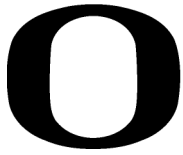


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# Increasing Generation Z Enrollment in Four-year Universities

CAPSTONE REPORT

**Natasha Roman**  
**Assistant Athletic Director for**  
**Business Operations**  
**Western Oregon University**

University of Oregon  
Applied Information  
Management  
Program

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Continuing and Professional  
Education  
1277 University of Oregon  
Eugene, OR 97403-1277  
(800) 824-2714



Approved by

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Dr. Kara McFall  
Director, AIM Program



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Natasha Roman

Western Oregon University



**Abstract**

This annotated bibliography addresses the decline in enrollment and increase in cost at four-year institutions over recent years. The issue of declining enrollment is compounded by the introduction of a new generation to college campuses, Generation Z. The references presented address the use of academic analytics to identify factors that may encourage the enrollment of Generation Z students at four-year institutions. This work is intended for higher education administrators and trustee boards of four-year institutions.

*Keywords:* Generation Z, enrollment, higher education, state funding, academic analysis, data analysis, college enrollment





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## **Introduction to the Annotated Bibliography**

### **Problem Statement**

State funding for public universities is currently in decline around the country (Marcus, 2019). Oregon in particular has seen a massive decline in state funding; state funding fell by \$7 billion between 2008 and 2018 (Mitchell, Leachman, Masterson & Waxman, 2018). Universities across the country have been forced to increase tuition rates, among other measures, to meet their budget needs (Seemiller & Grace, 2016). Published in-state tuition rates for four-year public colleges increased at an average annual rate of 3.1% beyond inflation between 2008-09 and 2018-19 (CollegeBoard, 2019). While this rate is actually less than the average annual increases of 4.1% and 4.2% over the prior two decades, 3.1% still corresponds to an average annual increase of \$270 in 2018 dollars (CollegeBoard, 2019). Western Oregon University (WOU) has been even harder hit; the Oregon Higher Education Coordinating Commission (2017) noted in 2017 “resident undergraduate tuition and fees at Western Oregon University increased 64.9% in the last 10 years” (p. 14).

Increased cost of attendance creates a barrier to entry for graduating high school seniors who want to attend a four-year university, especially those who come from a lower income background (Selingo, 2017). Studies have shown that through the rising cost of education, enrollment is falling even in periods of unemployment when enrollments traditionally have grown (Fincher & Katsinas, 2017). Other contributors to declining enrollments are stagnation in high school graduation rates and limited family access to financial resources (Pan & Ost, 2014; Selingo, 2017). Nationally, recent enrollment studies have shown that even students who come from high-income families are choosing to begin their educations at community colleges instead of four-year universities (Selingo, 2017).

In 2017 university presidents from all seven Oregon public universities wrote to legislative leaders to request at least a \$100 million increase in state funding for higher education to prevent tuition hikes over five percent and to “preserve current financial aid and student support services” (Manning, 2017, p. 1). Oregon was reported as one of the ten states with the largest enrollment declines in the United States in 2018 (Fain, 2018). Enrollment has been steadily decreasing in Oregon four-year public universities, with enrollment dropping from 68,520 in 2014 to 64,857 in 2018 (Higher Education Coordinating Commission, n.d.). At WOU specifically, undergraduate enrollment has declined steadily since 2012, from 4,729 fulltime equivalent (FTE) students in 2012 to 4,056 FTE in 2017 (Yahnke, 2017, p. 13).

College affordability is a top concern for recent high school graduates, who belong to the generation dubbed *Generation Z* (Loveland, 2017). Generation Z, defined as those born between 1995 and 2010, will make up one third of the U.S. population by 2020 (Seemiller & Grace, 2016). According to a recent study by Northeastern University, 81% of Generation Z students believe that college is imperative to beginning their careers (Loveland, 2017). However, the top concern for these students was college affordability (Loveland, 2017). Seemiller and Grace (2016) found that three-quarters of traditional-aged college students, defined as “a student who is between the ages of 18 and 22, who lives on or near campus, is a full-time student, and receives financial support from parents” (IGI Global, 2019), are concerned about their financial security. Many traditional-aged college students fear that they will not have the ability to take care of their families in the future (Seemiller & Grace, 2016).

One area that holds promise for increasing enrollments in four-year universities is *academic analytics* (Goldstein, 2005). *Analytics* is a broad concept and can be defined as “the science of examining data to draw conclusions and, when used in decision making, to present

paths or courses of action” (Picciano, 2012, p. 12). When analytics is combined with data mining software, organizations can “establish decision processes that convert data into actionable insight, uncover patterns, alert and respond to issues and concerns, and plan for the future” (Picciano, 2012, p.12). As Campbell, DeBlois and Oblinger (2007) explain, analytics allows institutions to mine data to produce “actionable intelligence” (p. 42).

Analytics can be used in many different ways depending on the purpose (Alias, 2011). Alias (2011) defined four different types of analytics: web analytics, learning analytics, academic analytics, and action analytics (Picciano, 2012, p.12). The focus of this paper will be academic analytics.

*Academic analytics* is defined as “a process for providing higher education institutions with the data necessary to support operational and financial decision-making” (van Barneveld et al., 2012, p. 8). Through complex formulas, institutions can improve enrollment management by reducing lag time associated with communicating with prospective students (Campbell, DeBlois & Oblinger, 2007). This kind of analysis can also help admissions officers better target students who may be a good fit for their institutions by supplying information on “standardized exam scores and high school coursework” (Campbell, DeBlois & Oblinger, 2007, p. 44). This information is useful for enrollment managers, who are now beginning to diversify the student data they gather to include high school descriptions and geographic locations (Cazier, Sargent Jones, McGee, Jacobs, Paprocki & Sledge, 2017). This data allows institutions to “connect student demographics with socio-cultural demographics”, which can give more insight regarding who may be likely to attend their schools and why (Cazier, et. al., 2017, p. 216) Other potential uses for academic analytics include “financial planning, donor tracking, and student performance monitoring” (Picciano, 2012, p.13)

Higher education institutions are also beginning to utilize online surveys to mine student higher education experience data such as what students are looking for in their college experiences (Selingo, 2018). Student data such as information on their college experiences and “how students learn in the classroom and how they interact with campus services” can then be analyzed and the results used to “segment students in order to build new academic offerings and personalize campus services” (Selingo, 2018, p. B26). As far back as 2005, Goldstein noted that universities can better utilize resources in a financial environment where state funding is lacking through the use of academic data analytics. Findings from van Barneveld et al. in 2012 noted that academic analytics were being utilized more and more in the higher education environment.

### **Purpose Statement**

The purpose of this annotated bibliography is to present scholarly literature that explores how academic analytics can be used to find key factors that can increase four-year institution enrollment of Generation Z students. The research is focused on increasing the enrollment of traditional undergraduate students. These students are of particular importance in addressing university enrollment concerns because “state programs generally favor traditional-age college students and are often not fully accessible to adult students” (Taliaferro & Duke-Benfield, 2016, p. 1).

While stakeholders from any four-year university can benefit from this research, the specific constraints and policies that impact four-year Oregon universities shaped the focus of this study. For example, enrolling traditional-aged college students impacts the funding four-year Oregon universities receive from the state legislature (Oregon Higher Education Coordinating Commission, 2014). Enrolling students after high school allows universities in Oregon to gain funds through the activity-based funding component of the Student Success and Completion

Model (SSCM), which was developed by a workgroup convened in 2014 by the Higher Education Coordinating Commission (HECC) to adopt rules governing the distribution of appropriations from the Oregon legislature to public universities, community colleges, and student access programs (Higher Education Coordinating Commission, 2014). The activity-based funding component is defined as funding that invests in credit hour enrollment of Oregon residents; for cash-strapped Oregon universities, enrolling traditional undergraduate students provides tuition revenue that would otherwise be foregone if the student enrolled in community college or did not pursue an education beyond high school (Higher Education Coordinating Commission, 2017).

Literature is presented from four areas: (a) characteristics of Generation Z students, (b) declining four-year university enrollment factors, (c) assessing university enrollment, and (d) the use of academic analytics in higher education.

### **Research Question**

How can academic analytics be used to increase enrollment in the Generation Z population at four-year universities?

### **Audience**

The audience members for this research are four-year university presidents, administrators, and trustee boards. All of these stakeholders can benefit from this research because it can be utilized to further university success through the enrollment of additional traditional students.

As early as 1976 enrollment management has been labeled as an “institutional effort” (Vander Schee, 2009, p. 2) As the importance of enrollment has continued to increase, the

complexity of managing the enrollment enterprise has been shifted to high-level positions, like vice president and vice provost (DesJardins, 2002).

Trustee boards are “responsible for ensuring the overall welfare of the institution and the academic freedom of the faculty as well as balancing the demands of internal and external constituencies while ensuring institutional autonomy” (Barringer & Riffe, 2018, p. 157). Trustee boards have the ability to create change through their position of power (Marcus, 2015). In WOU’s case, the role of the board of trustees is to focus solely on the governance and success of WOU (Western Oregon University, n.d.).

Trustees recognize that changing times require additional oversight and engagement; rather than filling an honorific role, boards of trustees understand that they are accountable for policies and strategies to advance the missions of the institutions they serve (Legon, Lombardi & Rhoades, 2013). The most effective partnerships between trustees and universities result when trustees engage with institution leaders beyond board meetings to create solid working relationships and build trust (Legon, Lombardi & Rhoades, 2013).

While Schmidt (2014) asserts that those who appoint trustees must ensure they understand their fiduciary obligation to taxpayers, Marcus (2015) reported that close to a third of trustee boards received no financial training and more than a quarter have admitted “they do not undertake much budgetary or financial oversight” (p. 1). With the landscape of higher education changing, trustee boards will need to participate more in planning the futures of their universities (Marcus, 2015).

## **Search Report**

**Search Strategy.** My search strategy was primarily centered on Academic Search Premier because this database contains the most online, accessible academic journal articles.

Additionally, the database allows for advanced searches that allowed me to narrow my results and save my articles to a folder for efficiency. In addition to Academic Search Premier, I also used the University of Oregon LibrarySearch. LibrarySearch allowed me to cast a wider net for scholarly articles. However, LibrarySearch is limited in the amount of sources that are available online, which is why it was not my primary search database. LibrarySearch also allowed me to search for articles that are housed on numerous databases. The third database I used is AcademicOne File. AcademicOne File has similar search features to Academic Search Premier and returned sources I did not see on other databases.

I seldom used the Google search engine, referencing this search engine only when I could not find definitions for keywords in scholarly articles, government documents were required, or additional survey results and news reports were necessary to report current information.

The greatest hinderance in my search was finding journal articles that were available online. There were several excellent articles that I could not access because they were only available at the University of Oregon library or required a subscription to a journal.

**Key terms.** Key terms that I used in this research are listed below.

- Generation Z,
- College enrollment,
- Enrollment,
- Higher education,
- State funding,
- Academic analysis,
- Data analysis,
- Declining enrollment, and



- Increase college enrollment.

**Search engines and databases.** I primarily used the University of Oregon Libraries' databases throughout the course of my research. I only used Google search engine to define keywords when no scholarly sources are available, when state documents were required, and when current statistics were required. I used the following University of Oregon Libraries' databases:

- Academic Search Premier,
- Academic OneFile, and
- LibrarySearch.

**Documentation approach.** I documented and saved references using two methods. The first method employed storing articles found in Academic Search Premier in the folder provided by the database. Upon the conclusion of the search, I exported the articles in the folder to a Microsoft Word document and saved them on my computer in a file made especially for the Capstone project.

I used the second method for all sources not found on Academic Search Premier. When I found a good source I saved the web address, key words used to find the article, and a brief description of the article in a Word document housed in the Capstone project file. I organized articles based on the week of the course in which they were found.

### **Reference evaluation criteria**

I used the *Evaluating Information Sources* document from the Center for Public Issues Education (n.d.) to evaluate references. This document describes five criteria to consider when evaluating reference sources: *relevancy, authority, timeliness, quality, and bias.*

*Relevancy.* I ensured that articles I referenced are focused on the enrollment of students in four-year institutions in general rather than a specific student population or a different type of higher education institution. I also looked for articles that address characteristics of Generation Z students, especially in terms of how they interact with four-year institutions.

*Authority.* I ensured that publications I referenced are from reputable, peer-reviewed academic journals and that the author has expertise in higher education; I gave preference to authors who had multiple publications on the subject of higher education.

*Timeliness.* Timeliness was a flexible factor for me in searching for reference sources. I welcomed older articles about higher education because they helped to provide background about my problem. However, I found that articles published within the last five years were the most reliable for describing the current higher education environment.

*Quality.* I ensured reference quality by using scholarly, peer-reviewed journal articles. In most cases, peer-reviewed journal articles are well organized in terms of clarity, flow, and structure and do not contain grammatical, spelling, and punctuation errors.

*Bias.* To address bias I made sure that the articles I cited present various perspectives and that any websites I used were neutral. I avoided publications from vendors selling a product or service.

## **Annotated Bibliography**

### **Introduction**

The annotated bibliography below includes 15 references that explore factors of enrollment management practices in four-year institutions as Generation Z becomes the target population. The studies included are intended to serve higher education administrators and trustee boards at four-year institutions as they assess their current enrollment management practices and attempt to recruit Generation Z students. References are presented in four categories that address the factors facing four-year institutions as they pursue increased enrollment and a new population of student: (a) characteristics of Generation Z students, (b) declining four-year university enrollment factors, (c) assessing university enrollment, and (d) the use of academic analytics in higher education.

Each annotated bibliography has three parts: (a) full citation, (b) abstract, and (c) summary. Abstracts that have been listed are complete and were written by the author of the reference source, unless otherwise notated. The summaries presented detail the decline of four-year university state funding and enrollment, the shift that is currently being made in higher education to use academic analytics to streamline enrollment management and efficiently utilize resources, and the key differences between Generation Z and the generations that attended college before them. With a better understanding of what Generation Z students want from a college experience and how they prefer to communicate, it is possible for four-year institutions to integrate these factors into their enrollment management analysis to capture more students.

### Characteristics of Generation Z Students

**Buzzetto-Hollywood, N. A., & Alade, A. J.** (2018). An examination of Gen Z learners attending a minority university. *Interdisciplinary Journal of E-Skills and Lifelong Learning*, 14, 41-53. doi:10.28945/3969

**Abstract.** This paper presents the preliminary findings of a pilot survey that sought to examine the technology uses, backgrounds, needs, interests, career goals, and professional expectations of Generation Z students enrolled at a minority serving institution in the United States Mid-Atlantic region. Students entering college today are part of Generation Z born in the late 90's through 2016. Known for their short attention spans and heightened ability to multi-task, they already outnumber millennials and are the first true digital natives born during the age of smart phone. In the fall of 2017, an online student perception survey was piloted with students enrolled at a mid-Atlantic minority serving institution. The survey included a combination of dichotomous, Likert-scaled, and ranking questions. The survey was administered electronically using the Survey Monkey system to students following completion of core computer concepts courses and explored their technology backgrounds, skills, perceived computing self-efficacy, and the role they predict technology will play in their future career. The data was subsequently exported to Microsoft Excel and SPSS where descriptive statistical analyses were conducted. As Generation Z descends on college campuses, with their technology dominated backgrounds and different communications, learning, and social preferences, it is important to better understand this generation whose needs and expectations will help shape the future of higher education. Additionally, this study also provides research on a population (first-generation minority college students) that is

expanding in numbers in higher education and that the literature, reports is impacted negatively by the digital divide and educational inequalities. This paper is timely and relevant and helps to extend our understanding of Generation Z. The findings show that Generation Z learners enrolled in a minority-serving institution enjoy computer classes, feel that using computers comes easy to them; and perceive themselves as experts in the use of social media, mobile operating systems, using a smart phone, searching the Web, and email. Participants also reported that they want to be more technologically literate, want to be more skilled in computer software applications, and are interested in learning about cyber security. In terms of the future, most respondents also believe that their career will require them to analyze information to inform decision making. Additionally, most stated that information security will be important to their future career. Finally, the results affirmed that college computing courses remain important and that college students recognize that technology will play a crucial role in their career with employers wanting to see job applicants with strong technology skills. Generation Z learners enrolled in higher education need, and want, a wide range of technology courses available to them in order to help them meet the rapidly evolving demands of tomorrow's workplace. Students in this study overwhelmingly see the value in enhancing their technology skills especially in such areas as computer software applications, information management, and cyber security. Institutions of higher education should invest in thorough and ongoing examinations of the information and technology literacy skills, needs, and perceptions of students. Understanding the interests and needs of Generation Z learners is imperative to the future of higher education. This survey is a work in progress

that is part of a pilot study that is being used to help guide a much more sizable examination of Generation Z learners.

**Summary.** This study uses data from a survey that was given to 160 Generation Z students who had finished a beginner computer concept and application course at the University of Maryland Eastern Shore, a historically black college. The authors establish key characteristics of Generation Z students, such as the fact that they enjoy self-directed learning but struggle with critical thinking skills. Buzzetto-Hollywood and Alade cite Sherry Turkle and Turkle's work on the concept of tethering. Turkle (2011) states that people are becoming so attached to technology that we now live in a network culture where people use technology as a way to control how people view them and their relationships. This point is especially true for Generation Z students, who are attached to their smartphones. Due to the consistent access Generation Z has always had to technology, scholars believe that this population will change the way society thinks and learns. While Generation Z is capable when it comes to social media, more employers are finding that this era of individuals lack the ability to use productivity tools.

The authors administered an online student perception pilot survey to Generation Z students enrolled in a mid-Atlantic minority-serving institution. The survey explored student technological backgrounds, perceived computer abilities, and the predicted role technology will play in future careers; of the students surveyed, 160 responded. Key findings from this study include that Generation Z is confident in their abilities to use basic computer applications, social media, email, smartphones, and the internet; technology will be a large part of most careers in the future; and students want to improve their technology skills because they know they are important. Limitations of this study

include surveying only one institution, administering the survey after students had finished a core computer concepts class, and limited available literature about Generation Z.

This study is relevant to my research because it addresses key characteristics about Generation Z related to technology. This generation is predisposed to using the internet and smartphones; thus, this data is important to inform effective methods to recruit this demographic of student.

**Loveland, E.** (2017). Instant generation. *Journal of College Admission*, 235, 34-38.

<http://www.eric.ed.gov/ERICWebPortal/contentdelivery/servlet/ERICServlet?accno=EJ1142068>

**Abstract.** Note: Abstract provided by the author of this annotated bibliography in the absence of a published abstract. The author presents characteristics of Generation Z, defined as those born between 1995-2010, and recommendations for how universities can better connect with this population. Recommendations include using preferred methods of communication, such as texting rather than e-mail; altering campus visits by breaking up information sessions and campus tours to prevent boredom; and addressing new methods of admission application submission such as allowing for self-produced videos rather than traditional written essays.

**Summary.** This article focuses on characteristics of Generation Z students, defined as those born between 1995-2010, and their higher education preferences. Generation Z students are looking for a more customized college experience, where they can select their courses of study. They appreciate practical-real life experience and highly value input

from their peers, especially when it comes to choosing a college. Due to rising student loan debt, parents and Generation Z students are cautious about the cost of college.

The author also highlights that technology has shifted the way students communicate, noting that while the preferred method of communication used to be e-mail, Generation Z prefer texting. The author also notes that while the most popular social media platform used to be Facebook, Generation Z primarily uses Instagram.

However, while technology preferences have changed for the next generation, Generation Z students still prefer one-on-one communication. The author encourages recruiters to employ face-to-face communication, personalized information for prospective students, and altered admission applications that include self-produced videos. The author discourages the use of paper handouts, long campus tours, and e-mail marketing campaigns with automated messages.

This article relates to my research because it identifies characteristics of Generation Z as they relate to recruiting students to universities. The suggestions listed in this article can be used as solutions to enrolling Generation Z students by improving enrollment management processes.

**Seemiller, C., & Grace, M.** (2016). *Generation Z goes to college*. San Francisco, CA: John Wiley & Sons.

**Abstract.** Generation Z is rapidly replacing Millennials on college campuses. Those born from 1995 through 2010 have different motivations, learning styles, characteristics, skill sets, and social concerns than previous generations. Unlike Millennials, Generation Z students grew up in a recession and are under no illusions about their prospects for employment after college. While skeptical about the cost and value of higher education,



they are also entrepreneurial, innovative, and independent learners concerned with effecting social change. Understanding Generation Z's mindset and goals is paramount to supporting, developing, and educating them through higher education. *Generation Z Goes to College* showcases findings from an in-depth study of over 1,100 Generation Z college students from 15 vastly different U.S. higher education institutions as well as additional studies from youth, market, and education research related to this generation. Authors Corey Seemiller and Meghan Grace provide interpretations, implications, and recommendations for program, process, and curriculum changes that will maximize the educational impact on Generation Z students.

**Summary.** This book identifies characteristics of Generation Z, specifically as they relate to higher education. Generation Z is rapidly replacing Millennials on college campuses. Those born from 1995 through 2010 have different motivations, learning styles, characteristics, skill sets, and social concerns than previous generations. Unlike Millennials, Generation Z students grew up in a recession and are under no illusions about their prospects for employment after college. While skeptical about the cost and value of higher education, they are also entrepreneurial, innovative, and independent learners concerned with effecting social change. Understanding Generation Z's mindsets and goals is paramount to supporting, developing, and educating them through higher education.

Seemiller and Grace conducted the *Generation Z Goes to College* study, where they surveyed 1,223 students from fifteen partner institutions over a three month period. Of the 1,223 students the study began with, only 1,143 were born in 1995 or later. Most of the findings Seemiller and Grace report are gleaned from the *Generation Z Goes to*

*College* study; however, the book is heavily supplemented with work from other scholars, including Carol Elam, Terry Stratton and Denise Gibson's (2007) research on Millennials attending college, where *Millennials* are defined as students born between 1982-2002; and Tom Koulopoulos and Dan Keldsen's (2014) research on Generation Z entering the work force. The authors explore nine characteristics of Generation Z: (a) beliefs and perspectives; (b) communication platforms and preferences; (c) social media use; (d) friends, family, and romance; (e) cares and concerns; (f) engagement and social change; (g) leadership styles and capacities; (h) learning styles; and (i) strategies for working with Generation Z.

Key findings from Seemiller and Grace revolve around the motivations of Generation Z and their priorities. Generation Z students are motivated by opportunities to get ahead, earning credit towards something, making a difference, and advocating for others. This era of student is more career minded than their predecessors. They are incentivized through reaching career milestones. While Generation Z prioritizes financial stability, they are more focused on relationships and working for a cause they believe in.

This generation understands the importance of education in relation to their own personal success; however, the financial burden of attending a higher education institution creates anxiety among the population. The authors found that this generation of student prefers a limited college experience; they want to take classes but they do not want the typical university experience that includes living on campus and attending athletic events. While these students may not prioritize the college experience, they are very invested in campus location, institution facilities and program flexibility. Program flexibility is one of the

most important areas for this generation because they want to have the ability to build their courses of study and learn according to their individual schedules.

In terms of communication, Generation Z prefers text messaging and face-to-face communications over all other methods. The authors note that though Generation Z prefer face-to-face communication, their interpersonal skills may be lacking due to the amount of time this population spends using technology. When it comes to social media platforms, Generation Z uses Facebook and Instagram. This generation values their relationships with their families, especially their parents, so their preference for Facebook stems from their desire to keep in touch with family members.

Of the nine characteristics the authors examined, the characteristics that have the greatest influence on college enrollment decisions are maximizing learning, cares and concerns, social media use, communication platforms and preferences, and beliefs and perspectives. This book relates to my research because it provides a detailed account of the characteristics of Generation Z as they relate to higher education. While there are characteristics that do not relate directly to enrollment and the book does not specifically address four-year institutions, this information will be helpful in identifying attributes of this population and strategies to compel them to enroll in four-year institutions.

**Turner, A.** (2015). Generation Z: Technology and social interest. *Journal of Individual Psychology*, 71(2), 102-113. Retrieved from <http://www.utexas.edu/utpress/journals/jip.html>

**Abstract.** The article explores Generation Z, its special relationship with technology and social media, and its values, as well as how this generation may form and practice social interest. The author shares recommendations for parents, teachers, and clinicians.

**Summary.** The author examines the characteristics of Generation Z, especially as they relate to technology, social media, and social interest. The author utilizes information from several sources, however, the source referenced the most is the study conducted by Rideout, Foehr, and Roberts (2010) for the Kaiser Family Foundation that examined media use in 2,000 Generation Z youth ranging in age from eight to eighteen. Definitions are provided for the Greatest Generation, the baby boomers, Generation X, Millennials, and Generation Z. Unique characteristics of Generation Z are identified as this generation being technologically inclined due to the availability of technology since birth, diversity of ethnicity and sexual orientation, highly conscious of financial matters due to the 2008 financial crisis, and a general belief that the world is unsafe due to exposure to constant war at a young age. The author outlines the importance of the internet to Generation Z. This population uses the internet to “meet new people, share artistic tastes, keep up with family and friends across the globe, mobilize civic protests, find romantic partners, and gain therapeutic support” (p.105). Because Generation Z relies upon the internet for so many purposes, media usage has reached an all-time high. The Kaiser Family Foundation (2010) reported that Generation Z spent more time on media than any other activity, excluding sleeping, which amounts to close to eight hours of electronic exposure per day. The Kaiser Family Foundation (2010) also found that smartphone usage is not exclusive to high income households; close to 60% of survey respondents in households that earned \$30,000 or less owned a cell phone. Additionally, it was found that youth of Latino and African American ethnicities consume 4.5 times the media as white youth. With consumption of media so high among this generation, the author claims that a digital bond has formed between youth and the internet. The author cites results from a study

completed by Palley (2012) that indicate that offline activities ranked lower than cell phone usage for Generation Z. Given the evolution of on-demand programming and more access to television, Generation Z spends an hour more per day consuming television. Results from Palley's study also indicate that Generation Z is more comfortable socializing with people online and find it more convenient than real life interactions. The author asserts that this lack of face-to-face communication could take a toll on this generation because they will lack the tools to connect with others.

The author asserts that the amount of time this generation spends using media is cause for alarm. Recent studies have linked excessive video game usage to bad grades and lack of control over emotions like anger and fear. Additionally, when Generation Z uses media to distract themselves from obstacles occurring in their lives, they miss the opportunity to grow as people. Yet the author notes that media has also been used as a place for youth to bully each other without having to deal with the reactions of others. The author concludes that these factors lead to the instant gratification Generation Z receive every day due to constant access to technology.

The author cites results from a study by Steyer (2012) that identified that regions of the brain in Generation Z that stimulate impulses are constantly activated by their access to media. Since this generation is so comfortable with technology and relying on search engines for answers, Turner asserts that this generation cannot assess the information they are procuring. The author uses the comparison of viewing and reading to illustrate this point, Generation Z views information instead of reading and assessing it. The rise in technology has also lead to the increase in multitasking behaviors and partial attention.

The author makes the following recommendations (a) involve critical thinking in the use of media by asking thought provoking questions, (b) create an awareness of Generation Z's frame of reference for older generations to stay actively engaged with the youth, and (c) encourage Generation Z to use coping mechanisms during times of distress to allow for growth of social interest.

This article is relevant to my research because it provides information about Generation Z and how they interact with and value technology. These insights could be used to create effective enrollment strategies.

### **Declining Four-year University Enrollment Factors**

**Fincher, M., & Katsinas, S. (2017).** Testing the limits of the price elasticity of potential

students at colleges and universities: Has the increased direct cost to the student begun to drive down higher education enrolment? *Journal of Higher Education Policy and Management*, 39(1), 31-29. doi: 10.1080/1360080X.2016.1211975

**Abstract.** Higher education enrolment has long been known to rise and fall counter to the current economic situation. This counter-cyclical enrolment response represents an economic principle where a price-elastic consumer is more likely make a consumption choice when another valuable use of resources is not available. Higher unemployment has historically led to increased enrolment as fewer prospective students have had attractive employment opportunities as an alternative use of the resource of time. This consumer decision was possible students generally had the ability to pay the cost. This trend has now ended as enrolment is no longer rising with increased unemployment. This indicates that ability of many students to pay has now been exceeded by the cost of tuition and other fees.

**Summary.** This study examines the connection between enrollment in higher education institutions and employment rates. In the past there was a positive correlation between economic downturns and increased enrollment in higher education institutions. This positive relationship was driven by opportunity cost. Students were able to go to school instead of work during economic downturns because quality jobs were limited and students had the funds to enroll using federal aid. Higher education policies have been heavily reliant on this employment-enrollment relationship, with the expectation that in times of economic recession more people will go back to school and boost the economy with their degrees. A very important part of the relationship between enrollment and employment is availability of funds. With tuition and fee rates continuing to rise, students may no longer have the opportunity to forgo work income to attend school.

The author revisits the history of financial aid in the U.S., starting with the Serviceman's Readjustment Act and the Surplus Property Act in the 1940s that assisted veterans of World War II by giving higher education institutions human and physical capital resources and assisting veterans with tuition and fees. The author follows higher education through the 1970s when the Pell Grant was created to 2014 when the cost of attending a higher education institution had increased but no substantial change had been made to federal aid.

This study utilizes the Human Capital Theory and Economic Theory. The Human Capital Theory states that people invest their resources in their abilities when it will increase their value and productivity. The Economic Theory states that individuals will make a choice based on what will most help them achieve their personal goals.

The authors also utilize a multiple regression model to evaluate enrollment, employment, and education costs between 1980 to 2012. Key findings include a strong relationship between unemployment and higher education enrollment when adequate financial resources are available to students. However, due to the rising cost of higher education and the stagnation of federal aid, the relationship between unemployment and higher education enrollment is decreasing. The author states that new strategies will have to be created to make up for the decrease in the employment-enrollment relationship. The authors suggest that states increase support of higher education institutions to allow for a reduction in direct costs and that the federal government increase federal aid to students to reduce out-of-pocket expenses.

This article is relevant to my research because it identifies barriers to increasing enrollment and validates the argument that enrollment is in decline due to high costs.

**Heckman, S. J., & Montalto, C. P.** (2018). Consumer risk preferences and higher education enrollment decisions. *Journal of Consumer Affairs*, 52(1), 166-196. doi: 10.1111/joca.12139

**Abstract.** Although there are widespread concerns that consumers are making poor choices regarding higher education, the fact that human capital investments are risky is often overlooked in the national conversation. Therefore, this research investigates the effect of risk preferences on higher education enrollment decisions. A sample from the 1997 cohort of the National Longitudinal Survey of Youth (NLSY97) was analyzed, and the results indicate that consumer risk preferences have a significant effect on the likelihood of enrollment. Specifically, there was a robust, positive relationship between risk tolerance and the likelihood of enrollment even after controlling for time preferences



and risk perceptions. Consistent with previous findings, ability, parental education, family net worth and income, and being female were positively associated with the likelihood of enrollment. The results suggest that risk preferences may be an important source of omitted variable bias in previous studies of higher education investment choices.

**Summary.** This study explores the relationship between consumer risk preferences, defined as “consumer attitudes toward and willingness to accept risk”, and likelihood of enrollment (p. 167). The authors identify several factors related to uncertainty that make higher education risky, including the uncertainty of whether a student will graduate and the demand in the market for the degree earned. Mistakes students will commonly make when deciding to pursue higher education are overestimating how much it will cost, not calculating how much they will owe in loans, and not connecting their degrees to prospective careers.

This study employs the concepts of risk premium and risk aversion. Risk premium is defined as “the amount of money that a consumer requires in order to be indifferent between the payoff of a risky choice and the same payoff of a certain choice funds” (p. 168). Risk aversion relates to how much risk an individual is willing to take. A risk averse individual will take minimal to no risks. This study also evaluates stability of risk preferences. The authors cite research that shows that individuals become more risk averse as they age and risk preference is impacted by macroeconomic conditions.

This study uses a sample from the 1997 cohort of the National Longitudinal Survey of Youth. The sample included respondents who were at least 15 years old at the time of the survey and had graduated high school or completed the GED by age 20, which amounted

to 2,781 individuals. The authors used logistic regression to model higher education enrollment in relation to risk tolerance.

Key findings of the study include: (a) individuals who lived with both biological parents were more likely to attend a higher education institution than those who lived with one biological parent, (b) individuals from less educated households, defined as a high school diploma or less, were less likely to enroll in a higher education institute, (c) individuals from families with higher net worth were more likely to attend a higher education institution than those from poorer households, (d) enrollment rates of women were significantly higher than enrollment rates of men, (e) Asians had higher enrollment rates than Hispanics, and (f) individuals who smoked had lower enrollment rates than those who did not smoke. Potential bias concerns of the study include differences in enrollment type (community college versus four year university), measurement of risk tolerance due to question framing, missing data, and timing of variable measurement. The authors state that there is a positive correlation between risk preference and higher education enrollment. Individuals who are risk-tolerant have a greater chance of enrolling in higher education.

This article is relevant to my research because it identifies factors that lead to higher education enrollment. The article also substantiates that those with higher risk tolerance are more likely to enroll in a higher education institution.

**Pan, W. & Ost, B.** (2014). The impact of parental layoff on higher education investment.

*Economics of Education Review*, 42, 53-63. doi: 10.1016/j.econedurev.2014.06.006

**Abstract.** This paper uses variation in the timing of parental layoff to identify the effect of parental job loss on higher education enrollment. Unlike research that compares laid-

off workers to workers who do not lose their jobs, all families in our analysis experience a layoff at some point. The treatment group (layoff when child is 15–17) and control group (layoff when child is 21–23) have statistically indistinguishable initial characteristics, but substantially different higher education enrollment rates. We find that parental job loss between ages 15 and 17 decreases college enrollment by 10 percentage points.

**Summary.** The authors examine the impact family income has on college enrollment. Pan and Ost used the Panel Study of Income Dynamics (PSID) to compare families who experienced layoffs, but where the timing of the layoff was different in regards to the ages of their children. The authors assumed that future parental job loss would have no direct effect on past college enrollment; they selected the population that eventually experiences parental job loss, but whose enrollment decisions are not influenced by the event as the control group. The authors note that Hilger (2013) wrote a similar paper that reported that college enrollment declines because of parental layoffs; however, the magnitude of his estimated decline is much smaller than the estimated decline the authors noted in this article.

The authors identified the following elements that can lead to reduced enrollment in conjunction with parental layoffs: (a) limited access to credit, (b) a drop in wealth caused by a layoff, (c) parental layoff during high school that causes a negative impact to academic performance, and (d) hostile home environment due to a layoff. Pan and Ost state that students may be intimidated by the sticker price of higher education, which discourages them from attending, noting the limited financial resources available to students through loans and financial aid.

The authors found three sources of bias in the study: (a) families who anticipate future layoffs, (b) parents who are laid off when their child is 15-17 tend to be younger than parents who are laid off when their child is 21-23, and (c) sample attrition has the potential to create bias. The sample size of this study was 4,030 children, 640 of whom had a parent who was laid off when they were 15-17 or 21-23. Using regression analysis, Pan and Ost were able to confirm that “parental layoff decreases higher education enrollment by 10.1 percentage points” (p. 55).

This article relates to my research because it focuses on higher education enrollment and how parental layoffs impact higher education enrollment, thus addressing a barrier to entry and the current higher education climate.

### **Assessing University Enrollment**

**Holley, K., & Harris, M.** (2010). Selecting students, selecting priorities: How universities manage enrollment during times of economic crises. *Journal of College Admission*, (207), 16-21.

**Abstract.** Note: Abstract provided by the author of this annotated bibliography in the absence of a published abstract. This article assesses the challenges of declining enrollment for universities. The article uses data collected from Southeastern University and Regional State University related to admissions and financial aid. The authors provide historical information for both colleges and describe how the environment of the universities has changed over the years. The authors break down specific components of enrollment related to the two universities, including recruiting and financial aid. Key findings of factors impacting enrollment include the breadth of online course offerings, the quality of institutional facilities, and the availability and amount of financial aid.

**Summary.** The authors examine how the impact of economic challenges on the college admissions process create a barrier to entry. Holley and Harris assert that economic recession partnered with higher tuition rates can create a barrier to entry for students. The data listed in this article was collected from a large case study of public four-year institutions. Six institutions were chosen from the southeastern United States for the study; however, only two of the institutions are mentioned in this article. The remaining universities are not named and interview respondents were assured confidentiality in regards to their responses.

The first university is referred to as “Southeastern University” (SU) and enrolls more than 25,000 students. SU saw a drop in their out-of-state students after the recession that began in 2008, which proved to be a financial challenge because the university relied on out-of-state tuition as a supplemental revenue source. To assist students with academic expenses, SU implemented textbook rental programs, worked with students on their financial aid packages, and gave more administrative support to student payment plans. Southeastern administrators also credited their merit-based scholarships as one of their major recruiting tools.

Regional State University (RSU) enrolls less than 5,000 students. RSU administrators stated that cost is not a barrier for students because the university is so affordable in comparison to other institutions but noted that for families that do not qualify for federal assistance, paying for college can be hard. This issue is made worse by the fact that there are limited job opportunities in the area, which means students have to travel up to 90 miles to find jobs. Additionally, RSU has trouble recruiting students to their rural location because it is too far from their families. To encourage students to stay on

campus, the university has renovated buildings and updated cafeteria offerings. To increase revenue, RSU has expanded their online degree programs, entered dual-degree and international partnerships, and increased tuition rates.

Holley and Harris emphasize that the most important areas of college enrollment are recruitment, financial aid, and maintaining momentum. The authors emphasize that institutions should consider the specifics of their organizations before responding to challenges that are external to their institutions.

This article is relevant to my research because it addresses declining enrollment using testimony from actual institutions. While this article is nine years old and specifically focuses on the impact of the recession that began in 2008 on enrollment, it is still relevant because students are still struggling to afford tuition.

**Maldonado, S., Armelini, G., & Guevara, A.** (2017). Assessing university enrollment and admission efforts via hierarchical classification and feature selection. *Intelligent Data Analysis*, 21(4), 945-962. doi:10.3233/IDA-160186

**Abstract.** Recruiting prospective students efficiently and effectively is a very important challenge for universities, mainly because of the increasing competition and the relevance of enrollment-generated revenues. This work provides an intelligent system for modeling the student enrollment decisions problem. A nested logit classifier was constructed to predict which prospective students will eventually enroll in different Bachelor degree programs of a small-sized, private Chilean university. Feature selection is performed to identify the key features that influence the student decisions, such as socio-demographic variables (gender, age, school type, among others), admission efforts, and admission test results. Our results suggest that on-campus activities are far more productive than career

fairs and other efforts performed off campus, demonstrating the importance of bringing prospective students to the university. Furthermore, variables such as gender, school type, and declared university and Bachelor degree program preferences are shown to be relevant in successfully modeling the student's choice of university.

**Summary.** The study examines the enrollment efforts of a small, private Chilean university using a discrete-choice model to measure the effect of multiple variables for four Bachelor degree programs: (a) engineering, (b) law, (c) business management, and (d) nursing. Variables analyzed in the study were: (a) admission marketing efforts, (b) prospective student online activities, (c) gender, and the (d) student's institutional preference. The authors used a hierarchical classification approach to model prospective student choices.

This study describes the three-step process of student enrollment decision-making: (a) inclination toward higher education, (b) search for potential school, and (c) final decision based on their choice set. The authors also examine the historical uses of data analytics to enable better enrollment strategies. Maldonado, Armelini, and Guevara reference studies completed in the United States that used factors like ethnicity, gender, and family income to better concentrate recruitment efforts.

This study uses three possible outcomes: (a) the student does not apply and does not enroll, (b) the student applies but does not enroll, (c) the student applies and does enroll.

The Knowledge Discovery in Databases (KDD) process was used to develop a model for each Bachelor degree program; the KDD process requires the following steps: (a) data consolidation, (b) data pre-processing, (c) univariate variable selection, and (d) model specification and final variable selection. The dataset was based on 25,325 students

during the admissions process from 2009 to 2011. Self-selection is listed as a limitation of the study because students who did not apply or participate in activities by an institution are not represented.

Key findings of the study include determining that campus visits and university presentations at secondary schools were effective in recruiting students, student proactivity through online research of institutions was a strong indicator of enrollment, e-mail and web-based interactions do not work for all programs, and institutions declared as a student's first choice have a higher probability of enrollment.

This study is relevant to my research because it addresses how data analytics can be used to better recruit students. While this study was completed in Chile, the factors addressed are the same as those represented by higher education institutions in the United States.

**Meyer, A. J., & Sikkink, D. H.** (2004). What does it profit a college to add more students? The relationship between enrollment growth and financial strength. *Christian Higher Education*, 3(2), 97-113. doi:10.1080/15363750490438958

**Abstract.** The relationship between growth and financial strength in a group of colleges and universities generally interested in enrollment growth was studied. Contrary to the conventional wisdom among administrators, it was found that institutions characterized by greater enrollment growth in a given year were not characterized by more positive subsequent changes in overall financial strength.

**Summary.** The authors examine the history of correlating enrollment to institution viability, citing the Morriss-Olson (1996) study that used enrollment changes and financial ratios to evaluate institution health. Morriss-Olson found that enrollment and fund balance ratios were of importance to small college viability. The authors identify



that faculty prefer higher enrollments because they often lead to personnel additions and department growth. Additionally, having high numbers of applications elevates an institution's public image.

The authors point out that few schools fully utilize all of their resources because they continue to add more resources to attract more students. Furthermore, the authors state that continual enrollment increases cannot be financially advantageous in the long term because financial health is not directly tied to enrollment change, noting that the more students an institution enrolls the greater their operating expenses will be to maintain the same quality of education.

Meyer and Sikkink revisit the history of financial aid and whether financial aid was intended to help institutions increase enrollment or to help students. In 1984 the U.S. Supreme Court ruled that federal financial assistance was really aid granted to an institution. The authors state the difference in financial aid policy between Europe and the United States. In Europe policies for higher education funding have been focused on the institution rather than focused on the individual student like United States. The authors point out that due to this dissimilarity in policy the United States has greater diversity within their educational system.

Meyer and Sikkink used colleges and universities from the Council for Christian Colleges and Universities (CCCU) for their study. They chose to focus on these institutions because: (a) they are a small set of schools and the data was available, (b) institutions in the CCCU are interested in enrollment growth, (c) CCCU institutions have seen rapid growth in comparison to other schools, and (d) institutions within the CCCU have unique mission statements. They initially used data from the National Center for Education

Statistics for this study, focusing on enrollment variations and changes in the financial status of institutions from 1976 to 1996. The authors found that an increase in enrollment correlated to financial loss.

Meyer and Sikkink investigated their findings further by studying the year-to-year effects of enrollment change. They used three ratios during the study to establish financial health: (a) assets to liabilities ratio, (b) current fund balances to expenditures and mandatory transfers ratio, and (c) measurement of current operations surplus or deficit ratio.

Key findings in this study were that institutions with increased enrollments in base years were not more financially secure in the years that followed than institutions who did not see growth in their enrollments. Additionally, institutions that had a decline in enrollment of 2-7% were stronger financially than those that had enrollment growth. Meyer and Sikkink state that further work in this area could include the study of the relationship between enrollment growth and financial stability in other institutions using data from 1996 to present.

This article is relevant to my research because it explores the idea that financial gains do not automatically follow enrollment gains. This finding contributes to the philosophy universities should have about the recruitment of students, with the idea that more is not necessarily better. While universities will need to evolve to accommodate Generation Z students, they must also pay attention to the factors that lead to financial viability.

**Vander Schee, B. A.** (2009). Embracing enrollment management: A comprehensive approach to college student marketing. *Academy of Marketing Studies Journal*, 12(1), 1. Retrieved from <http://www.alliedacademies.org/academy-of-marketing-studies-journal/>

**Abstract.** Small private colleges that are heavily dependent on tuition for fiscal viability are challenged each year to maintain and grow student enrollments. However, the size of smaller institutions also affords them the opportunity to react quickly to changes in the student market. This also allows them to readily assume a comprehensive approach to college student marketing by adopting an enrollment management program. A comprehensive enrollment management program includes the following five components: institutional marketing, admissions/recruitment, retention programs, planning, and model of coordination.

The purpose of this survey-based longitudinal study is to investigate how Council for Christian Colleges and Universities member institutions have responded to enrollment and resource pressures with enrollment management strategies. The analysis in this study focused on enrollment management practices at the program and component level. The results indicate that having certain components in place has a positive influence on student recruitment and retention. Implications for college student marketers and enrollment managers in higher education are discussed and considerations for future research are also highlighted.

**Summary.** The author notes the decrease in government support to religious-affiliated, private, four-year colleges and the need for colleges to attract more students and retain the students they have to remain economically viable. Vander Schee states “enrollment management is the comprehensive approach to college student marketing expressed in terms more readily accepted and understood by higher education administrators” (p. 2). Vander Schee states that an institution must have five components to have an identifiable enrollment management program: (a) institutional marketing, (b) admissions/recruiting,

(c) retention programs, (d) planning, and (e) operation of a structure or model with coordinated enrollment management efforts.

Vander Schee uses a theoretical model that combines marketing principles and enrollment management to “investigate the relationship of enrollment management utilization to student recruitment and retention” (p. 4); the model was adapted from a survey developed by Taber (1989). The author used a causal-comparative methodology to calculate changes in enrollment management programs and investigated the utilization of an enrollment program in relation to student recruitment and retention measures from 1997 to 2009. The results from his study indicate that there is no one right structure for a successful enrollment management system. The findings further indicate that the use of institutional marketing and admissions/recruiting have the greatest positive effects on admissions yield, coordination of enrollment management efforts has a positive influence on retention and graduation, and planning is essential to encourage a positive long-term enrollment outlook.

Vander Schee encourages enrollment managers to review enrollment efforts and encourages institutions to plan desired outcomes five to ten years in the future. He also suggests that enrollment managers assign importance to retention programs due to their cost effectiveness in maintaining current students.

The author identifies the limitations of the study as: (a) focusing on whether an institution had a model of coordination in place rather than how effective each model was, (b) the possibility that the survey respondents lacked the appropriate institutional knowledge given the high rate of turnover in higher education, and (c) compromised survey results

because the survey asked respondents to answer using increments of five years rather than exact years and months.

This article relates to my research because it provides an in-depth look at enrollment management of four-year institutions in an environment where government funding is in decline. While the study is primarily focused on religious-affiliated, private four-year institutions, the enrollment management components are still relevant and applicable to other higher education institutions.

### **The Use of Academic Analytics in Higher Education**

**Cazier, J. A., Sargent Jones, L., Mcgee, J., Jacobs, M., Paprocki, D., & Sledge, R. A. (2017).**

Moving from forecast to prediction: How honors programs can use easily accessible predictive analytics to improve enrollment management. *Journal of the National Collegiate Honors Council*, 18(2), 213-234. Retrieved from <http://www.nchchonors.org/resources/nchc-publications>

**Abstract.** Note: Abstract provided by the author of this annotated bibliography in the absence of a published abstract. The authors propose an enrollment model for honors programs using data analysis to create individual predictions. The model includes seven factors: grade point average, SAT scores, gender, race, socioeconomic status, major, and location. The authors found that by analyzing these seven variables, honors directors would have a more holistic view of prospective students and could better recruit based on the attributes of the cohort they wanted to establish. The authors examine the current state of the higher education environment, especially as it relates to recruitment of honors program students.

**Summary.** Cazier, et. al. (2017) explain the function of enrollment management and the difficulties institutions are faced with when recruiting students. The authors mention that the perception of the value of a college degree among potential students is declining and the resulting intensified competition between universities for high-quality freshmen and “students who can afford to pay out of pocket” (Cazier et. al., 2017, p.217). The authors describe the precarious financial position of honors directors, noting that if directors do not offer the appropriate amount of aid, they risk insufficiently funding students or not recruiting enough students to the programs.

The authors examine how data analytics has been used in a university setting, specifically in the analysis of enrollment and completion data. They explain the difference between forecasting, predictive analytics, and prescriptive analytics, identifying forecasting as an “estimate of a future event, generally in aggregate form,” predictive analytics as forming predictions of how likely the event is to occur, and prescriptive analytics as the use of tools to find ways to change outcomes (p. 214). Cazier, et. al. state that predictive and prescriptive analytics can help to improve efficiency and effectiveness.

The authors propose an enrollment model for honors programs to predict an individual’s likelihood of matriculation instead of using historical acceptance rates that institutions have used in the past to create initial forecasts. The model includes seven factors: grade point average, SAT scores, gender, race, socioeconomic status, major, and location.

Cazier, et. al. (2017) admit that “predicting an individual’s overall likelihood of accepting an enrollment offer is precarious,” but note that financial aid and cost of attendance are large factors in attracting students (p. 215). The authors compare the historical process of honor program recruiting to recruiting using analytics, stating that data allows

universities to perform a “more granular examination of who is likely to attend and why” (p. 216). Their study uses data from a mid-sized regional university in the southeastern United States to illustrate the value of predictive analytics (Cazier, et. al., 2017).

The model uses two academic credentials, grade point average and SAT score, and five demographic data points. The authors found that by utilizing multiple data points indicative of enrollment and predictive analysis, universities could discover which prospective students were most likely to attend and why.

Cazier et. al. (2017) conclude that using data analytics enables honors directors to make more informed decisions when building their cohorts by creating individual predictions of who will and will not enroll. The authors state that the method described in the study is not a perfect system and honors directors should make adjustments for ethical considerations to prevent turning away students because they do not fit the statistical model. The authors suggest that directors should accept students based on how likely they will be to accept an offer rather than basing their decisions on demographic qualities.

This article relates to my research because it addresses the use of data analysis to improve enrollment processes. While the article is focused on honors programs, the content can be applied to institutional enrollment as a whole. As universities become more competitive it will be important to shift data analysis to individual predictions so institutions can be more intentional with their limited resources.

**DesJardins, S. L.** (2002). An analytic strategy to assist institutional recruitment and marketing efforts. *Research in Higher Education*, 43(5), 531-553. doi:10.1023/A:1020162014548

**Abstract.** This article demonstrates how to fit a statistical model to historical data, test whether the model can accurately predict enrollment out-of-sample, and use the results to

segment admitted students into groups so that different recruitment and marketing interventions can be applied. Conceptual and practical issues are discussed, as well as policy considerations.

**Summary.** The author addresses the increased importance of recruiting students as enrollment has grown more challenging during a period of declining government and state funding for institutions. DesJardins describes the different stages of enrollment and emphasizes that the admitted-to-enrollment stage is one of the most important because institutions use so many resources getting admitted students to enroll. DesJardins describes the use of data analysis at this stage to segment admitted students based on the probability of the student enrolling and the use of targeted messages that are sent based on segmentation. While this strategy is known and practiced, the author notes that consultants and institutional analysts do not share their techniques in an effort to protect their livelihoods, so little information is known about the actual analysis. The author states that the analytic strategy of segmenting students should be used as a complement to the experience of an experienced enrollment manager, not as a substitute.

DesJardins identifies the three stages of the college-choice process: (a) formation of college aspirations; (b) identification and selection of and application to a set of colleges; and (c) admission to a higher education institution.

DesJardins performed a study in order to build a model that would provide insight about the admitted-to-enrollment stage of the student college-choice process. The study institution was a large, public Research I institution in the Midwest that enrolled close to 3,800 new freshmen each year. The study used data from the admissions office and limited samples from the following groups: (a) students who were admitted in early



January and planned on attending that year; (b) students who were not student athletes; and (c) students with ACT Student Profile Questionnaire (SPQ) information on file. To aid in the objective of building a model that would give institutions more information about the admitted-to-enrolled stage, the author further restricted data by only utilizing information from admitted students. The conceptual model DesJardins used was based on the human capital theory that “students make college-choice decisions by weighing the benefits and costs of various schooling and nonschooling alternatives” (p. 535).

Key findings from the study included: (a) students who have high admissions index scores, admission index score is defined as “ACT Composite score times two plus high school rank percentage”, are more likely to enroll as low scoring students; (b) students from high schools with high yield rates, high school yield rate is a five year average defined as “the amount of high school students enrolled at an institution divided by the amount of high school students who applied to the institution”, are more likely to enroll than students from low yield schools; (c) students who listed the study institution as their first choice or who were residents of the study institution state were more likely to enroll; (d) students whose parents graduated from the study institution were 1.3 times more likely to enroll than students that did not have family ties to the institution; (e) students who apply for admission before September are two times more likely to enroll than a student who applies for admission in December or early January (p. 536).

The author concluded that enrollment managers must use a combination of empirical methods and subjective analysis to determine which prospective students are wavering in their decisions to attend college and which students are planning to attend. Furthermore, this type of analysis allows enrollment managers to target low-probability students,

saving institutional resources by focusing less on high-probability students. DesJardins warns enrollment managers that the time period in which they begin scoring students is critical. In the case of the institution in the study, the best time to score students was in early January because over 80% of new students had been admitted by that time. The author also stresses that strategic enrollment management should incorporate all aspects of student recruitment, selection, and retention.

This article is relevant to my research because it provides insight into using data analytics in relation to student recruitment. While the article is seventeen years old, many of the concepts discussed are still relevant to higher education enrollment management.

**Selingo, J. J.** (2018). Here's what today's students want from college. *The Chronicle of Higher Education*, 65(8), 1-3. Retrieved from <https://www.chronicle.com/>

**Abstract.** Note: Abstract provided by the author of this annotated bibliography in the absence of a published abstract. The article addresses the use of online survey data to enable universities to better cater to their student populations. The author points out that methods universities currently use to address student needs are rooted in old practices rather than information to be gleaned from student data. The author explains how recent research used student survey results to group students, a process called student segmentation. Using survey results, the author was able to segment students into five different “personas” based on how the institution could better address academic programs, marketing, and new services to these groups.

**Summary.** The author states that U.S. high school graduation rates have been mostly flat and are projected to remain so for the next ten years. The next group of students coming to college will be more racially and ethnically diverse, include more first generation and

low-income students than any other group of undergraduates in America, and be a completely new generation called Generation Z. The author asserts that colleges have been failing to offer their core populations the academic programs and student services they need because they do not have a clear understanding of their student populations. The author states that a concept called *student segmentation* can help to better align institutions with their students.

Student segmentation occurs when institutions group students based on their needs as reported in campus surveys. These groups allow universities to offer academic programs and campus services that then fulfill student needs. Recent research completed by Selingo indicated that “by more broadly adopting a segmentation approach to inform academic majors, help students navigate campuses, and enhance recruitment practices, colleges can put themselves on stronger financial footing and improve student success” (p. 1)

Selingo conducted a survey via a Harris Poll for the education company Pearson to learn what Americans from the age of 14 to 40 thought about college and education in general. Key findings from the author’s survey were that teenagers and adults had changed their minds about why they want to learn, why they want to go to college and the value they saw in a degree compared to how much it costs to earn one. Adults understand the relevance of education and are seeking a degree with broader learning opportunities, where teenagers want to earn a college degree to create financial stability. The survey results also indicated that alternative credentials and certificates are just as sought after as legacy degrees by college graduates and those interested in continuing their educations. Using these results, Selingo was able to demonstrate student segmentation by developing five student personas: (a) the traditional learner, (b) the hobby learner, (c) the career

learner, (d) the reluctant learner, and (e) the skeptical learner. Selingo noted that the five categories were not meant to encompass all types of learners or represent every type of student at every institution. The author found that these personas could be put to use by higher education institutions to serve new populations and increase enrollment.

This article is relevant to my research because it addresses the changing landscape of higher education with the entrance of Generation Z and how data analytics can be used to assist with the transition. The research completed in this article could be used as one approach to increase enrollment based on Selingo's findings that institutions that segment students to better design course offerings and student services may be able to increase enrollment, particularly with Generation Z.

**van Barneveld, A., Arnold, K. E., & Campbell, J. P.** (2012). Analytics in higher education: Establishing a common language. *EDUCAUSE learning initiative*, *1*(1), 1-11. Retrieved from <https://library.educause.edu/resources/2012/1/analytics-in-higher-education-establishing-a-common-language>

**Abstract.** The use of analytics in higher education is a relatively new area of practice and research. As with any new area of practice, a variety of terms are adopted to describe concepts and processes. Each of these terms is being integrated into the literature, but a preliminary review of the analytics in education and practitioner literature revealed similar terms with different conceptual or functional definitions, as well as different terms with similar conceptual or functional definitions. The intent of this paper is to present the different descriptions of the various types of analytics being discussed in the academic and practitioner literature. Second, we propose a conceptual framework that

depicts the types of analytics and their relationship to each other. Finally, we propose a synthesized set of definitions for analytics-related terms commonly found in academia.

**Summary.** The authors propose a conceptual framework for the use of analytics in higher education. The authors address the importance of efficiency and how analytics further efficiency efforts in retention, admissions, fund raising, and operations within higher education by allowing institutions to run predictions. The authors provide two frameworks to explain the use of different types of analytics in academic and industry settings.

The first framework the authors propose explains how various types of analytics can be used within a higher education institution. For the purposes of this study, business analytics is defined as “the practice of iterative, methodical exploration of an organization’s data with emphasis on statistical analysis”, and academic analytics is defined as “[a] process for providing [higher education institutions] with the data necessary to respond to the reportage and decision making challenges facing contemporary universities” (SearchBusinessAnalytics.com, 2010; Dawson, McWilliam & Pei-Ling, 2008) These type of analytics are used by administrators to find out how successful the institution is. Learning analytics in terms of academia will defined as “[the] use of data and models to predict student progress and performance, and the ability to act on that information” for the purposes of this study and is focused on students and gathering data to assist the students in being successful (Gilfus Analytics, 2011).

Predictive analytics, defined as connecting “data to effective action by drawing reliable conclusions about current conditions and future events” for the purposes of this study, are

used in all areas of higher education to allow for “informed decision making” (IBM, 2010; p. 6).

The second framework the authors propose focuses on teaching and learning. The authors note challenges that occur when using analytics in a teaching and learning environment, including credibility, meaning “a set of rigorous standards and practices must be established and widely accepted”, transformation, meaning “faculty and practitioners in different disciplines need to transform their current practices into formal inquiries regarding teaching and learning in their classrooms” , open and accessible scholarship, meaning all should have access to analytics to allow for further development of “established scholarly work”, and scale, meaning since the transformation of data requires human capital it can be challenging for institutions to transform and use data (p. 7, 8).

This article is relevant to my research because it defines different types of data analytics as they relate to higher education.

## **Conclusion**

This annotated bibliography summarizes the current state of enrollment at four-year institutions, how data analysis is used in higher education environments, and key characteristics of Generation Z students. Using the overarching themes from this compilation of scholarly articles, higher education administrators and trustee boards can begin to plan enrollment management strategies that will specifically target traditional students from the Generation Z population using academic analytics. Themes explored in this annotated bibliography are: (a) characteristics of Generation Z students, (b) declining four-year university enrollment factors, (c) assessing university enrollment, and (d) the use of academic analytics in higher education.

### **Characteristics of Generation Z Students**

Generation Z, defined as those born between 1995-2010, is the next population of students attending college (Loveland, 2017). These students are unlike any others that have attended higher education institutions: technology has been available to them since they were born, they are diverse in ethnicity and sexual orientation, they are financially aware, and they hold a general belief that the world is unsafe due to their exposure to war at a young age (Turner, 2015).

A common theme among Generation Z students is their need for a customized college experience (Loveland, 2017). This population enjoys self-directed learning and prefers a limited university experience (Buzetto-Hollywood & Alade, 2018; Seemiller & Grace, 2016). They want to build their courses of study and learn on their own schedules (Seemiller & Grace, 2016). Generation Z students are more interested in campus location, institution facilities, and program flexibility than having the traditional college experience that includes living on campus and attending athletic events (Seemiller & Grace, 2016).

Another key characteristic of this group is their attachment to technology (Buzzetto-Hollywood & Alade, 2018). This attachment has grown so strong that we now live in a network culture where people use technology as a way to control how people view them and their relationships (Buzzetto-Hollywood & Alade, 2018). Turner (2015) reported that Generation Z spends close to eight hours per day on media.

With technology becoming the center of this population's attention, methods of communication have changed. Generation Z prefers text messaging and Instagram to e-mails and Facebook (Loveland, 2017). Higher education institutions are encouraged to allow students to post self-produced videos rather than written essays on their college applications and avoid long campus tours to maintain prospective students' attention (Loveland, 2017).

An important trait that Generation Z possesses is fiscal responsibility (Seemiller & Grace, 2016). When the recession of 2008 hit the parents of Generation Z students, they often raised their children to fend for themselves (Seemiller & Grace, 2016). Generation Z understands the importance of getting an education to further their career opportunities; however, they are intimidated by the cost associated with higher education (Seemiller & Grace, 2016). As college loan debt continues to rise, parents and prospective students become more cautious about enrolling (Loveland, 2017).

### **Declining Four-year University Enrollment Factors**

The rising cost of attending a four-year university is a common condition at higher education institutions that are experiencing declining enrollments. Due to continuous reductions in state funding, four-year universities have increased tuition rates to meet operation needs (Seemiller & Grace, 2016). However, the cost of education has reached a point where higher education enrollment policies are no longer relevant (Fincher & Katsinas, 2017). Fincher and



Katsinas (2017) studied the correlation between economic downturns and increased enrollment in higher education institutions, a relationship that higher education policies have relied upon heavily (Fincher & Katsinas, 2017). The correlation between economic recession and increased enrollment has historically been positive because the opportunity cost favored students enrolling in higher education institutions (Fincher & Katsinas, 2017). Students could justify attending a higher education institution because they had financial support or federal aid to offset the costs of attendance and so they could complete post-secondary degrees, which would allow for higher quality job opportunities (Fincher & Katsinas, 2017). With the increase in cost of attendance and the amount of financial aid remaining stagnant, students can no longer forgo work income to attend school (Fincher & Katsina, 2017).

While stagnation of federal and state financial aid can hinder the ability of a student to attend a post-secondary institution, parental job loss also plays a large role (Pan & Ost, 2014). Pan and Ost (2014) found that parental layoffs decreased higher education enrollment by a little over ten percent. These researchers also found that limited access to credit, a drop in wealth caused by a layoff, parental layoff during high school that causes a negative impact to academic performance, and hostile home environment due to layoff can lead to reduced enrollment (Pan & Ost, 2014).

Another driving factor of declining enrollment is a change in risk preferences. In recent years, higher education has become more of a risk due to the uncertainty of degree completion and the changing demand in the market for degrees earned (Heckman & Montalto, 2018). Heckman and Montalto (2018) found that individuals with a higher threshold for risk were more likely to attend a higher education institution. Other important factors Heckman and Montalto (2018) identified that impacted an individual's likelihood of attending a higher education

institution include: (a) individuals who lived with both biological parents were more likely to attend a higher education institution than those who lived with one biological parent; (b) individuals from less educated households, defined as high school diploma or less, were less likely to enroll in a higher education institute; (c) individuals from families with higher net worth were more likely to attend a higher education institution than those from poorer households, (d) enrollment rates of women were significantly higher than those of men, (e) Asians had higher enrollment rates than Hispanics, and (f) individuals who smoked had a lower enrollment rate than those who did not.

### **Assessing University Enrollment**

With tuition rates rising, factors that are important to the increase in enrollment have been assessed more thoroughly (Holley & Harris, 2010). Maldonado, Armelini & Guevara (2017) found the most effective strategies to recruit students were campus visits and university presentations at secondary schools; they found that e-mail and web-based interactions do not work for all programs. They also observed key factors in student enrollment including student proactivity through online research of institutions and students listing institutions as their first choice. Holley and Harris (2010) found that the solutions for decreased enrollment vary by organization. They emphasize that institutions should consider their organization's specifics before responding to external challenges (Holley & Harris, 2010). Vander Schee (2009) studied the value of enrollment management programs, coming to the conclusion that there is no one right structure for a successful enrollment management system; he does however encourage institutions to plan desired outcomes five to ten years in the future.

Meyer and Sikkink (2004) argue that enrollment does not have a positive correlation to financial viability. They state that continual enrollment increases cannot be financially

advantageous in the long term because financial health is not directly tied to enrollment change (Meyer & Sikkink, 2004). Meyer and Sikkink (2004) assert that the more students an institution enrolls, the greater their operating expenses will be to maintain the same quality of education. Through their study, Meyer and Sikkink (2004) were able to show that institutions that declined in enrollment of two to seven percent were stronger financially than those that had enrollment growth. This finding was due to the fact that few schools fully utilize all of their resources because they continue to add more resources to attract more students (Meyer & Sikkink, 2004).

### **The Use of Academic Analytics in Higher Education**

From as far back as 2002, academic analytics have been used to enhance enrollment management at higher education institutions (DesJardins, 2002). The use of analytics to assist in recruiting and enrolling students is widely employed by consultants and institutional analysts; however, because those individuals want to protect their livelihoods, little information has been shared about the actual analyses (Desjardins, 2002). The articles cited in this bibliography used homegrown analyses to establish the best use of data analytics in the enrollment process (Cazier et al, 2019; DesJardins, 2002; Selingo, 2018). Cazier et al. (2017) proposed an enrollment model for honors programs that used academic and socio-demographic data to determine the likelihood of matriculation. DesJardins (2002) built a model to provide institutional insights regarding students who are in the admitted-to-enrollment stage of the enrollment process. Selingo (2018) used survey data to segment students based on their educational needs.

A common trend in all of these studies was the ability to better focus institutional resources. Cazier, et. al. (2017) found through the use of analytics they were better able to ascertain whether an honors student was likely to attend an institution and why. This additional data enabled honors directors to make more informed choices when building their cohorts

(Cazier, et. al., 2017) DesJardins (2002) found key indicators of enrollment through his analysis that could be used by enrollment managers to target students with low probabilities of enrollment, rather than using resources unnecessarily on students who were most likely to attend. Selingo (2018) was able to segment students into five student personas to be used by institutions to serve new populations and increase enrollment. Van Barneveld et al. (2012) stated that analytics allow institutions to operate efficiently because of the ability to run predictions.

Generation Z students pose additional impetuses for higher education institutions to use academic analytics (Cazier, et. al., 2017). Cazier, et. al. (2017) mention that the perception of the value of a college degree among potential students is declining and the resulting intensified competition between universities for high-quality freshmen and “students who can afford to pay out of pocket” (Cazier et. al., 2017, p.217). Selingo (2018) observes that the methods universities currently use to address student needs are rooted in old practices rather than information to be gleaned from student data, asserting that colleges have been failing to offer their core populations the academic programs and student services they need because they do not have a clear understanding of their student populations. Selingo (2018) recommends the use of academic analytics to perform student segmentation to group students based on their needs as reported in campus surveys; this segmentation will enable universities to offer academic programs and campus services that then fulfill individual student needs. The end result of student segmentation is improved success for the students and stronger financial results for the colleges (Selingo, 2018).

While analytics has proven invaluable to improving enrollment management in higher education institutions, several authors have pointed out that data analytics should not be the only

tool in use. DesJardins (2002) notes that analytic strategy should be used to complement the experience of a seasoned enrollment management professional, not as a substitute for one.

### **Final Thoughts**

As four-year universities move forward it is clear that new methods of enrollment management will need to be adopted to adapt to and attract Generation Z students (Loveland, 2017). Higher education organizations must move in the direction of technology to connect with this new population of student (Selingo, 2018). Academic analytics will be key in utilizing university resources efficiently and effectively to recruit students who are a good fit for the institution (DesJardins, 2002). As Meyer and Sikkink (2004) concluded, enrollment increases are not the most important piece of institutional financial stability: fully utilizing institution resources and maintaining quality should be the priority for higher education institutions.

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