes indicates that a large number of students ranked at the 0% to 84% level. Out of 200 students, 147 ranked within 0% to 84% for Life Factors, while 53 ranked at the upper level and 169 ranked within 0% to 84% for Individual

Attributes, while 39 ranked at the upper level. A future study could compare these online student rankings with students taking comparable courses using other deliver methods (e.g., face-to-face, web-hybrid).[3]

The results should also be compared to success factors in different disciplines using a matched-pair experiment. For example, how does an English course, where reading comprehension is critical, compare to courses in other disciplines.

In addition, future studies could compare results from QM certified courses to courses that have not been designed using QM standards.

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[3] Detailed information on SmarterMeasure research is at

http://www.smartermeasure.com/research/

References

Hilke, J. (2010).   Maryland Online, executive summary. In *A "w" study, why do students take a course online? why do they withdraw*? [PDF Document]. Retrieved from

    http://www.marylandonline.org/sites/default/files/W-Study%20Summary%20Report.pdf

SmarterServices. (2011, December 1).   SmarterMeasure research findings, results of

    institutional level research projects [PDF Document]. Retrieved from

    http://www.smartermeasure.com/smartermeasure/assets/File/SmarterMeasure%20Research%20Findings.pdf