

From FOCUS to Artificial Intelligence: How Data Has Changed in Higher Education

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As access to data, and expectations around its availability, have evolved in higher education, so too have the role and responsibilities of professionals charged with managing and analyzing the information.

When I first started working in higher education in the early 1990s, we used to sort things manually and type up everything, for everyone. People did not use computers then the way they do today. There was no such thing as a smart phone or Alexa, and even Windows was new back then.

Making reports available to people was a manual process using a language called FOCUS. We would spend the first couple of hours of our day, every day, issuing commands and waiting for downloads. We were so excited when we could use Microsoft Access as a front end to reports so users could now get data on their Windows 95 machine instead of looking at Greenbar reports that would take hours to print each day. As the nineties progressed and the World Wide Web began to take off, we started coding reports so that our users could get to them from a browser; it seemed so revolutionary at the time.

As we prepared for the new century, reporting was becoming more and more important, but really only from a descriptive standpoint. Because reporting required so much work, we were all just excited to get raw data that we could summarize on our own and try to make sense of it all. Software companies knew there had to be a better way, though, and they all started coming up with new reporting software like Crystal Reports and Reporting Services. This was an exciting time as we could now make reports available online and incorporate logos and other graphics easily. The days of greenbars finally seemed behind us. Things were good then, life was easier, but then Google started up.

Google came about and made it so easy to search for things. Never before had it been this easy to find information. As a result, I believe, that users began to change their expectations of how easy it was to get information. You no longer had to drive to a library to look up something. You no longer had to keep encyclopedias around. Information, though, really is just another word for data. Now you could ask Google to tell you anything you wanted to know and it just told you. Back then it certainly was not as sophisticated as it is today, but it was revolutionary for its time. Google made things more accessible and, as a result, changed people's expectations.

Reports became more and more crucial to all of our daily lives. Executives began expecting things faster and faster. Like most institutions, we switched to a new Student Information System, which made it possible to track even more data. Companies like IBM and Microsoft continued to make reporting easier and easier for the less and less technical. This was wonderful and exciting but the expectations seemed to grow much faster than the technology or the skills of the technologists providing the data. While reporting was easier, it still required some understanding of basic principles of data. There was also still the concept of "garbage in, garbage out." No matter how fast you can create a report, bad

data is still bad data. Microsoft also started working on data mining and predictive analytics in higher education, but we were severely limited by scale and how much data we could crunch in a short amount of time. It was still hard to do much beyond descriptive reporting of who, what and when. Data warehouses were becoming more fashionable, but required a skill set not found with your average application developers who had historically done reporting in the past. It was at this point that business intelligence groups began to develop.

In 2003, a group called HEDW (Higher Education Data Warehouse) was launched to share and collaborate on what it meant to be in business intelligence in higher education. This group suddenly had members from over 50 institutions of higher education around the world and started holding annual conferences. Since that time phrases like Big Data, Data Scientist, Predictive Analytics, Prescriptive Analytics, Modeling, Hadoop, Spark, Aurora, Internet of Things (IoT) and Mongo DB—just to name a few—have become part of our lexicon. It used to be that Microsoft and Oracle were the main players in Higher Education data, but now Google and Amazon Web Services and Tableau are taking over and everything is changing rapidly. Most companies are pushing new changes out in 30-day increments instead of waiting three years as they did previously.

This is exciting, but rapid change sometimes makes it hard to keep the lights on. It used to be that executives would do annual reports that would take them and their staff months to produce, whereas now those same executives want data at their fingertips on a moment's notice. Data is becoming a key element to all of our lives in ways we do not even fully comprehend. Artificial Intelligence is going to be driving our cars and very soon will be deciding who lives and who dies in order to avoid a crash, and those decisions will use data.

While the growing importance of data is scary to many, it is also an exciting time to be in the data industry. We who have always worked with data are suddenly at the forefront of a large movement that will shape the future of higher education in ways not previously imagined. Those of us who work with data now have opportunities to influence policy and change and student success like never before. Our dashboards, reports, and artificial intelligence will now become more and more central to all that our institutions do.

Our job, then, is not only to make the data available in new and exciting ways. We also must have the hard conversations around ethics and privacy, making

sure that those that would use our data understand its significance and power and never abuse it.

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