Book Review

Building a Smarter University: Big Data, Innovation, and Analytics. Jason E. Lane (Ed.). Albany, NY: State University of New York Press, 2014. 325 pp. ISBN–13: 978–1438454528. Hardcover, $81.00. Paperback, $27.95.

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The dam has broken. We are now awash in a deluge of data so large that it has its own special name, "big data." This is not a bad thing, nor is it totally unexpected. Sooner or later, social scientists and policy makers were going to get their hands on the data that people generate as they use the Internet. Already, such data have helped researchers understand political trends, health seeking behavior, and economic fluctuations. Now, it is time for higher education researchers to face the challenge of big data. What is big data in higher education? How can it be used? A new book, *Building a Smarter University: Big Data, Innovation, and Analytics*, tries to answer these questions with a series of essays written by higher education professionals.

Roughly speaking, innovations trigger three types of responses. First, people ask "What is this?" Second, one may ask, "What can we do with this?" And third, one may ask, "What are the rules for doing this?" *Building a Smarter University* has chapters addressing each question.

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When innovations emerge, practitioners try to make sense of the new phenomenon. They did not learn about the new technology in graduate school and that raises unexpected issues. Early in the history of a technology, one will encounter essays that focus on definitions, examples, and guidelines for practice. One might call this the exegetical phase of a new science. At this point, scholarship is more about sense–making than problem oriented "normal science." It is about explaining things to a puzzled audience. At times, this can be productive. People need definitions, a key to help them understand what is new and why it deserves attention.

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Building a Smarter University has its fair share of explanatory essays, such as Lane and Finsel's chapter that explains the "basics" of big data and why people might care. Some readers might be familiar with the basic themes, but the basics of big data bear repeating. Basically, big data is usually characterized by its size, speed, and continual creation. There is an emerging definition codifying this idea: big data has "five V's": Volume, velocity, variety, veracity, and value. While I do not dispute this basic intuition, it often misses something important. Big data is native to the Internet and the computing world in ways that older types of data are not. It is also natural in the sense that it was not concocted by a researcher in a survey or interview.

This is an important distinction for higher education researchers. For example, consider the typical student affairs professional who now has access to real time data on how students search for classes from their institution's online catalog. While size and speed may be important, the crucial issue is that this is a more accurate reflection of a student's shopping behavior than what people report in surveys or focus groups. Similarly, if one were interested in bolstering minority enrollment, it might be better to monitor social networks than rely on self–reports of the college experience. The reason is that the Internet sometimes encourages a more candid discussion of issues than the manufactured environment of the focus group or survey. The Internet also records real behaviors as well. That is the true value of big data, not necessarily its speed or size.

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While *Building a Smarter University* has some fine exegetical chapters, there are some that are less helpful because they use big data to pursue philosophical points that typical practitioners will not find relevant. For example, Bringsjord and Bringsjord use big data to illustrate a theory of information ("big data" vs. "big–but–buried data") and relate it to Zeno's paradox. There is a valid point to be made that raw information and knowledge are different things, but I am not sure that such an esoteric presentation is helpful. Even though I took courses in mathematical logic in college, I honestly found it difficult to relate their approach to what the typical higher education researcher would find helpful.

Once people know about innovation, the question becomes application. People want a sense of how a new resource can be used to solve specific problems. It is here that *Building a Smarter University* has the most to offer. Numerous chapters offer concrete examples of how this new type of data can help administrators make colleges better. Indeed, given how difficult it is to change or affect student behavior, it is refreshing to see creative applications of big data.

Ben Wildavsky's chapter is one excellent example of an application of big data to student affairs. Normally, student affairs professionals must react to student performance. A student may meet an advisor after they have received a bad grade, or are at risk of failing the course. Often, an advisor can not help the student because their current score is so low that even an exceptional performance in the rest of the course will not save them. Instead, what if the advisor had real time

access to the student's performance? Or models that would project grades based on the performances of thousands of earlier students? Perhaps, there might be a real time warning system. As the instructor enters grades, students with poor performance might have a warning signal sent to an advisor.

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Such a system that continually monitors, tracks, and assists students with course selection would be enormously useful (Denley, 2014; Milliron, Malcolm, & Kil, 2014). It would be a vast improvement over the current system where advisers go on a high school transcript and good intentions. In some cases, they rely on second hand knowledge of courses handed down by earlier generations of students. Considering that a college degree carries an enormous premium on the labor market, helping a student complete their degree using advice derived from a big data model could be of enormous importance.

Other chapters by Goff and Shaffer, Owens and Knox, and Lane and Bhandari touch on financial aid, identifying course equivalencies, and measuring the globalization of higher education. It is not too hard to imagine that organizational strategy in higher education would be impacted by big data. Enrollments and recruitment could be measured, faculty productivity monitored, and fund raising can be optimized.

There is the question of ethical and legal standards. *Building a Smarter University* has a number of chapters that address the legal aspects of big data. Jeffrey Sun's chapter is a nice review of the relevant privacy issues. The primary issue is how FERPA applies to student generated data. In general, such data can be used internally for research purposes, but complexities arise when a university has branches that are located outside the United States, or in states where privacy rules differ. As administrators try to use this data, there will be an effort to provide some clarity and uniformity on these issues.

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This book shows how big data can be an important tool for higher education administrators. While there have been earlier attempts at harnessing college generated data, we simply have not had the tools to effectively use that information. *Building a Better University* shows how that might change.

References

Denley, T. (2014). How predictive analytics and choice architecture can improve student success. *Research & Practice in Assessment, 9*(2), 61-69.

Milliron, M. D., Malcolm, L., & Kil, D. (2014). Insight and action analytics: Three case studies to consider. *Research & Practice in Assessment, 9*(2), 70-89.