SmarterMeasure
Learning readiness indicator

SmarterServices™

SmarterMeasure™ Research Plans

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SmarterMeasure™ Research Plan
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Background

The SmarterMeasure™ Learning Readiness Indicator is an online assessment of a learner's level of readiness for studying in an online or technology enriched environment. The assessment quantifies the learner's "goodness of fit" for learning in these modalities. Rather than being used as a gate keeper to prohibit learners from enrolling in these types of courses, it is a diagnostic device to identify learners who may be at-risk so that the school can provide appropriate services for remediation and/or support. SmarterMeasure™ does not make a value judgment indicating that a student should or should not take the courses. Rather it informs the student of their strengths and opportunities for growth in areas related to taking these type courses. If a student is indicated to be deficient in a certain area and if the school provides appropriate remediation and/or support, then SmarterMeasure™ can serve as a retention tool by helping students succeed as they learn in the context of online or technology rich courses.

Since 2002 almost one million students from over 400 educational institutions have taken the SmarterMeasure™ Learning Readiness Indicator.

Research literature shows that maintaining high retention rates in distance education programs is a significant challenge. SmarterMeasure™ serves as an early warning device to identify students who may be deficient in the skills and attributes necessary for successful distance and technology rich learning and who may, therefore, be at risk of dropping out of these programs.

Educational institutions invest heavily in attracting and recruiting students. However, there is little return on the investment when students quickly drop out of the program. SmarterMeasure not only helps schools to identify the students who are likely to drop out, it also provides resources for remediation so that at-risk students can improve.

As individuals, students also invest thousands of dollars in their education and may be hesitant to continue their education for fear that they might not do well. SmarterMeasure™ helps students recognize their strengths and provides resources to strengthen their weaknesses. Students who are confident of their readiness are much more likely to enroll in a distance learning course.

SmarterMeasure™ is designed to be a student service tool which can aid in the satisfaction and retention of students. In an optimal implementation plan, someone at the school such as an orientation course instructor, academic advisor, or enrollment counselor discusses the learner's SmarterMeasure™ scores with them. While there are general resources for remediation and support provided in the score report, the strongest gains can be made when the SmarterMeasure™ scores are used as a discussion starter to then make the student aware of the resources for remediation and support that the school provides. SmarterMeasure™ is designed to be the diagnostic tool, not the full remediation and support system.

SmarterMeasure™ is a 124 item assessment that measures variables in the following scales and sub-scales:

Table 1 SmarterMeasure™ Scales and Sub-scales

Scale	Sub-scales	Items
Individual Attributes	Procrastination Time management Persistence Willingness to ask for help Academic attributes Locus of control	24
Life Factors	Availability of time to study Availability of a dedicated place to study Reason for continuing one's education Support resources from family, friends and employers Perception of academic skills	20

Learning Styles	Identifies the degree to which they posses each of the following learning styles:
	    Visual
	    Verbal
	    Social
	    Solitary
	    Physical
	    Aural
	    Logical
		35 or 21

Reading Skills	Reading rate On-screen reading recall	11
Technical Knowledge	Technology usage Technology in your life Technology vocabulary Personal computer/Internet specifications	23
Technical Competency	Computer competency Internet competency	10
Typing Skills	Typing rate Typing accuracy	1

Rationale

Justification for the Research Plan

In the current economic climate, all institutions of higher education must be prudent and justify all expenditures. As schools use SmarterMeasure™ they often want to quantify the ways that it is benefitting their students individually and their school collectively. This Research Plan has been developed by SmarterServices™ (the provider of SmarterMeasure™) to identify several strategies that could be used by schools to measure the impact that SmarterMeasure™ is having. Schools using SmarterMeasure™ are encouraged to participate in as many of these research strategies as appropriate to fully understand the impact of the assessment.

In compliance with the Privacy Policy of SmarterServices™, schools are only allowed to use data from students from their institutions. If multiple institutions desire to combine data sets for an extended analysis, written letters of consent from an appropriate person at each institution must be submitted to SmarterServices™ prior to the creation of a combined data set.

Research Plan Options

Multiple Points of Measurement

The familiar story is told of several persons who were blindfolded and then allowed to feel of a part of an elephant. Each of them described what they felt, but a complete understanding of the elephant could only be obtained from a synthesis of the observations of all of the blindfolded persons. Academic research is much the same in that any singular measurement of a phenomenon rarely provides a complete analysis.

When schools desire to study the impact of SmarterMeasure™, the first, and sometimes only, analysis that is done is a correlation of SmarterMeasure™ scores and the students' grades. While this is certainly one analysis that should be conducted, it is limited in construct validity because the SmarterMeasure™ Learning Readiness Indicator is not designed to be a predictor of academic success. Rather, it is designed to be an indicator of learners who may not initially be a good fit for distance learning or learning in a technology-rich environment. Academic success is impacted by a myriad of factors including the learner's own academic aptitude, levels of prior knowledge, the effectiveness of the instructor, the design of the course, etc.

SmarterServices™ recommends that schools consider the following research strategies to obtain a full picture of efficacy of the assessment.

Table 2 – Research Strategies

Construct	Analysis	Data Sources
Academic Success What is the correlation between SmarterMeasure™ scores and learners' grades?	**Correlation:** Stronger correlations may be found with scores of individual attributes and academic achievement. Other case studies have found individual attributes as the strongest indicator of academic success.	• SmarterMeasure™ scores at the scale and sub-scale level as listed in Table 1 • Students' grades in a specific course • Students' overall GPA
Student Engagement What is the correlation between SmarterMeasure™ scores and metrics of student engagement?	**Correlation:** Stronger correlations may be found with scores in technical competency and technical knowledge. This may especially be the case for learners in their first term of enrollment. As is demonstrated in the National Student Readiness Report, scores on technical competency and knowledge improve as the student gains experience in studying online or in a technology-rich environment. First-time online students are often confused about how to participate in an online course. See the section below labeled "Engagement Metrics" for more information.	• SmarterMeasure™ scores at the scale and sub-scale level as listed in Table 1 • Numbers of discussion board postings • Metrics of total "clicks" a student has made in a learning management system
Student Satisfaction What is the relationship between SmarterMeasure™ scores and metrics of student satisfaction?	**ANOVA – Analysis of Variance:** Responses to end of course survey items such as "I would enroll in another online course" could be used to segment students into groups and then the means of the SmarterMeasure™ scale scores could be compared across the groups.	• SmarterMeasure™ scores at the scale and sub-scale level as listed in Table 1 • Student satisfaction measures such as items from end-of-course surveys
Student Retention What is the relationship between	**Independent Samples T-tests:** A comparison of SmarterMeasure™ scale scores between retained and	• SmarterMeasure™ scores at the scale and sub-scale level as listed in Table 1

Construct	Analysis	Data Sources
SmarterMeasure™ scores and metrics of student retention?	non-retained students could be calculated.	• A listing of students who took SmarterMeasure™ which is adjusted to indicate whether or not the student enrolled for the subsequent term
Quantitative Student Feedback What is the relationship between SmarterMeasure™ scores and quantitative points of student feedback.	**Correlation:** Students typically take SmarterMeasure™ near the beginning of their enrollment. After the students have completed their first term of enrollment, encourage the students to submit a survey which allows the student to provide feedback about their experiences in the online or technology-rich courses. Then correlations between these reported experiences and the student's initial SmarterMeasure™ scores can be calculated as a measure of construct validity of SmarterMeasure™. Questions which would be appropriate for this survey are provided below.	• SmarterMeasure™ scores at the scale and sub-scale level as listed in Table 1 • Results from a post-course survey
Qualitative Student Feedback What is the relationship between SmarterMeasure™ scores and qualitative points of student feedback.	**Comparison:** Assemble a focus group of students for a one-hour conversation about topics such as the construct of learner readiness and realities of online learning. A listing of possible discussion starting questions is presented below. Compare the observations made by the students either to their SmarterMeasure™ scores individually or to aggregate scores from the general population of students who have taken SmarterMeasure™.	• SmarterMeasure™ scores at the scale and sub-scale level as listed in Table 1 • Compilation of notes taken during the focus group. These notes can be categorized and quantified to facilitate data analysis
Integration Plan Comparison	**Independent Samples T-test:** Considerable variance exists between the	• SmarterMeasure™ scores at the scale and sub-scale level as

Construct	Analysis	Data Sources
Is there a difference in SmarterMeasure™ scores between schools with strong and schools with weaker implementation plans?	implementation plans of different schools/campuses. The impact that SmarterMeasure™ is having could be impacted by the strength of the implementation plan. A comparison of results of some of the suggested research strategies above could be made between schools with different implementation plans.	listed in Table 1 • A categorization of the strength of implementation plans of various schools/campuses. SmarterServices™ can assist in the classification of implementation plans based on our experience with other institutions
Quasi-Experimental Design	**An ANOVA could be used to evaluate the differences between groups** in a quasi-experimental research design in which an experimental group could receive the treatment of taking SmarterMeasure™ followed by appropriate remediation and support and a control group that does not take the assessment and self-selects what resources for remediation and support that they need. Measurements of academic achievement, student satisfaction, and student engagement could be compared between the groups.	• SmarterMeasure™ scores at the scale and sub-scale level as listed in Table 1 • Measurements of student achievement, engagement, and/or satisfaction

Third Party Analysis

To ensure integrity in the data analysis it is recommended that schools consider using the services of a third-party company to conduct the data analysis. Schools are welcome to identify their own providers of this service, or they may choose to use Applied Measurement Associates in Tuscaloosa, Alabama. Statisticians from Applied Measurement Associates are familiar with data from SmarterMeasure™ because they have worked on projects with the data before. If schools do not want to incur the expense of using a third party provider for this service, then Dr. Mac Adkins, President of SmarterServices™, can conduct any of the statistical analyses described above.   These statistical analysis services are provided at a per-hour rate
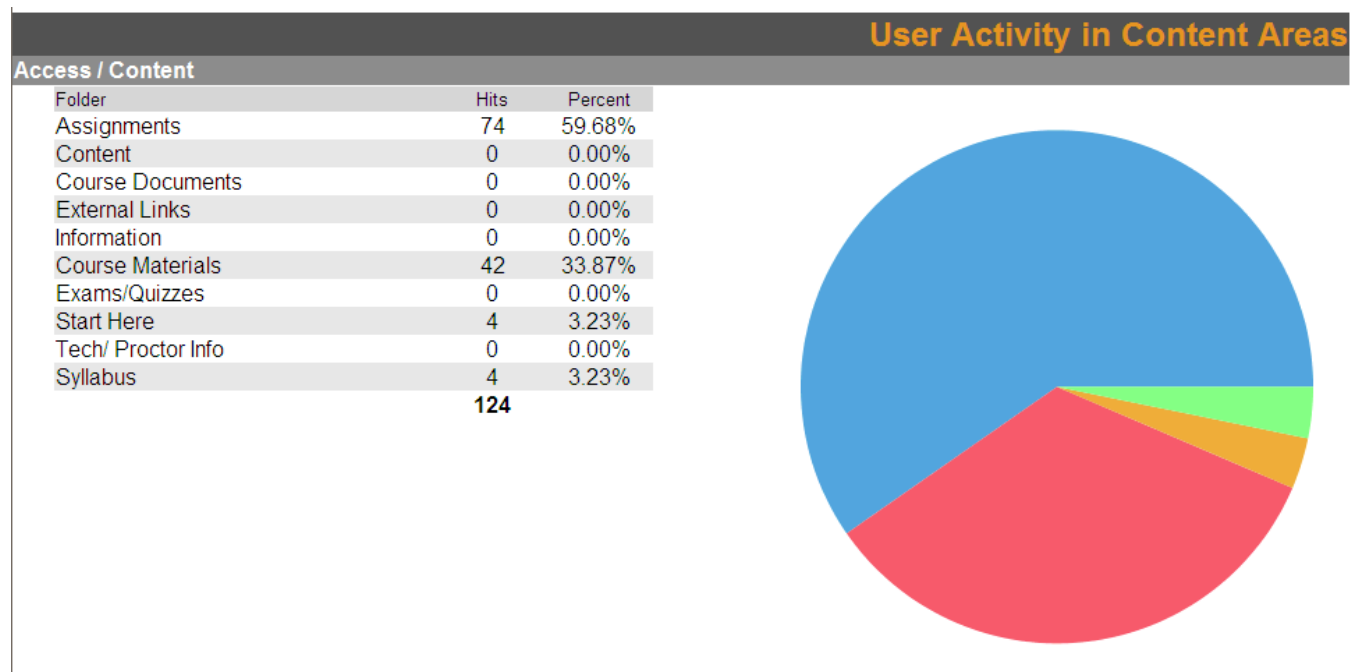
which is in addition to the existing license agreement. Schools are also welcome to use in-house expertise to conduct the analysis.

Engagement Metrics

Most learning management systems provide to the faculty and/or administrators metrics about a student's level of activity in the course. An example is shown below which indicates the level of activity on the course discussion board as well as the days since the last course access. Metrics such as this can be correlated to SmarterMeasure™ scores.

Last Name	First Name	Username	Role	Last Course Access	Days Since Last Course Access	Review Status	Adaptive Release	Discussion Board
Adkins	Mac	mac	Instructor	Feb 25, 2011 10:05:40 AM	0	0		18
Mosley	Travis	tmosley71207	Student	Feb 24, 2011 7:28:24 PM	0	0		15
McDay	Shayla	smcday	Student	Feb 23, 2011 6:39:47 PM	1	0		14
Rivers	K	krivers	Student	Feb 20, 2011 8:12:59 PM	4	0		10
Rogers	Amy	arogers	Student	Feb 23, 2011 6:52:26 PM	1	0		14

Another example of engagement metrics would be learner activity in content areas. The image below shows how the number of hits and the percentage of hits per content area could be calculated and then compared to SmarterMeasure™ scores.

User Activity in Content Areas

Access / Content

Folder	Hits	Percent
Assignments	74	59.68%
Content	0	0.00%
Course Documents	0	0.00%
External Links	0	0.00%
Information	0	0.00%
Course Materials	42	33.87%
Exams/Quizzes	0	0.00%
Start Here	4	3.23%
Tech/ Proctor Info	0	0.00%
Syllabus	4	3.23%
	124	

Quantitative Student Feedback

As stated in **Table 2 Research Strategies**, a useful metric of the impact of SmarterMeasure™ is a study to determine the degree to which a student's SmarterMeasure™ scores are indicative of their experience in an online or technology-rich course. The following questions could be used to quantify the learner's experience, and then these ratings could be correlated to the SmarterMeasure™ scale scores. These questions could be asked on a five-point likert type scale ranging from strongly agree to strongly disagree.

Post-Course Survey Item	*SmarterMeasure™ Scale Score*
It was easy for me to keep up with the reading required for my online course(s):	Reading Rate and Recall
It was easy for me to find time to complete my online course(s):	Life Factors
It was easy for me to complete my online course(s) with my level of computer skills:	Technical Competency
It was easy for me to complete my online course(s) with my level of technical knowledge.	Technical Knowledge
Generally speaking, online courses are a good choice for me:	Individual Attributes
I would take another online course in the future:	Learning Styles
It was easy for me to complete my online course(s) with my level of typing abilities.	Typing Rate and Accuracy

Qualitative Student Feedback

The quantitative question items provided above could also be asked in individual interviews or to a focus group. In addition to these questions, other qualitative questions which could be asked to foster dialogue about the students experience could include:

- **How was the experience of taking an online or technology-rich course different than you expected?**
- **Was the experience more or less difficult than you expected?**
- **What was the most difficult element of the course for you?**
- **What advice would you give to a student who is about to take their first online or technology-rich course?**
- **What is one thing that you wish you would have done differently in the course?**
- **What types of support from the school could have made your experience in the course even better?**

Data Analysis Considerations

As a school plans a research project using SmarterMeasure™ data, it should be noted that correlations and other comparisons of means can be calculated at the scale and sub-scale level. For example, in addition to correlating levels of student engagement to the scale score for Individual Attributes, a correlation could also be calculated for the sub-scale of motivation to student engagement.

To facilitate the comparisons of SmarterMeasure™ scores to other metrics of student success and satisfaction a paired dataset could be created. Identification variables could include first and last name, email address, and demographic factors (age range, gender). SmarterServices™ can assist schools in the production of a paired dataset. This service is considered "custom programming" for an hourly fee in addition to the SmarterMeasure™ license agreement.

Aggregate Analysis of SmarterMeasure™ scores

In addition to the research strategies described above, SmarterServices™ is also available to assist schools in an analysis of their aggregate dataset of SmarterMeasure™ scores. By looking at the means and standard deviations of a learner's SmarterMeasure™ scores, compelling information may emerge. For example, it may be determined that a substantial majority of a school's learners are of one dominant learning style. This fact could impact instructional design decisions. An aggregate analysis would also reveal levels of technical competency which could inform decisions regarding types and amounts of technical support that are needed to support a school's students.

Similar Research

SmarterServices™ encourages schools to do research with SmarterMeasure™ data regarding their own students. When schools plan to do an analysis of their SmarterMeasure™ data, they often plan first to correlate SmarterMeasure™ SmarterMeasure scores to students' grades in the course. This is a welcomed analysis and typically results in statistically significant findings. The 2008 study conducted by Atanda Research (described below) analyzed the SmarterMeasure™ scores of 2,622 random students representing over 300 schools. Correlations significant at the .05 level or higher were found with 11 of the 15 SmarterMeasure™ scores variables and student's grades. However, this analysis is really not the most appropriate way to measure the validity of SmarterMeasure™ scores because student's grades are impacted by a myriad of variables (prior academic experiences, IQ, etc.). SmarterMeasure™ is not designed to be an indicator of academic success. There are several tools such as the ACT, SAT, and GRE which serve this purpose. SmarterMeasure™ does not measure any constructs of content knowledge in areas such as math, science, history, etc. So to use SmarterMeasure™ solely as a predictor of academic success is not the most appropriate application.

In 2010 Middlesex Community College in Middletown, CT, desired to create a culture of support for online students and improve failure rates of online students. They conducted a study of failure rates before and after using the SmarterMeasure™ learning readiness indicator. Their study found that after implementing SmarterMeasure™ the failure rate was cut in half. MCC conducted a correlational study to determine the relationships between SmarterMeasure™ scores and learner success. They found statistically significant correlations between the construct of Personal Attributes and student grades. The study concluded that "personal attributes, represented by self-motivation, self-discipline, and time management, plays a very important role in student success of online learning." MCC also analyzed the differences in grades between online students who did complete SmarterMeasure™ and on-ground students who did not. The finding of that study was that "**Noticeably, before SmarterMeasure™ was implemented, 6% to 13% more students failed online courses than students taking on-ground courses. After the implementation, the gaps were narrowed, 1.3% to 5.8% more online students failed than on-ground students.**" The finding implies that SmarterMeasure™ assessment helps "at-risk" students to do better in online learning. In other words, the use of the SmarterMeasure™ assessment has contributed to better success in online learning particularly for students who are more likely to fail. This finding has moved the distance learning support beyond technical assistance to inspiring students to be highly motivated and disciplined, accompanied with using appropriate study strategies to ensure greater success. A case study of their research project is available at http://www.smarterservices.com/documents/casestudies/middlesex-community-college.pdf.

In 2007 an external research firm (Atanda Research, Alexandria, VA) was commissioned to analyze the data gathered during a study concerning the relationship of SmarterMeasure™ scores and measures of academic success and goodness of fit of distance education as a measure of construct validity. The major findings of this report were that there were forty-two statistically significant correlations between SmarterMeasure™ variables and measures of academic success and goodness of fit. Of the five constructs measured by SmarterMeasure™, the construct with the most correlation to academic success and goodness of fit was Individual Attributes. The variable of the participant's individual attributes scores were statistically significant at the .001 level with all measures of academic success and goodness of fit. The variable with the strongest correlation in the study was relationship between Grade Point Average and Reading Comprehension. A copy of this report is available at http://smartermeasure.com/documents/READI_Correlational_Study.pdf.

In 2008 the study conducted by Atanda Research was replicated as a part of a learner's dissertation research which involved 2,622 students who had taken SmarterMeasure™ representing over 300 schools. This replication yielded even stronger results than the original study. Of the possible 105 correlations measured, 74 were found to be statistically significant. The factor measured by SmarterMeasure™ that had the strongest correlations to measures of goodness of fit and academic success was individual attributes which yielded correlations in each of the seven categories which were statistically significant at the .01 level. This finding mirrored the finding from the 2007 study which also indicated that individual attributes were the strongest indicator of goodness of fit of distance education.

It is worthy of note that in each of these three studies (Middlesex Case Study, Atanda Research and dissertation research), the scale measured by SmarterMeasure™ that had the strongest correlation to academic success was individual attributes. The individual attributes section of SmarterMeasure™ measures traits, habits and attitudes that impact one's goodness of fit of distance education as a delivery system. The six attributes which are measured are time management, procrastination, persistence, academic attributes, locus of control, and willingness to ask for help. There are 24 items in this section with each of the six attributes being measured by four items. The items are measured on a four-point likert-type scale of not like me at all, not much like me, somewhat like me, or very much like me.

In 2009 Dr. R McLawhon completed a dissertation at the University of North Texas titled, "Readiness Scores As Indicators of Online Faculty Satisfaction." The purpose of this study was to determine the relationships between online readiness scores and online faculty job satisfaction. Online readiness was assessed using the SmarterMeasure™ (known at that time as READI) assessment. The assessment incorporated the independent variables of learning preference, technical competency, technical knowledge, personal attributes, on-screen reading speed and comprehension, and typing speed and accuracy. Online faculty job satisfaction was assessed using the National Study of Postsecondary Faculty (NSOPF) job satisfaction questions. Analysis of variance was used to determine whether there was a difference in satisfaction based on individual instructor learning preferences. Correlation coefficients were used to analyze the relationships between the remaining independent variables and online instructor satisfaction. The sample population (N=110) consisted of online faculty members at Tarrant County College. Most of the statistical analyses revealed non-significant results at the .05 alpha level. However, a significant difference in satisfaction with equipment and facilities was found based on instructor learning preference. Additionally, a statistically significant negative correlation was found between online instructor technical competency and satisfaction with benefits.

Making a Difference for Students

Thermometer analogy

As a parent I may observe my child to be playing lethargically and looking flush. So I suspect that they may be getting sick. So I use a thermometer to take their temperature. If my child has a fever, then I have a decision to make. Should I give them some over the counter medicine or take them to the doctor? That decision may largely depend on the measurement of their temperature. If it is 100 degrees, I may just give them some over the counter medicine. But if their temperature is 105, then I may decide to take them to the doctor. That night as I reflect on the day and my role as a parent, should I feel good about the fact that I took my child's temperature? Yes, but what I should really feel good about is the fact that I used that measurement of temperature to inform a decision that prompted action.

SmarterMeasure™ is similar to a thermometer in that it provides a measurement of the learner's level of readiness for studying in an online or technology-rich environment. It is a

rather sophisticated thermometer in that it gives multiple points of measurement, but nonetheless it is still just a measurement. While there are some benefits of providing the results of the measurement to the students, the real benefit of SmarterMeasure™ comes when schools look at the student's scores and then take appropriate action.

The research strategies above are parallel to computing correlations between a child's temperature and then some measure of their health. There would be benefit in doing that, but the real benefit would be identifying life habits that impact the child's health and focusing on reinforcing those habits. So while the intention of these research strategies is to determine the relationship between SmarterMeasure™ scores and metrics of student success and satisfaction, schools are encouraged to engage in a dialogue with SmarterServices™ about implementing integration strategies that impact student success.

Review of Related Literature

Thermometer analogy

With the shift toward online learning, it is important to explore the adoption of online education. Previous studies found that among academic leaders, 64 percent believe that it takes more discipline for a learner to succeed in an online course (Sloan Consortium, 2006), therefore placing additional responsibility on students to be self-directed learners. Before the start of an online program or course, it should be determined if a learner's instructional need can be resolved through a distance education approach (Willis & Lockee, 2004). Assessing the pre-requisite skills of the distance learner is critical (Hsiu-Mei & Liaw, 2004; Simonson et al., 2003). Learners need to have enough pre-requisite skills of technological proficiency and a strong motivation to learn by technology (Hsiu-Mei & Liaw, 2004). Because of the difficulty in accommodating a group of learners with a wide range of acquired skills, requirements for pre-requisite skills should be set (Falvo & Solloway, 2004). A researched method of examining the notion of online readiness is listed using three aspects: (a) Student's preference for online form of instructional delivery as compared to traditional face to face instruction; (b) Student confidence in using electronic communication for learning and competence and confidence in the use of Internet and computer-mediated communication; and (c) Ability to engage in autonomous learning (P. J. Smith et al., 2003). Hall (2008, para 27) stated that "the primary value of the surveys may lie in raising awareness for any student considering enrolling in a distance education course."

Pamela Dupin-Bryant of Utah State University - Toole conducted a study which was published in The American Journal of Distance Education titled "Pre-entry Variables Related to Retention in Online Distance Education." This study identified pre-entry variables related to course completion and non-completion in university online distance education courses. Four hundred and sixty-four students who were enrolled in online distance education courses participated in the study. Discriminant analysis revealed six pre-entry variables were related to retention, including cumulative grade point average, class rank, number of previous courses completed online, searching the Internet training, operating systems and file management training, and Internet applications training. Results indicate prior educational experience and prior computer training may help distinguish between individuals who complete university online distance education courses and those who do not. SmarterMeasure™ measures all of the variables that this study indicated as indicators of success except for class rank.

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