

# THE WORK SCIENCE CENTER



## The Work Science Center Podcast

### Episode 6 Trends in Modern I-O Psychology

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How to cite this podcast:

Fletcher, K. A., & Landers, R. (Presenters). (2019, January 23). Trends in modern I-O psychology [Audio podcast]. In The Work Science Center (Producer), *The work science center podcast*.

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**Keaton Fletcher:** Welcome to the Work Science Center Podcast, brought to you by the Work Science Center of the Georgia Institute of Technology. I am your host, Keaton Fletcher. You can find more about the Work Science Center at our website [www.WorkScienceCenter.GATech.edu](http://www.WorkScienceCenter.GATech.edu). In today's podcast I speak with Richard Landers, John P. Campbell Distinguished Professor of Industrial-Organizational Psychology at the University of Minnesota, and the brain behind NeoAcademic, a blog covering a range of topics related to I-O psychology. Richard and I discuss the future of I-O psychology in the modern workforce and ways to integrate I-O with modern technological advances available to our field.

Thanks, Richard, for talking with me today. Just to start things off, would you mind briefly describing who you are, your research, and then also what NeoAcademic, your blog, is about?

**Richard Landers:** Sure, I'm Richard. I am on the faculty at the University of Minnesota. I actually just started there. I was on the faculty at Old Dominion University for about nine years. My research broadly is on the intersection point between what I would say modern I-O psychology is, and technology, usually in the selection and training domains where we work primarily. That means we work with a pretty wide variety of specific technologies. We've done some artificial intelligence work, some games and gamification work. We looked at social media. Basically anything that involves the modern things coming out of computer science and data science and how those interface with I-O psychology.

The blog is something that I started a very long time ago. I can't remember when the first post was, but that was probably eleven maybe twelve years ago. It was really more of an outlet for grad school, at the time. I felt like I had a lot of thoughts that couldn't go anywhere, so I decided to write them down in a blog, but it has kind of evolved over the years into, I don't know if it's public facing exactly. It is sort of targeted at a savvy I-O audience for the most part, one who is interested in understanding what the potential is for technology in the field. Because there is certainly a lot of people interested, but just don't know how to dive in. So, it is mostly targeted at that, just generally with the goal of increasing awareness, and comfort, and demystifying some of the technology that we are seeing everywhere now.

**KF:** There is so much in there where I feel like we can dig into, but first, I want to dig into the notion of what it means to be an I-O psychologist, especially in the modern workforce. I think you and I can both agree that the scope and domain of our field has expanded and changed. How do you define I-O psychology, and give me your feelings on what I-O is, how they are related.

**RL:** Sure. I think broadly, I would say I-O psychology is still the science of workplace behavior. It is really about understanding and applying scientific methods to understanding how people behave in organizations. That is probably a much broader definition than most people come into it with. There is a bit of a legacy of the psychology part of I-O psychology. People tend to focus in on what they understand based on their training, and past experience, and their past interests, and so on.

I think that where I-O is changing, is we have moved from this more compartmentalized application of psychology to employees, to a broader more interdisciplinary integration of all of the areas relevant to understanding workplace behavior. It is becoming increasingly important



too, as other fields are starting to see I-O psychology as an application area. It is something that has really surprised me talking to computer scientists who have had absolutely no training whatsoever in the workplace in particular. They will just be running and saying, “Ah, we can just apply some algorithms and solve all of your human resource problems.” So, without really starting to dig into those other fields, we don’t even understand why that is attractive to modern management. Why people in organizations would hear “oh we’re going to algorithm up your HR function” why is that attractive? Why did they want that? In what ways is I-O not competing that makes that attractive?

This is historically our space, talking about selection, and training, and performance management, and teamwork, and leadership pipelines, and all of that. That is our wheelhouse. We are seeing all of these technology purveyors start to really seriously threaten that. We have a few options for what to do with it. I don’t know. I feel like we haven’t had a good field-level conversation about what I-O psychology should become at this point. You have some hold outs that really stick to that, “It’s psychology, and that is all we do. We have just got to stick to our guns.” Versus this other group, which I would be a part of, arguing that it is time to expand much further. That the old I versus O debate is such small potatoes in this landscape that we are entering into. It is really a time to unify around a core vision of what I-O is, and should be, and promote that.

**KF:** You touched on how computer scientists are getting into our domain, but also it seems, at least judging from your work, that you have some sort of collaboration with them. So, where do you see the greatest synergies, and the challenges, associated with collaborating with people radically outside of our field?

**RL:** That kind of gets at the heart of interdisciplinary, versus multi-disciplinary, versus trans-disciplinary work. I think, historically, what I-O psychologists have done—because it is not like interdisciplinary research is a new thing, and collaborating across these lines is somehow something we haven’t done before—but in the past researchers would see something in another literature and say “Oh, that seems useful or cool” and they would write up a JAP or P-Psych article where they pretended that they invented that thing, and they would sell that as an I-O concept. We saw it really early on from personality and social psychology. So much is repackaged, and contextualized social and personality psych. Which is still useful. That is still good. But it is still fundamentally an interdisciplinary enterprise.

So, when you work with computer scientists it is the same sort of question, you have to ask yourself, “are we going to integrate computer science, or are we going to just pick and choose the pieces of CompSci that seem useful and then pretend that we invented them?” What has happened, though, is I think CompSci is moving too fast for that to be realistic this time. Whereas, social psych, because it is so similar to the core I-O psychology training, it is easy to say “Oh, I see how this social psych concept fits in. I am going to rename it and make a new theory, or whatever.” It is easy to do that. But in CompSci, the knowledge space, the domain, is so wide and so much faster moving that I do not think that is possible anymore. And that is why we are seeing so much, I don’t know if it is resistance exactly, but that’s why I think we have been slow to adopt it. Because in order to understand something like artificial intelligence, and



integrate it into your work, it is no longer a matter of, “Oh, I read an article and that sounded interesting.” It is now a matter of I have to basically get a Master’s degree in this topic to have any idea of what is even going on. It doesn’t necessarily have to be that bad, but until we have more translators who are dipping into CompSci and talking to these folks, and really learning, really being interdisciplinary, not multidisciplinary, that we are going to have an easier time for I-O psychologists in the broader sense who want to learn these skills.

I have definitely experienced it personally working with CompSci people. I have worked with several different types. I think that is something that is not well known in the I-O community.

**KF:** Different types?

**RL:** Yeah. I mean, CompSci is as broad as psychology is. There are all sorts of subfields and expertises and such. It’s not just like a person who knows programming. You specialize. There is all sorts of CompSci theory and compartmentalized pieces of knowledge. So, for example, artificial intelligence mostly came out of vision research. Trying to understand how computers can better interpret images and videos and such. They had a really hard time doing that processing, because the datasets are just enormously complex. Not artificial intelligence, I’m sorry, deep learning. The deep learning stuff came out of that vision research because they needed to develop new predictive models that could interpret pictures. So that is a unique problem that they had to solve. So the people on that side, which I would say is the more technical side, is one general category of computer scientist person. They are the ones who, at least in my experience, generally don’t care much for the human side. So, when you talk about a problem in an organization it is a mathematical, it’s an engineering problem they need to solve, and nothing more.

You then have the other side, which is human-computer interaction, which are the behavioral scientists of computer science. Who are trying apply psychology, social science, political science, other social sciences to computer science type problems. They tend to be more integrative by default. They are sort of the interdisciplinary wing of computer science. There are also people outside of CompSci who will identify themselves as being human-computer interaction people. It is sort of this entry point, I think, for psychologists.

A recent paper that we did on gamification, we actually collaborated with some human-computer interaction people at University of Waterloo. I think it is most useful, because they still have the fundamental assumptions and philosophies of computer science. The attention is not to theories the way we conceptualize them in psychology. It is usually much more about design and methodologies, and how do you create a system that elicits particular feelings and particular affective experiences for the people that use it. It is a very different kind of mindset in approaching human behavior issues. Whether there are problems to be solved or you are trying to improve some aspect of human behavior for a particular goal, they approach it from a dramatically different perspective. I think that is possibly the most valuable thing that really integrating with what they do and what they understand, is for us, is for I-O.

**KF:** Along those lines, then, as our field starts to change, whether it is keeping up with computer science and all of those changes, and changing how we view the field, where do you think we are



headed as a field? Do you see any changes in publication? I know your blog has sort of kept on top of some of these membership changes, publication changes, things along those lines.

**RL:** There is so much changing. It is hard to predict precisely how they will all interact. I think we are seeing, on one side of that, I think we are seeing a difference in the marketplace for I-O psychologists. Whereas, historically, I-O psychology served a pretty narrowly defined set of organizations, or types of organizations. We were really much more optimized for huge Fortune 50, Fortune 500 type, even more toward the 50. Places with 10,000 employees benefit way more, historically, from I-O psychology, than places with 20. That is starting to change, I think, because there is greater awareness of what I-O psychology is and what it potentially brings. There has also been some high-level, news stories, let's say, about people fundamentally misunderstanding their own employees, and creating big problems. As that keeps happening, then there is more awareness of "wait aren't there some experts somewhere that know about employees, and what they do, and why they do it?" And as that happens, we're seeing more and more demand for I-O. I think that is related very strongly to the call for Master's level training in I-O. We have seen just an explosion in the number of Master's students, and people graduating with their Master's in I-O over just the last decade or so, because there is a growing recognition that we need more people on the ground practicing I-O. So there's that piece of it.

We are also seeing changes in the broader sense, in terms of where I-O is valuable, because once those people go out, they recognize that the core psychology sort of training that we get is not really enough. There is this whole business side that we are not really traditionally trained well in. There is just this awareness that when people get out in the field they are like "Oh, I know what I know. I know my I-O psychology piece, but I don't necessarily connect that to how to be valuable immediately upon entering a new organization." They are suddenly in this big self-development phase. Every Master's student I have talked to, when they get out in the workforce they go "Oh, man, I have to figure out how to apply all of this stuff." And then, they develop their own knowledge, their own understanding of the field in order to figure out how to actually do that there. And that knowledge, for some reason, never really makes its way back, really, into academia, and into the training. So, instead you end up with what we have historically called the science-practice divide, but now instead of it being Ph.D.s on either side of the fence, it's the Ph.D.s in academia, versus everyone else.

It is sort of growing, I don't know if it is growing too fast, but it is this chasm, a bit, in terms of priorities and goals. It is actually a big part of my mission, because I think that academic I-O psychology's focus on pure theory development, which is something that has really grown over the last decade also, or maybe a little longer than that. Where, if you look in, like, JAP these days, to the average person practicing in the field, it is nigh incomprehensible, it is incredibly deep, complex theories about the minutia of human behavior that in most cases are not super useful to a real-life human being. One part of my mission is to say that I-O psychology needs to return to its roots. Historically, our strength has risen from integrating the science and the practice. In the old days when you saw people go out into industry then come back into academia, that was way more common several decades ago. That integration is something that we are gradually losing our hold of and we need to return to really hard.



Part of the technology interest for me is about that. I hear from people who go out into industry, whether Master's or Ph.D. level, and suddenly they say "I have to work on a team with data scientists and I don't even know what they are talking about." So, really saying, here are the real problems that practitioners are facing in the field, and then understanding how academia serves those goals. We are supposed to be, in my mind, and this is not meant to be condescending, but I always feel like we are the medicine for practitioners. It is real easy to run away with cool ideas and do what you think sounds good, but somebody has to be off somewhere saying, wait a minute, there is some research that says otherwise. Right? But, what has happened is that academia has sort of gone off on its own direction, so that the medicine is no longer relevant to practice. So, practitioners are just off on their own, which they have to be, because that's what the job is, but that means that academia is no longer serving practice the way that I think it should be for our field to be successful in the long term. That is the broad shape of it. The science practice divide is something that has really bothered me for a long time. All of these problems are related, even the interdisciplinary stuff I was talking about earlier. It is academia not recognizing how the real world of work is changing, at least not as fast as it should, and then just becoming increasingly irrelevant to that real day-to-day practice. I think it is a really severe issue.

**KF:** I was actually just listening to the SIOP podcast from earlier this year with Fred Oswald and some other people as well, I can't remember who else was on the panel. They were talking about the scientist-practitioner gap and they were collectively like "it's not a gap, it is a bridge, and we all have this bridge within us, and we can work harder to strengthen this bridge."

**RL:** Yeah, well.

**KF:** I think it was part of the Bridge Builders Initiative as well. Which is a really interesting perspective, but I think harder to act upon, right?

**RL:** Yeah, you know, there has to obviously be a willingness, so in that sense I would totally agree with that. Whereas if for people that are going to grad school and getting their Master's or Ph.D and the whole time they are like "I'm just going to get out into industry, and this degree is just a means to an end" that is not a healthy perspective for those people. But, similarly, academics have to be willing to say "we need to serve real problems, we can't just dig deeper and deeper into our theories." Even if it is good science, and even if it is true, in some sense, if it is not useful, then it is kind of a waste of time, in my perspective. So, we do have to have a willingness to cross that bridge so to speak, but at the same time I think fundamentally we have to be more integrative within ourselves. Everyone should think of themselves as a scientist-practitioner in our field. That is our core strength. If you are just going to be a practitioner of human resources, then you should have an MBA in HR. If you are just going to be a theory development person, then you should get a Ph.D. in Organizational Behavior. The core value of I-O, versus all of these other perspectives, is the integration, so we need to lean into it.

**KF:** Sorry, I was over here, silently nodding along the entire time. I was like "Yes. Yes." I want to dig in a little bit deeper into the technological advances and your specific research. One of the areas that the Work Science Center focuses on is technology in the workplace because it is



radically changing work, we think. A high level overview of your research, what you think the field has learned, where we are heading in the technology realm?

**RL:** So technology is a real weird thing to study in I-O right now. It is getting more normalized. Tech is sort of a situational constraint or enhancer on the way work is performed. If you think about your classic person-situation interaction models, it changes the situation. Historically, psychologists do not study the situation really well. We focus on the person, as the name psychology would imply. So, all of these new techs are coming out. They all follow the same general kind of pattern. My favorite metaphor for this, a research firm, Gartner, came out with the Hype Cycle. Where, you see these new technologies appear everyone is “Rah, rah” it is going to change the world, everything is amazing, it’s great. And then it crashes at some point later when everybody realizes, “Oh wait a minute, it is not as useful as we thought it was.” Then you have this longer period of productivity afterward related to “Oh, OK. It is not going to save the world. It is not a legitimate snake oil. It’s also not snake oil. It is instead somewhere in the middle. There are some good uses and some bad uses.” So, that happens with basically every technology we have studied.

I started all of this with virtual worlds. I don’t know if you remember, but in 2004 or 5-ish, everyone thought everything, everywhere was going to be in Second Life, like everyone. Reuters opened up a news office in Second Life, which today sounds insane. But, it was that much hype. That much enthusiasm. This idea that we are all going to live in the meta-verse now, everything is going to turn virtual. And then, of course, people realized, “wait a minute, why are we here? There is no real reason to do this.” And then the popularity died off dramatically. There are still core Second Life users, but it is not nearly what it was.

So, we see that pattern with basically every technology that comes out, very small number of exceptions, like the internet. So, social media is one. Social media for selection purposes for example. There was a lot of talk about that for a while, where the idea was “oh, you don’t even need to apply to jobs anymore. We can just harvest information about you from all of your social media profiles, and just magically, be able to hire the best candidates for every job, forever.” That was the enthusiasm in the tech field. That was not the enthusiasm in I-O.

**KF:** That sounds terrifying.

**RL:** Yeah. That was the idea in the tech area, and then when companies tried to do that, they discovered “oh wait a minute, there are all of these challenges associated with doing that. It is not going to work as well as we thought it was going to work. Oh, there is a certain limit to the kind of information you can even get that way.” And suddenly it all kind of fizzled down a lot. That was probably five or six years ago. And now, we are seeing a little bit of a gain again because artificial intelligence is making some of that a little bit easier to do. So we see that sort of cycle.

Artificial intelligence, itself, is probably the one we are stuck in the middle of right now. Where, AI fundamentally is just really advanced predictive modeling. It is regression that can handle variable sets that we could only dream of before. Where you could input a video feed as a set of predictors in a regression model. That is what AI is. Even self-driving cars is fundamentally just



predict, given a set of inputs (the map, the camera sensors, the place you are trying to go), what should I do with the brake, the pedal, and the wheel. That's it. It is really just predictive modeling, just advanced and crazy predictive modeling. But, because of that complexity, a lot of people sort of attribute to it this kind of magical property. That it can just solve problems for you. That somehow we are going to go into the selection systems, for example, that I-Os have designed and say, "Oh no, you are not using artificial intelligence. If we use artificial intelligence, it is going to be better." They won't exactly explain how it is going to be better.

That is kind of what is happening right now. We are seeing just an incredible amount of enthusiasm for AI without people really understanding what AI is. So, we are going to head to a bit of a crash for that. But at the same time, I think that that is the future of I-O in a lot of ways. Our approaches, the ones that we traditionally take for selection, to identify specific psychological constructs, specific KSAOs that we think are related to job performance based on job analytic evidence or whatever else, whatever inputs you might have, and then develop some psychological measures and administer them over surveys, and then you are done. The problem with that is, these AI technologies are objectively better at creating predictive models than anything we have right now. Just, period. They are optimized toward generalizability. They are optimized toward getting better out-of-sample prediction, in ways that our kind of traditional regression approaches just don't work as well, if at all. So as soon as you start getting into this complexity area, the R-squareds, the predictive value of what computer scientists can do, is better and will have better predictive validity. It will have better prediction, in general, of the outcomes that organizations are interested in, and that is going to create a problem for us.

Now the good side for us, is that they do not at all understand the legal side of anything they are doing. Pretty much every CompSci person I have talked to (I have actually consulted with two or three organizations, now) when I am literally having a conversation where, "No, there is employment law, and it does put restrictions on what you are doing." There is just very little awareness, because in startup culture, the "move fast and break things" mindset, they just don't pay attention to it. It's just, "Oh, we'll figure that out later."

So, where I-O would be particularly valuable, is by really fully integrating AI as it evolves by not just being passive users of AI but actually to work collaboratively or in a truly interdisciplinary sense, learn a little computer science to help develop AI that is optimized for the situations that we find ourselves in. Whether that is a selection application, or whether that is determining who is going to be best in your leadership pipeline. Whatever application area where you might use a predictive model. We need to be a part of that.

In the same way that psychology was integral to developing psychometrics. Taking statistics and understanding "well how does statistics play out in terms of humans, in terms of measuring human characteristics?" We developed psychometrics by being interdisciplinary about statistics. We need to do the same thing with computer science. We have to integrate what they have been doing with artificial intelligence and use that to build an artificial intelligence of human behavior that is more optimized to that context than anything that we can do with just the general tools alone. So, I think that AI is key to moving forward here. Because, it has all of the characteristics of a technology that is not going to fizzle out, in that it is basically just an evolution of what we





already have and yet it is better in distinct contexts than what we are using now. That is not like Second Life where you would have to make an argument of “why would anyone care?” Here, you are getting better prediction, period. That is a core goal; so it seems like a technology that is going to stick around. I think we just have to be right on the front of that train, or else we are going to get run over.

**KF:** I love it. I am fired up. I want to start learning AI. Which, quick question, how do you do that? Do you just snag a computer scientist and say “teach me?” or—

**RL:** Again, think of AI as being a statistical modeling. So you have both what you would call supervised AI, supervised machine learning, which is just regression-type things. And then you have unsupervised learning, which is really just things like cluster analysis, or factor analysis, trying to identify categories within existing data. So that means that the struggles of learning AI are very similar to the ones of learning stats. You can actually be a practitioner of artificial intelligence with very little expertise. A lot of CompSci people who have bachelor’s degrees in computer science who startup their sole proprietorships, their own little companies, to sell AI services, that’s what they are doing. They actually are practitioners of AI. They could not explain in 100 years, based on what they have right now, how random forests work or how deep learning works. They don’t know. They don’t care to know. All they have to know is how to implement it. In the same way that you can go into SPSS and click on the ANOVA button, you can use AI the same way without really understanding at all what is underneath it.

So, that means the challenge is very similar. I think it is most useful, personally, to learn to be a practitioner of the material first. In the same way like in stats I would say the first thing you should learn is what all the analyses look like, how they function, and kind of what the language of statistics is, to just try to learn to navigate and gain a general familiarity with what it is. And then, only after you have that general familiarity and maybe in your own research you just instead of using regression, you used elastic nets. It is a relatively simple thing to change. I can give you a set of code in something like R to do something like an elastic net in five lines of code. It is not like you are sitting there writing thousands of lines of programming.

**KF:** Nice!

**RL:** And then only after you have a general comfort with the language and how it works. Then try to dive in and understand, well how does this work? In the same way that you would say, for example, you were trying to learn what random forests were, you would learn how to execute one, which requires only a couple lines of code. Then after you are comfortable with that, you try to learn how they work and try to implement one from the ground up. In the same way that in stats you learn how to click the buttons in SPSS first, then you are like “what’s actually going on under the hood? Let me learn the formulas. Let me understand what a normal distribution is. Let me understand how all of these concepts link together.” So you gain that deeper level of understanding.

In terms of the practice piece, it is actually really easy. So, I have a course, for example, that I developed at [datascience.tntlab.org](http://datascience.tntlab.org), which is data science for social scientists, which basically teaches people how to use R. And part of that course, there is just a week, or one module worth



of material on learning how to run AI algorithms. And, I don't explain how they work in that, because that would be much more than an hour video, but rather I just say this is kind of the language of these things. This is how you execute one. This is how you take a project that you have already done with regression, and just replace it with AI, which is not that hard. And then once people have done that, once you learn that basic skill set, that is when you can dive in deeper and get books on the mechanics on some of these algorithms. There is also a couple of articles out; I think it was a JAP recently, where they laid out, in really plain language, real psych-friendly audience language, just a paragraph or two what are random forests. What do they do? What is elastic net ridge and lasso regression, and what do they do? And it really kind of demystifies the complexities of those analyses. So, I would start with that high level, just put it into practice and see how it works, see what is the same and see what is different from what you already know, and then, at that point, say "alright, let me dig in a little deeper, now."

**KF:** Thank you so much for your time. This was very helpful. Thank you so much.

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