



In Session: with Pete Irwin

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Colleges and universities are among the most stable and fundamental institutions in our society. At the same time, they are on the front lines of change, fostering the process of discovery and human knowledge, driving new technologies and answering society's most important questions. Whether it be global climate change or adapting to technologies and artificial intelligence, we have to ensure the stability and success of these institutions so the next generation of leaders in every discipline can help society adapt to those changes as they enter the global workforce.

In Session is KPMG's latest higher education insights series that features interviews with industry professionals that are working with colleges and universities around the country that are being tested by the rapid pace of change. Whether it's taking a hard look at business models or developing new tools to enhance the ability of the administration, KPMG is working shoulder to shoulder with these institutions to help them provide services effectively to their faculty and students.

Pete Irwin is a leader in KPMG's Data & Analytics Center of Excellence who focuses on helping clients apply advanced analytics to make better decisions that result in improved business performance. With over 15 years of analytics, IT, and business systems consulting experience, Pete leads teams that leverage data to develop and implement solutions in the areas of predictive analytics and decision intelligence. Pete currently leads KPMG's Decision Intelligence (Optimization) team and Data-driven Revenue Forecasting solution. He recently started working with universities around the world to design solutions that integrate large volumes of university data with external signals to make predictions around student engagement, time-to-complete, grades, and retention.

Q You recently began working with various universities around the world – how did you get involved in this industry?

I am part of KPMG's Lighthouse team, which has developed a leading platform for ingesting and transforming data from around the world. We had done a number of projects focused on customer growth and retention, built on our intelligent signals engine, to look at spending patterns for our clients. A university had approached us with a similar interest, so we took our commercial models and tailored them to the specific education environment, which allowed us to look at retention and growth in a whole new way.

Q Are the analytical characteristics and concepts the same or different for higher education?

The behaviors are very similar, but the way you get at them is very different. The types of signals you glean based on data related to students is very different from a retail consumer. The signs of engagement are similar with students and customers, so the way you build the models is similar, but the input data is going to be drastically different.

Q *What information are universities interested in the most?*

There is a variety of information that universities are interested in so the important thing is to develop the models in a way that gets at the reasons for some of the predictions. A popular piece of information is whether or not a student is going to succeed or drop out, but it's also just as important to provide reasons that are supported by the data. When you do that, a university can react to them and hopefully work with that student in more meaningful ways to help ensure their success.

For example, student 123 is at risk and here are the reasons. The university can then determine how to interact with that student in hopes of preventing them from leaving the school. On the flip side, student 321 is likely to succeed, with the reasons to support it, allowing the university to nurture those behaviors to set them up for better success. In both examples, the university is able to adapt and provide the best experience possible for students.

Q *What's the first step for a university or college that has an interest in looking at student data?*

The first step is to figure out what questions they are trying to answer: what are they trying to understand? Who's at risk and why? How do we mitigate? What other areas of engagement can we improve on in student life cycle? If you can scope out the questions that you want answered, we can build models around that to generate the answers.

Once you do that, it's really all about the data. A lot of universities and colleges aren't aware of how much data is already at their fingertips. So we then take steps to gather as much data as possible and put it into a system of record so you can understand it. A lot of universities still operate on an old mainframe or legacy system and therefore the data is located across different sources. It's imperative to get all of that data into a single platform so you can look at it from different perspectives.

Q *What types of data are you talking about?*

When we talk about data, it's not just things like HR and financial information. We want to look across the entire spectrum of the university which includes things like grade data, library logs, wi-fi access, class attendance records, activity facilities, fitness centers, dining halls, etc. All of this data is at the heart of how engaged students are at the university.

For example, if we want to know if a student is continuing to stay engaged in their learning experience,

we will look at patterns in their behavior, such as: meal patterns, fitness patterns, comments on message boards, attendance in class, etc.

We can also marry that with external data outside of the university (which is available publicly) such as economic conditions, levels of crime where students come from, how academically challenging their high school was, and other factors that may provide patterns and trends of their behavior. All of this information together provides a pretty powerful predictive model. In some cases, statistical models and predictors can be made before a student steps onto a campus.

Q *What's one of the common models you use?*

Student success and retention is a popular topic. Part of a university's core mission is ensuring the success of its students, so understanding whether or not they are likely to drop out is a very useful piece of information.

One of the approaches we use is called "survival analysis," which generates real-time hazard scores for each student. This approach allows us to identify students who are at risk of dropping out and why. The survival analysis looks at signals that are precursors to an event happening. The model is designed to tell you what signals are indicative of the student dropping out in the next 60 days – signals that reflect patterns of moving around campus differently in different combination. It's much more powerful to look at the nonobvious signals as to why a student might drop out, versus looking at obvious signals after it happens.

Q *This really is powerful information. How does this change the landscape of higher education?*

I think it provides higher education institutions the ability to better itself by understanding the drivers of student behaviors.

Once you understand the nucleus of a student, you can make multiple predictions and models around that. It's not just predicting whether or not they will drop out, but understanding the drivers for success: will they be a good alumni? Are they likely to donate? Are they likely to be an adjunct professor? Chances are they are more likely to do these things if they have a good experience at the university.

In addition, universities can use the knowledge of existing students to improve the recruitment of future students. If you target and accept students that have the best chance of success at your university, you can improve the life cycle from student to alumni.

The other aspect of this is that today's students have grown up in a digital world. They expect everything to be available online including courses. Most universities are well down the path of making education available online, in some fashion. Academic purists will focus on the negative. From my perspective, having all of that activity and data digitized allows for better insights into the students and even faculty for that matter.

Take Amazon.com for example – they understand how buyers shop and recommend things based on what you enjoy. The same concept can be applied to a university. If you understand how your students are navigating their education, you can provide a better experience, ultimately driving your core mission of fostering student success.

Q *Are there any privacy concerns when it comes to all of this data?*

The privacy issue obviously can't be ignored. Clearly, you have to make students aware of what you are doing with the data and make it an opt-in process. I would hope that most students going to a university would be OK with sacrificing a bit of anonymity in order to provide them a better learning experience.

Even with traditional classrooms, there are still going to be digital aspects where data is captured – whether it's from submitting coursework online, chatrooms, digital

blackboards, etc. Privacy applies across the board. So long as you are transparent in what you are doing, you will be able to mitigate the associated risk.

You have to realize: the data is already there. It already exists in the learning environment. How it's being used and ensuring it stays in a safe environment is what matters most.

Q *How does this type of modeling affect the future of higher education?*

Higher education is a competitive market, and in order to stay competitive, you have to adapt and change the way you interact with students. Understanding students through data and refreshing this on a regular basis, making adjustments where necessary, can lead to happy, successful students.

Online universities have the advantage in this space right now, as they are already capturing this data. They already know what classes are most popular, which ones have low enrollment, which professors are most popular, etc. Those online universities are reacting in real-time based on all the data we discussed earlier. Many traditional universities are now starting to enhance their own processes to be able to do something similar. If you modify your business model to include statistical analysis and modeling, you may just find yourself with greater success rates as a university.

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