

The Seismic Transformation in Higher Education in the 21st Century: The Case for Data Analytics and Student Success

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Abstract

Changes are constantly sweeping many higher education institutions across the globe. They are more rapid than was ever projected for the twenty first century higher education. These institutions are out of sync with the demands of the twenty first century economy. Consequently, current college graduates are facing very difficult times landing a meaningful entry level job within the workforce. The inability to find jobs makes them unable to have financial freedom following graduation. This trend is real and ongoing because the graduates are lacking basic job ready skills. The endless list of many problems that have been chronicled to be wrong with higher education include but are not limited to lack of accountability, the constant budget woes, the ever-increasing declining trend in enrollment, retention, cost, and deficient basic job ready skills for graduates. Data analytics as a management tool as applied in industries holds promise in addressing many higher education issues. As a way out, transcripts are gradually being promoted as credentials in their own right. This paradigm shift has led many experts to predict the proliferation of badges, and expanded transcripts in place of diplomas for the professions and fields that are not easily certified. This study examined the spectrum of data analytics as a management tool in higher education: recruitment/retention, budgetary issues, degrees vs. badges and credentials, student success, supportive infrastructure, customer service, cybersecurity, predictive models/algorithms, and achievement of institutional effectiveness/goals. Further, it addressed advantages of data analytics, getting the right data at the right time, data informed learning design and key changes in higher education for the future.

1. Introduction

Data analytics is at the center of focus for student success and involvement in higher education. There is an increased interest in higher education institutions to utilize data on their students to identify and measure academic success, retention and potential for

graduation. Predictive analytics is the actual term that is gaining an enormous amount of attention. The role has changed for the institutions; it is around success of the student as a learner. Higher education institutions are compelled to review the graduation completion rate of all students. Educators have come to realize now that the role is more than learning, it is moving above and beyond the threshold of learning. The more institutions gather data on students use and access, learning impacts how educators teach and learn. Having the accessibility of integrating data provides the appeal for educators to understand how students engage within the academic experiences that have been designed for them specifically relative to the chosen major or minor. Some of the key challenges being faced now consists of enrollment, budget, and retention. Many institutions are finding out that they are not able to meet the enrollment goals, less amount of students are graduating, and mainly the large budget cuts that have been reducing higher education institution goals globally. What does this mean for the future in higher education? How can we maintain the status quo and prepare students for the workforce? Some of the major concerns for students to consider coming to college is financial support. Higher education institutions are going to have to optimize closely and set goals that can be met successfully. Higher education has been late in adopting the management tool of data analytics for learning. Data analytics has been used for many years in the area of consumer behavior. There is much research that use the term data analytics and/or predictive analytics. For this research, the term data analytics is used. Data analytics for this study defines data as innovation and meaningful communication patterns in data by way of assorted tools and techniques employed to provide a quantifiable number in the performance of students, make predictions and to use results to design strategies to improve academic success of students. This can be done in many ways. Higher education defines analytics as being the utilities or systems engaged on both sides of the coin for administrative and academics to improve student learning and

performance. At this point, the professor is at the forefront and plays a major role as to the efficacy and management of student enrollment and budget justification [1]. The reasons for the role can be linked to the increase in institutional accreditation requirements, lack of funding, competition, assessment, state and federal regulations demands. These are some of the major contributing factors to the adoption of analytics in higher education. [2] suggested that higher education institutions have always gathered data on learning but the data is not being analyzed adequately and interpreted into useful data. Since 2007, according to [1], governmental systems, accrediting agencies, parents and students made a call for the implementation of new and efficient ways to improve and monitor students' retention and academic success. For many years the focus was on retention, reviewing formulas by looking at high school transcripts and standardized test scores to determine the success of a student, but it has been proven over time that learning and teaching at institutions is so diverse and can be a complex experience for students. Data analytics affects the whole higher educational system. Learning Management Systems (LMS) is at the core of academic analytics in higher education. LMS has the ability to record all staff and student's information along with results within a system. Once the LMS is added, it generates meaningful information in such an array that is beneficial to the competitive range for different information systems [3]. [4] recommended that institutions gather meaningful information from a collaborative perspective, otherwise, the data will remain to be a total waste. Almost every institution uses surveys in order to gain a better understanding of the community at large which leads to better enrollment figures towards future education. It is imperative for future enrollment and trends, that institutions move towards use of a more sophisticated analysis. Such change will aid in better future actions that will lead to optimal choices and successful progress towards student academic success.

2. Recruitment and Retention/Budgetary Issues

Many institutions are facing an array of continued financial difficulties ranging from a smaller class sizes of high school students to a decrease in state and federal dollars toward higher education. For instance, in the United States the state of Louisiana has recently limited the dollar amount that students receive for the Taylor Opportunity Program for Students (TOPS). [5] reported that higher education institutions are facing turmoil that will impact pedagogy, teaching and learning, content delivery method, tenure and promotion for the future. The driving force for using data analytics has to do with the need for improvement in retention rate among college wide students. For

years retention has been focused on support and for students especially during the freshman year. Recruitment will continue to be a driving force for universities in spite of the financial shortfalls. The challenge is no longer retention, but the new problem is engagement. It is a necessity for higher education to review their student populations and determine what can be done to increase student retention and engagement. Student success is based on what the institution does for students as well as what students can actually do for themselves. The academic rigor of universities continues to remain important for academic and student success. Studies have reported students who are actively engaged within the learning process tend to be more likely to remain at a college or university [6].

Higher educational systems have put into place over the past several years strategies to collect enormous amounts of data relative to graduation rates and student surveys. To analyze that data does not gear towards positive results of change and determination to face the financial and educational budget woes within the system. Currently, higher education institutions are reviewing the success and process in which Netflix, Pandora, and Amazon utilize data analytics. Some institutions are planning on implementing familiar tools and features specifically to assess advisement and the registration process. It is highly recommended that higher education focuses their attention on college freshman and learning engagement. According to [5] higher education is one of the fastest changing markets ever. College students enrolled in higher education are anticipated to be more than double to 262 million by 2025. This process can be categorized as how to identify the low to high risk student and have them to be part of the groups for retention consideration. See Figure 1 for the predicted low to high risk student retention for academic success.

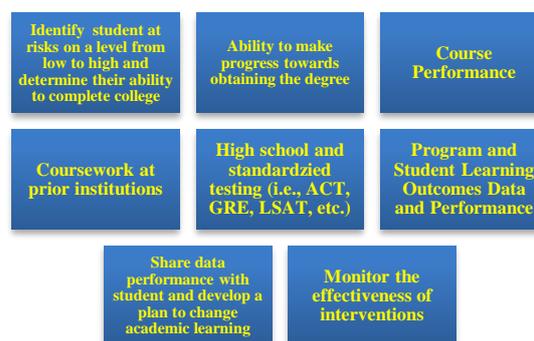


Figure 1. Predictions from Low to High Risk Student Retention for Academic Success

3. Degrees vs. Badges and Credentials

Most higher education institutions have established their own method to provide evidence

about the college experience of their graduates such as the Diploma. The Diploma and Degrees conferred by accredited colleges still command some sense of dignity and respect to employers and the general public. Today's students live much of their lives online. Currently, many institutions are still printing, typing and mailing to students. For most students to receive a transcript today, it requires them to fax or email the request, mail a check or money order and wait in line to receive an envelope or receive it via USPS mail. Higher education is in need of a transformation in order to figure out how to find specific ways and measures to transfer information to students and their employers. Colleges and universities are the beneficiaries to this growing credentialing society due to the fact that they are the caretakers of many of those credentials. Basically, higher education has a challenge to figure out how to credential better in more ways that are accessible, digital, and most of all transferable.

Presently, job demands have become higher and technically more complex than ever. More information is needed for the higher standards within the workforce so students can be better equipped. The question to ask ourselves is does the degrees offered at the bachelors and master level correlate with the requirements of many of the jobs within the labor market? Higher education has moved into a new era where some industry and nonacademic certifications stand out more than the diploma. Employers are telling students they want more than a college degree and transcript [5]. Transcripts have become the norm for credentials within and higher education institutions are using badges to offer employers information about students' abilities in many ways diplomas can no longer attest to [5]. Decades ago, the high school degree was all a person needed but as many people obtain more education, a graduate degree such as a masters and/or specialist/doctoral degree will become the employment differentiator. Employers are requiring students to be better prepared for the workforce. We are seeing a rise in expectations from both students and employers for more comprehensive credentialing that documents skills, abilities, and knowledge across the lifespan. Unfortunately, most universities have not come close to the bargaining table to meet the expectations for workforce ready. Students must be prepared and ready to meet specific employer needs. Students need to have the following to demonstrate their readiness to work within the workforce (see Figure 2).

Additionally, higher education can plan for teaching teamwork, problem-based learning, and case study based approach for students entering the workforce. It is imperative that students learn how to work well with others, be creative, and think outside of the box.

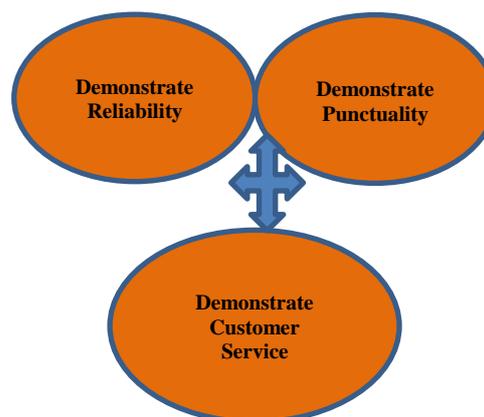


Figure 2. Students' demonstration of their readiness to work within the workforce

Higher education institutions will need to work harder and more competitively to prepare students to invoke their creativity, and innovation within the workforce [5]. Students will need to go above and beyond the role of using computers in knowing how to navigate the world of computing. Due to the compelling need to operationalize a paradigm shift in teaching and learning, the move has made faculty to take into consideration 21st century skills for students [6].

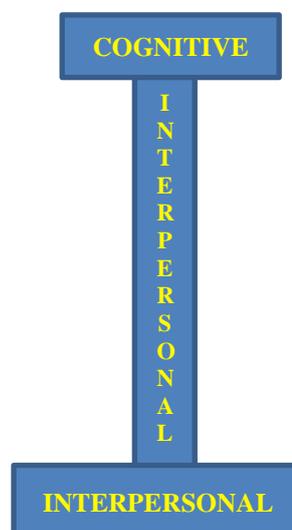


Figure 3. Skills that students need

This allows the teaching and learning to focus more on creativity, diversity, flexibility, motivation, critical thinking, and problem solving. Some of the future trendsetters are robotic instruction, artificial intelligence, and coding classes. 3-D printing is already common, but by 2030, printing a replacement for a broken part of your bathroom cabinet may be the norm. Possibly the need for truck drivers will be no

more due to driverless car technology. Many computer jobs will be around from robots to artificial organ farmers-a person that grows new livers, kidneys and spleens like peanuts or roses in a garden. There will continue to be advancements in the 21st century such as e-learning. These e-learning environments can aid our higher education systems to customize the learning environment and personalize the realm of delivering audio/visual and graphical content in order to enhance and improve higher order thinking skills and abilities. By doing so, it prepares students for the mobile workforce. [5] indicated that the flipped classroom approach is challenging within the learning environment, but the outcomes leads to improvements with the actual engagement of students and feedback in order to measure what works.

4. Conclusion

It is quite important for boards at the university level to understand the reasoning behind data analytics. Competition in higher education continues to be fierce and the continued efforts in running an institution is constantly challenging. Data analytics will assist universities with meeting the calls to legislators, government officials, accreditors, community and public at large about their management operational systems along with student learning outcomes. Data about student learning will definitely improve teaching and learning in ways that help students to achieve and yield better results. The learning process is the key for consideration of credentialing. Credentials do matter because they provide a marker for perilous life outcomes for a digital world. Higher education today must capture the entire educational experience of the student in order to create both a course and campus-based achievements. By so doing, this protects, enhances, innovates, preserves and limits access to data but in the long run make the data portable, available and actionable for 21st century learners, graduates, its institutions, and employers. Lastly, the ultimate goal for all students is to be able to manage their lives and function as responsible members of a society. Data analytics holds great promise for helping colleges and universities make good decisions impacting student life cycle. Data analytics must start with a top down processing approach including the President and Provost. Lack of this, institutions will be unlikely to

have the resources to build such a campus-wide effort. Data analytics is still new in higher education. However, there are many compelling reasons as to make the investment and commitment, including recruitment and retention performance, consider the improvement of students' lives, and review the needs for accountability. Data analytics will continue to influence higher education. Future studies should assess the best and effective tools for determining student success, identify the types of things you would like to track and measure about students, and consider how to design a learning environment that is helpful in producing useful data. We can simply imagine a future where students are in control of the data and documenting the learning across lifetime.

5. References

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