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Reviewing *Big Data and Learning Analytics in Higher Education: Current Theory and Practice*

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Big Data and Learning Analytics in Higher Education: Current Theory and Practice. By Ben Kei Daniel, ed. Switzerland: Springer International Publishing, 2017. 272 pp. ISBN 978-3-319-06519-9 DOI 10.1007/978-3-319-06520-5 (HARDCOVER) \$89

The Scholarship of Teaching and Learning (SoTL) as defined by seminal author Ernest Boyer (1990) typically focuses on student learning in the classroom. Specifically, the question “Has learning occurred?” is answered by statistically examining data collected on students. For example, pre-/post-test results can be examined using a paired t-test to see if student learning occurred as a result of an assignment or activity. SoTL is important to faculty and administration alike because it provides a way to quantify what is happening with respect to pedagogy and student learning. It enables us to verify that learning has indeed occurred and then to share and disseminate that information to our peers so that other faculty may be encouraged to improve their pedagogy.

Since Boyer’s introduction of SoTL, much research and discussion has taken place regarding SoTL in the classroom. However, another question has arisen due to the abundance of available data today; that is, does SoTL extend beyond the classroom into the upper echelon of administration and supporting services (e.g., financial aid, registrar, institutional research)? I believe that the answer is yes, as long as the focus remains on teaching and student learning.

Throughout their college career, much information is collected on students. Administration and faculty alike use these “big data” sets to determine institution-specific KPIs (Key Performance Indicators). In the book *Big Data and Learning Analytics in Higher Education* (2017), editor Ben Kei Daniel refers to this as a “macro-level analysis” (pg. 2). Ideally, we can also determine how student learning can take place and help faculty best use all the resources available to them for the purpose of improving teaching (a meso-level analysis). In the classroom, scholarship can occur on a much smaller and more intimate level using simple statistical tools (a micro-level analysis). However, when dealing with big

data sets, this type of scholarship is referred to as “learning analytics,” which is the focus of the 15 chapters written by 32 educational research experts (272 pages) comprising Ben Kei Daniel’s timely book.

Higher education institutions (HEIs) typically utilize academic analytics to determine retention rates, graduation rates, attrition, and other program level metrics. While useful, these metrics do not adequately address the issue of SoTL in the classroom. Learning analytics, on the other hand, focuses on measuring, collecting, and analyzing teaching and learning level metrics that are indicators of student success. Thus, the learning analytics methods and examples in this book are extremely useful and insightful extensions of the SoTL methods in use today.

For example, many HEIs use learning management systems (LMS) such as Blackboard, Moodle, or D2L for course support and to track student interaction within the virtual classroom. With academic analytics, participation data collected from the LMS helps administration track student attrition for the purpose of developing an “early warning system” (EWS) that identifies this type of student and allows for early intervention, prevention, and appropriate resource allocation. Thus, student participation levels would be interpreted with respect to student retention and attrition. With learning analytics, faculty use this same participation data from the LMS at a more granular level—that is, at the student learning level. Here, the goal is to improve and/or optimize student learning and/or student learning behaviors so that the student can be more successful. Thus, participation levels would be interpreted as a learning metric along the lines of SoTL.

In the logical flow of research, data must be collected before it can be analyzed. In this book, the chapters logically flow from big data to learning analytics. This is helpful to the readers and leads them through the discovery process. The chapters on big data introduce the reader to basic concepts of big data in higher education, examining what is being done today and how to prepare future researchers for this type of data analysis. These chapters are easy to understand and useful for anyone interested in this topic. However, later chapters in this section delve more deeply into big data and discuss higher level concepts of data sources, data mining, data ecosystems, and domain ontologies, which may be somewhat overwhelming to the novice researcher.

In the second part of the book, the authors first examine the subject of learning analytics from an ethical perspective. The numerous ethical issues that arise when dealing with massive amounts of data make this section quite interesting, but with all this data, it is easy to forget about the individual learner. For instance, the benefits and risks to the individual as well as data governance and ownership are just a few of the ethical issues that are addressed. Another chapter in this section deals with the overall concept of big data and learning analytics, providing many insights into this topic. Later chapters in this section provide specific examples and case studies on implementing and utilizing learning analytics.

Daniel states that this book will be useful to educational researchers and others interested in utilizing educational data, and I agree with Daniel's assessment of his target audience. Indeed, many of the chapters provide a basic understanding of the concepts of big data and learning analytics; however, other chapters provide higher level analytical and big data topics that would be more useful to the experienced researcher. Thus, there is something for everyone in this book. While the chapters may seem disparate in topic and level of understanding, they all work together to give the reader a better understanding of learning analytics resulting from the collection of big data sets. I would recommend this book to any researcher who needs a good overview of utilizing learning analytics and big data to help students learn and succeed.

REFERENCES

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Dr. Ardith Baker earned her B.S. Ed. in Biology Education (1980) from Pittsburg State University and M.S. in Statistics (1992) from Oklahoma State University. She earned her Ph.D. in Applied Management and Decision Sciences (2011) from Walden University. Dr. Baker has taught in the area of operations research and business analytics for over 20 years at Oral Roberts

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