

NARRATOR: Anticipating rapid changes in the workplace—further accelerated by lessons learned from the COVID-19 pandemic—RIT is seizing on the opportunity to guide students to new economy majors that are multidisciplinary, transformative, and future-focused. These new economy majors break down traditional boundaries and open students up to a new world of possibilities. In this episode of Intersections: the RIT Podcast, Ian Mortimer, vice president for Enrollment Management; Steven Carnovale, assistant professor of supply chain management, and Dan Johnson, professor of packaging science, discuss the importance of offering majors that ensure successful outcomes while meeting the ever-changing needs of a new, and evolving, economy.

IAN: RIT has this kind of unique capacity and this rich history in creating academic programs that are typically five years out, ten years out. Then when the rest of the world catches up to us, we're onto the next definition of either an evolution of that program or something that may be in a completely new vertical. Two of the majors that we have proven that this forward-thinking process has helped industry and helped our students is in supply chain and packaging science. And that is undebatable based on the success that our graduates have in the marketplace based in both of those fields. We were one of the first in packaging science and engineering and design, but we've continued on this evolutionary and innovative story. And the same holds true in supply chain, particularly in a world where shipping and delivery and in an Amazon-commerce world now. And so, our strength in the new economy within these two areas was very progressive, very forward thinking, very advanced, ahead of its time. But how do you see these two areas kind of driving innovation moving forward as you're seeing the external environment?

DAN: We've been a program since the '70s, so packaging science has been around for a long time. Really, what happened is the explosion around e-commerce made people really think about exactly why a package is the way it is. And it made them accept some more different kinds of formats and really engage with – how's the product really land on the shelf? And then from a sustainability standpoint. What's the right thing to do with that material to get it dispositioned properly? Either recycled or whatever that process is going to be. That sort of exploded the interest in the kind of things we've been doing for many, many years.

STEVEN: Supply chain management is a term that got coined in the mid '90s. Before that it was logistics and before that it was physical distribution. And the transition that we've seen perfectly reflects where the new economy is. It's the integration of technology and industry. It's the digitization of everything. When you think about what Amazon does – I can go on my phone right now and order a pair of pants, and there will be operations research models on the back end optimizing from what distribution center through which shipping routes and that's all automated. And then one step further back you go inside of the warehouses, and there's robotics in place to pick and pack and to organize everything. So, I think our program fits exceptionally well within RIT, within the auspices of technology, design, and the like. And I think, why supply chain, why now? COVID highlighted it. There's a project I work on called the Logistics Managers Index where we've got data on this. We went from having some relatively available

warehousing and a tight but not overly strained logistics system to basically no capacity available and pressure on the transportation systems because when COVID hit we moved to online and e-commerce, exactly like Dan said, which not only highlights the importance of packaging, which it absolutely does. It highlights the importance of those systems. It's like eight-dimensional chess that we're playing, but at least packaging and supply chain are in the same side of the camp I think.

IAN: That's really cool. I think the other thing is an observation particularly within RIT and particularly the majors that you represent. I think we're much more agile. And what I've observed, and you just reinforced, both of you, is that your programs and your majors are really contributing to the real world's pace rather than being a lagger behind it. And I was wondering, and this probably is uniform across all of our new economy programs and a lot of what we do at RIT, you're actually leading the pace of change rather than being a victim of it. Is that a fair statement?

DAN: I'd definitely say so. The interesting thing is the research focus used to be on creating the product, focused on product design and manufacturing. Pushing that it's not just the product itself, it's the overall experience of how does it get to you, right? And then what do you do with it? How do you actually interact with that company? So, I think we've really been pushing what the experience of a purchase is. It used to be you went to the store, picked it up, but now oftentimes you are engaging with that product through the internet, you're engaging with the company on multiple different levels. And so really the overall experience, I think, is pushing and integrating all that is really what is the interesting part.

STEVEN: We're building foundations for what could come. It is hard to fathom a world in which there exists a little supply chain. It's just different kind of facets of supply chain management. Whether that's a service supply chain for the cloud technology and cybersecurity or whether that's a physical supply chain providing the materials and the packaging and all this kind of stuff, it's building the foundation to springboard into the future is, I think, what both of our majors certainly do.

IAN: How do the two of you think about material – the idea of material management, the idea of material curation – from each of your different vantage points? The creation of new materials to meet the needs of say, packaging, as well as the efficient management distribution curation of the materials via supply chain. This is a big question for not only the world, but especially for young people who are interested in this type of work or even engineering. If you want to be an engineer, you better understand how materials are going to be accessed and have that into your input.

DAN: One of the things that we're seeing is a lot of the big consumer goods brands have all committed to using post-consumer recycled content in their products and in their packaging. And really you need to look at the forecast for that kind of thing. Currently there's not enough recycled content available in the US to even come close to helping some of these brands meet their goal. And so, what that really does is it drives research. It presses us to come up with better systems of recycling and better ways to

make products out of post-consumer recycled goods. So always looking forward to say 'Okay, of the raw materials that I really need, what's the forecast for all those sources? And is the supply going to increase or shrink and then what are my alternatives? And where can I go basically to come up with some of these answers?' Because the supply of different materials changes over time, and we've seen that happen, especially in a pandemic, you get shorted on different kinds of things and you know you need to find ways to innovate around them.

IAN: What's the supply chain response to how that gets solved?

STEVEN: There's two different things that we typically think about as it relates to materials. The first is from a procurement standpoint, we're always trying to hedge risk. And that risk comes in two different ways. It either comes in availability, as Dan alluded to, or it comes in price volatility. So, the fact that our education in supply chain ends up being STEM-designated proves out to be incredibly useful because the mathematical analysis is critical in looking at those forecasts and kind of providing a backstop for managerial decision making to figure out whether or not we need to make a decision sooner rather than later. That's kind of the quantitative piece to it. The qualitative piece to it or the strategic piece to it, and the supply chain response, it's the relationships. We train people on how to think about engaging with their suppliers to ensure a continuous supply, there's that people piece to it. I mean, material availability as supply chains expand and continue to expand globally, on the one hand, diversity in supply increases, we have more global points of access, we have more repositories from which we can draw different kinds of materials. But it also means that my company is not the only company doing this. I'm not the genius who came up with the idea to source from China. There's a life cycle to it. So, the really smart supply chain folks are sitting out there thinking everybody's rushing to China, maybe now they're starting to go to Vietnam and Indonesia. Where's next? For my money, I think the continent of Africa is going to be an interesting play over the next 20-30 years probably.

IAN: The other thing again to kind of connect to this idea of new economy learning is, in both of your areas, the pace of the work coming out of school is real and it's legitimate. How do you embed that understanding and that expectation that if you're going to be a really successful contributing member in each of your appropriate industries – how do you embed that idea of pace and that idea of agility in the academic environment? How does that take shape? Because your graduates are in high demand. In career and co-op, the packaging recruiters and the supply chain recruiters are absolutely some of the most – it's really competitive to get our grads. How do you embed that pace and that sense of real-world environment?

DAN: So, I think one of the keys is sort of building in that culture of collaboration. Packaging and supply chain, they are the kind of things that you can't do by yourself, and there's lots of different skills there. And so, sort of the students pressing each other to keep that pace up with the kind of projects that they do. But then co-op is really a huge benefit for programs like this because if you're teaching something like forecasting, you can teach it mathematically, but until you get the experience of being at

work and having the numbers come in for the quarter and seeing how close you were and sort of actually experiencing it or actually being on a team that's pushing you to make sure you're collaborating appropriately. And I think that's accelerating. That's always been the case at RIT but I think the pace of that and the amount of collaboration is accelerating.

STEVEN: So, Ian, I think how we do it in supply chain is two-fold. So, at our undergraduate level we've got a capstone that all students are required to do. I teach that course and since I've been here I've gotten out and I've gotten a company to give us a problem. And they actually solve an actual problem and report to the company and go through all of the heartache and angst and stress that you would deal with in an actual problem. At the graduate level, this is the first year we're going through our program, of course, and so I look for issues in industry where companies can help give us a problem. To give an example, we've got a student in my class now that works for the University of Rochester Medical Center, and they have been having issues related to PPE, as you might imagine given COVID. Basically, it's an inventory problem, it's a forecasting problem, and it's an outbound distribution problem. So, in my class in supply chain analytics, I use that as our project. I said, "This is what you guys are going to be doing. You're going to be using what I teach you and you're going to be solving a real problem." So, it's not just, "Sally has 55 items of PPE. Next quarter it might go up by 10 percent..." It's an actual problem that is being solved. And I think because we have a unique opportunity right now with both of our disciplines being front and center, you gotta strike while the iron's hot. And that's kind of how we make sure that they're forward thinking. It's integrative, and I think it's well within the ethos of RIT because of our co-op culture. Students go out, they work, they get jobs, they have experience, so that when they come through my 'assembly line' and I stamp them 'quality approved, you can go out there and be somebody,' they've already been quality tested. And I think that matters a great deal, at least to many of the employers with whom I've spoken, I think it matters a great deal.

IAN: At RIT we have these sets of programs and, obviously, the two of yours represent these in amazing ways that are environmentally and in commerce top of mind. In high school settings they are not top of mind. Right? So, there's not really any curricular exposure to packaging science or supply chain in a K-12 curriculum. And I don't know if we always think about the complexities and the opportunities that exist in terms of how we live our lives and the delivery of product and the aesthetic and the design of all these things, it's just not a natural reaction. If you were to frame out how young people should think about planning for their futures – and maybe even kind of agnostic of what you do from an academic perspective – but can you share a little about how you're seeing the future and how young people may want to think about it? Either from the pace of change or the big opportunities that you see.

DAN: One of the things I'm seeing, Ian, is people are sort of adapting their careers over time much, much more than they used to. So, it's not so much what is the exact right major, it's what's the right category. Do you like analytics? Do you like that kind of work?

Or is it more of the creative design piece? Because you can adapt those skills to lots of different roles.

STEVEN: That's spot on. And the way I think about it, the way I frame decision making when I talk with students and people generally, it's about laying the right foundation so that you can springboard. So, what that means – I have a bias, so disclaimer – it's STEM, it is mathematics that will drive the future. I think that's unavoidable. I think programming is such an important skill to have, computational logic and decision making around problem solving. I'm not saying they have to learn C or Python or whatever – you have to know how to think about things. So that's a baseline of importance I think everybody who's coming into the new world, the new economy, should know. The STEM angle means that you become a value creator, not a cost center. If you can leverage mathematics, engineering, technology to solve problems better than they used to be solved, you're proving your value and you're ensuring your success. And that's obviously well entrenched within RIT. That's kind of why I was so excited to get here because I want to be at a place that appreciates that, and it is. And I think our students appreciate that or else they probably wouldn't be at RIT. That's the way I've been thinking about it.

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