Transcript for Session 2: The Evolution of Training for Supply Chain Automation Technicians

Mary: Thanks. Next up, we have a short video entitled "what is a supply chain technician?" Then we will take a short break and hear from the panel at 1 p.m. Eastern. We will see you at the top of the hour. ♪

>> A number of distribution and warehouses no longer have clipboards. They use robots and lasers and complicated systems. We're looking for individuals like you to run these machines. Ever wonder who maintains this technology? Today we will hear from some of the top technicians in the field.

>> You will need to understand how computer technology controls mechanical function of automated systems.

>> I used to work in production for 10 years. I picked boxes on the line. I decided to go to school at a technical training. I applied for an opening and have been here ever since.

>> If you like to fix broken things, then support of supply chain companies is the thing for you.

>> I got a chance to go to school and now I have a better job with better pay.

>> In the next 30 years, there will be massive growth for technicians who can work on automation that goes far beyond their imaginations.

>> In my 40 years in the field, I have only been out of work two weeks.

>> My favorite part is to solve a problem.

>> Electrical is important and maintenance. Without it, you cannot repair.

>> we have responsibilities in the building and we work on these. There are other people working in mechanics, electronics. You name it.

>> As training and development manager for a large supply chain company, I can tell you, there are many high-paying jobs available for you.

>> Every day I come to work and do something different. Electrical, airline, battery, forklifts, etc.

>> It is never one thing.

>> If you have ever taken anything apart or been interested in building robots and computers, we are looking for you. There are high wage, high skilled jobs in automated systems. ♪

Mary: What's oops, did the quintessential thing of leaving my mute on zoom. We will get to our next presentation and this session will feature a panel of educators on supply chain automatic technicians. It will be led by our moderator, Bob Slowinski. -- Bob Sompolski. Sure to select the panelists and attendees and this is a good one to do that because we have got four presenters and they will be watching the chat. Be sure to put your questions in the chat window and address them to panelists and attendees. With that, I'm going to hand it over to Bob. Welcome, Bob. Welcome, panelists.

Bob: Thank you. Let me begin by introducing the other members of the panel. Jeremy Banta, associate professor in Columbus Ohio for supply chain management. He is also API for the collaboration of mid West professionals for logistics engineering technology engineering project. We will be referring to that as the computer leaked brain. Then we have the lead supply chain manager from Columbus state who works on the complete brain. Then the fourth member of the panel is Dr. Ned Young, a professor of management at Sinclair Community College in Dayton, Ohio. We are both co-PIs on the National Center for supply chain automation and are collaborators on the complete brain as well and we would like to provide you with some of the history of these various projects. In July of 2016 our original national Center funding, you saw me narrating the video during the break, it suggested that I of -- apply at a conference at the Navin -- Navy's -- than AVP or. Everyone at the conference was trying to figure out how to plant marketing tools so the game players could transform into paying customers. I visited the Expo and I met staff from Columbus state who were promoting their logistics engineering technology curriculum and it was a way to implement I.T.

curriculum into supply chain, something that Ned and I were very interested in. We introduced proposals to continue that work and those efforts have interacted with the National Center and that's basically our story. We are going to ask of the Columbus state people to talk first and I believe that Chris Dennis is going to begin the discussion. Chris?

Jeremy: -- Chris: Thank you very much, Bob. Today Professor Banta and I will be talking about logistics engineering technology, the program, why we started the program, and we will speak about the complete grant. First, there is always a lot of confusion when you bring up the word logistics or supply chain management. So let's define the word logistics. Logistics is a part of the supply chain process that plans, implements, and controls the forward and reverse flow of goods and services. Logistics is the moving part of the supply chain. In Columbus, the reason why that is so important and I can tell you it's important, we have new distribution centers coming up all the time. We had the huge distribution center Park around the Air Force Base towards the southern part of Columbus. There are distribution centers on the west side of Columbus, a large park on the right side of Columbus and a lot of clothing and designer brands, Bath and body works, as well as a Facebook center out there. Columbus is growing. Why is Columbus growing? It has a lot to do with the location. In Columbus we are a 10 Hour Drive away from 47% of U.S. manufacturing capacity. 48% of the U.S. headquarter operations. We are that same 10 Hour Drive away from about 30% of the Canadian manufacturing capacity. That's what makes Columbus and Central Ohio, what makes logistics and logistics engineering supply chain automation technicians important here. These are some of the companies that are in and around the Columbus area. It accounts for a large portion of our employment in the region, supply chain logistics. 9% of the jobs in the area are in this sector. Some of these same companies, large companies came to Columbus state. We invited them in to ask them what you need to. What can the college better for you? They asked for the let program -- LET program. Central Ohio is home to the supply chain sector. There is the 9% figure it accounts for in these are good jobs. Career earnings, $50,000 to $70,000 per year. High paying jobs for people with two-year degrees. So, what we did was we partnered with over 20 of these companies and they wanted us to prepare slides -- prepare supply chain managers with a curriculum and engineering capabilities, as well as I.T. capabilities. So, we developed this hybrid model and I will go through the classes with you that technicians take. They take these classes through in person and online formats. There are only a

few classes done in person because they need to be in a laboratory setting. We have an IST lab where they are able to work with equipment and electrical troubleshooting. We also have a classroom that is outfitted with trainers for the students. The trainers help the students learn how to wire circuits. Also, troubleshoot circuits. And also work with PLCs to understand how to program and use ladder logic. The technicians all get classwork in the area. There is also an embedded internship. Not for all students in the program, but we took an existing model that we call the modern manufacturing work study where students will go to class and take specific coursework in the first year to make them valuable to these employers and in the second year of their program, they are working part-time in making a really good wage and going to school part-time. These students are able to graduate a lot of times with absolutely no debt. A high percentage of the time, I have heard 98%, they are offered full-time employment after internship. So, the first year , theLET student, this is not the money -- modern manufacturing work-study model. This is just of classes that an LET student would take. It would be adjusted for the modern manufacturing work-study students. Here you can see they are getting supply chain management coursework. They get a principles class and inventory management. But they are also in that first year getting some engineering, basics, and the 1200 is more about industrial engineer methodology like six Sigma. They learn about just in time. They learn about total productive maintenance. In the second year they will get into more hands-on engineering training. You can also see some I.T. coursework with Excel experience in the first year and they are getting an introduction to programming logic. In the second year, the students in the engineering part of the program, they get into much more detail with intro to electric motor controls and PLCs. This is where they use the trainers, they take field devices and wire it up and see how they can make things work and learning ladder logic in order to put the circuits together. Finally in the later part of the class they learn how to take what they have already learned, how to actually wire the circuits and instead of wiring they use PLC to utilize the logic to make the circuits work. They are also taking an I.T. course in logistics. Still logistical basic supply chain management. There is also a mixture of I.T. courses, as well as data acquisition systems. We feel that this is a well-rounded program where they get equal classroom time in all three disciplines and we have some ideas about taking the new certifications, the supply chain and automation, trying to integrate that coursework into our two engineering classes so that the students have the availability on graduation to test for those certifications. What careers exist in this field? I can tell you that in

Columbus and I would imagine in most major metropolitan areas, there are a lot of openings in supply chain. Logistics engineering technicians or supply chain automation technicians. Supply chain managers, systems analysts, operations analysts. We have had graduates in the program who were hired as safety specialists. We also had a graduate of the program that ended up at I.T. and a distribution center. There are a lot of titles you can get after finishing up this degree. Now, in our programs at Columbus day community College, the professor and I offer these degrees and certificates. Logistics engineering technology is our newest degree. It is more stem related as an Associates degree but we have international commerce SCM certificates as well as supply chain management and international commerce. Associates, supply chain management Associates and the CORD -- and the LET degree. Next, Professor Banta will talk you about the complete grant.

Bob: Thank you, Chris. Yeah, calling me Professor Banta makes me sound old, but thank you. -- Jeremy: Thank you, Chris. Calling me Professor Banta makes me sound old. Like Marvel movies, this makes more sense if you know the background area the first grant established the LET program and as Chris alluded, this was done with a lot of industry feedback. We didn't even know it was going to be called LET until we were part of the way through the process. The grant went so well and we were so happy with the curriculum that we designed, we put in another proposal and got a second grant that moved the program into the work-study model, which is where students go to school for the first year and during the second year are partnered with one of our partner companies, where they work part-time time and go to school part time as well. The third grant, which takes us even further is the complete grant. We hope that there will be a fourth. We have a couple of ideas and some proposals for the future on those as well. The primary goal of the grant is to share what we learned in the previous two grants with others. Specifically Sinclair College and Oakton community College but also through a network and a lot of other venues as well. Four deliverables on the grant. The first deliverable, basically, is led by Columbus day and revolves around the dissemination of information from prior grants and what's going on currently. We do this through our partners and continual outreach locally and nationally at events like this one. The second one that I will focus on a bit more, even though all three schools are doing this, a kind of evolves around a network and it makes sense that the three schools revolve around this but also on their own, it revolves around creating this network and when the

grant had been proposed and the deliverable written, we were not 100% sure what the network look like, we wanted to dig into it and see where it went. Through exploration we realize that schools like Ohio State University have advisory boards at the college level and the school level, like for the business college, but they didn't have it or the individual programs. There's a Masters of is this logistics engineering and the gentleman that runs that program did not have an advisory board to get info on his program specifically and we thought a network might be able to help replicate that and make sure that local schools were on the same page when it came to delivering supply chain management education. So we formed the Ohio supply chain academic network and the L -- primary goal is to connect the industry with academic partners at the Hyo -- higher Ed level and K-12 level. Here you can see some of our current partners. We have not only industry members and academic members, but we also have what is called supply chain adjacent partners like veterans services, the Columbus Chamber of Commerce and the mid-Ohio regional planning commission. We have been in existence for two years and pre-pandemic had some really good local speakers while creating some really good partnerships. Post pandemic we have obviously gone to virtual and made the meetings more virtual type but we are hoping to get back to in person and we have also branched out into hosting some events on our own as well. A K-12 agar asked us to partner with them on a virtual event connecting K-12 students with a recent college graduates to talk about different careers within supply chain management. The third deliverable revolves around educating faculty. We are looking to replicate some of the programs they have created. The fourth deliverable revolves around prior learning assessment and we have modeled but Sinclair has done and we continue our work in this area. That is a quick down and dirty of what we are doing. Any questions about the program, feel free to reach out to either of us and now I will be followed by Ned to from Sinclair. Ned?

Dr. Young: Thank you, Jeremy. As was mentioned, we are now at the national center in our 10th year anniversary and we wanted to give you a bit of background on where we started and where we are now. So, for this particular presentation I would like to talk to you about a few things, including how we started, beginning by the way in 2000 11. We were called the national Center for supply chain technology education and we did several things, creating model programs. We will talk a bit about that. We created a course in a textbook on introductions to automated warehouses. We were there for five years. Supply

chain automation bringing it into what we are seeing today with the supply chain. Kevin Fleming, who you saw in the video, many of you probably heard him speak in those videos. Vince did Noto is running the GIS center and is still a good friend of the center. Erica is out in Tacoma in Washington and began with us and has since retired. Then we have these bad pennies here, Bob and myself. This was the original model program that we developed. We call it a model program because it gives a reference to various colleges as to what the skill sets are that are wired. Much like Jeremy mentioned, industry involvement was really the driver of this particular program. We had industry membership across the nation that met several times physically and electronically and developed this, as you can see this curriculum is very Mecca Tronic oriented. We had it all in bags, kind of the core part of the supply chain automation technician. In 2016 when we reapplied we had a different change in the participants. Colleen at the time was the PI and has since retired. Valerie Piper who you met earlier is now our PI. We were able to bring Jamie Dale in, who is a really important member of the team. Central Piedmont in North Carolina. Then those two bad pennies are still around, like myself. This year we have worked and had several zoom meetings across the country with industry partners. The new technologies are somewhat based on the technologies that Chris was talking about. The importance of having that in the model program, this is the new model program. We will jump into this closer. First, there were several that we didn't make much of a change to. Things like the general mechanics and microprocessors, the hydraulics, the pneumatics, those were the core foundations to the technician. We did have to make some changes to certain courses. Like the introduction to the automated warehouse with all the new technologies, we will talk about those in a second. We combined AC/DC courses together. This gives you an idea that with the OSHA, we decided to implicate -- use that so that a student could sit down for the certification for the OSHA 30. In the PLCs we did a lot of work on the variable frequency drives. We combined the AC/DC courses and we felt like it was important to highlight those together, so we did that. And then probably the biggest addition to it was in the introduction to the automated warehousing course, where we added networking and robotics, much of the robotics that Jason and Patty were talking about, as well as Cybersecurity. Three new courses, introduction to networking, the IOT Cybersecurity and robotics. These were three new courses in the model program and we will break these out in more detail in just a little bit. We get copies of these, but in the, in the introduction to computer networking we thought it was important for supply chain technicians to understand some of the ecology's they

would be dealing within the network, realizing that there are probably I.T. specialists setting up these networks and things and there will be troubleshooting that needs to be had. Understanding a bit about ethernet standards, wireless having become so important now. Jason and Patty were talking about those AMR's driven by wireless technology. The focus will be on troubleshooting and how a technician would, would manage that, that network. The next slide is an outline to just kind of give you an idea of the topics we are talking about it again, we are looking at troubleshooting support for these networks. So, than the next course deals with the Internet of things. I think the biggest change I have seen in the 10 years I have worked at the center has been the introduction of IOT devices. Companies are finding many different types of devices, whether they be cameras or security kind of devices or we have seen a lot of HVAC kind of do's eyes -- devices in cold storage, that kind of thing, these are implemented in the warehouse distribution centers and because of that, technicians need to understand what occurs and how these IOT devices work and when we add that in there we are getting into the issues of cyber security because now you are opening up your facility to the Internet and issues with that. So, the next slide shows you the outline that we are recommending in this particular course. In focusing on what the pieces and parts are and how a tech should can review and then perhaps troubleshoot and find issues if those should occur. Lastly, and I think this came up in the chat on the last session about what should a supply chain technician understand about roadblocks, this module, that is what we are trying to get at. Just an overview of the common types of robots out there. We mentioned AG bees versus AMRs and romantic -- AGB's versus ROI --

[INDISCERNIBLE]

AMR'sAMR's -- -- AMR's and what technicians need to know. There were a lot of sensors on these robots and that becomes an Orton part of the technician to understand, how they work. Lastly, this slide gives an outline of the major topics that were proposed by the industry partners for this module. So, with that I would like to turn it over to Bob Sompolski, who is going to talk to us about the automated warehouse course we have with the textbook and the changes made based on the new technologies.

Bob: Thank you. Before I delve into the textbook, it should be pointed out that each of the three partners schools had a role in each of the new classes. Sinclair

took the lead on networking. Central Piedmont took the lead on robotics. Hoped and took the lead on everything in the Internet of Cybersecurity. Back to the introduction to the cyber warehouse, in the first round of funding the center identified the need for an entry-level course that would serve the necessary skills and equipment technicians should have to be hired for supply chain automated positions. Discussion of curriculum led to plans to develop a textbook that was a collaborative development for the national Center of supply chain automation and the developed tool was to use the Apple iBook application and the book is currently distributed through the iBook bookstore and the Google play store. It comes in both PDF and iBook format. There are a number of interactive crossword puzzles, exercises based on the Jeopardy game and links to various YouTube Leos. The puzzles and games that referred to as widget. By 2016 we produced a instructors manual recognizing that something that book publishers regularly make available. We wanted the book adopted, so the manual contains examples of solutions to textbook problems. Supplemental activities as well and we included some laboratory activities for faculty going down the book with a scheduled lab component in the course activities. So, this is the overview of the current textbook. Basically the distribution of widgets on availability are displayed in the right-hand columns and as we started inking about adding material to the book, we took some liberties to redesign things. You can see that the first three chapters highlighted in a yellow bar are the relative shortest. The fifth chapter surveys material handling and is relatively long. The size of the existing chapter five made it difficult to put the emphasis where it was necessary and currently made a point that there were at least someone in one of the And, so, when we redesigned the book, wanted to make sure the future robotics chapter, in addition to the net working cybersecurity that would occur later in the book. Our redesign of the first three chapters, we basically squeeze them into one chapter. We updated a career awareness material from the first edition. We included the new MS see certified technician supply chain that we will talk about later. And, big thank you to helping us develop materials for that part of the book. And, we included a new widget, which I believe was originally an NSF supported project. Survey supply chain management. The material for chapter five was large enough that we thought it could, perhaps, be split into three chapters. The first four sections basically serve a human driven device is an automated storage and retrieval systems. These are highlighted in yellow on the slide. The areas highlighted in blue focus on processes and computerized maintenance management software that supports the maintenance process, as well as some

automated inventory tools. We reserved, basically, a middle chapter for new material on robotics. Which, we have seen from the waypoint team how important those things are. They are actually participating with us to draft the material. The new material is coming from waypoint. I was going to spend some time talking about their lab activity that they had focused on fry robot. But, both Jason and Patty ended up talking about that. Just to remind you, the website has a software development environment that can be graphical. But, can also be textual. Starting with the graphical construction, that code can control a virtual screen robot or use a Bluetooth connection and download it. Entry-level users can proceed over a. Of time -- a period of time. The predictive maintenance material that will appear in what is currently chapter five is being developed by Mike Recchi of Metropolitan community College in Omaha, Nebraska. Working on the use of sensors, to and productive maintenance. In this area of the book, it should be noted that we will be using centers in areas that include applications ranging from the measurements of devices that indicate a need for maintenance. The automation of inventory, as well as the ability for an autonomous vehicle across the warehouse floor. The importance can't be underestimated in this area of the text. The new chapters have been submitted by Dr. Sands. He is speaking later this afternoon. John had submitted material, a suite of webpages maintained, it was created by a Google engineer. It supports the design in our simulations. And, the chapter on cybersecurity has been provided by John Romano. The assistant director of the Texas and center. He has provided an activity that features the famous enigma cipher that was used by German intelligence during World War II. If you have ever seen the 2014 will be imitation game, the story is not how the cipher was broken by a group headed up by Alan Turing. He is viewed as one of the founding fathers of modern computing. Basically, the enigma worked and had letters of the alphabet rotating around the cylinder. He has provided a version that wraps around the cylinder of a Pringles container. Two demonstrate how the code was decrypted. I never thought in my life I would ever use the words Pringle and enigma at the same sentence but John is done that for me. So, the second edition is going to play out kind of this way. Items that are not highlighted are basically replicated from the first edition. Items that are highlighted in green represent existing text of the first edition we are going to rearrange. And implement into the chapters I have identified. Items that are highlighted in blue represent new material. That will be added to the book. We also have new widgets and new laboratories that come into it. We think these will provide better support for the faculty. We use this as a manufacturing class. We did run into one

problem in the production of the original book. They will continue to support the iBooks reader. What we are going to do is use EPUB, and international digital publishing -- publishing forum. It has some readers that are available at no charge. Actually, the majority of these things are available at no charge. It also has writing tools, that are available at no charge. The important thing of this is after the center sunsets, if the book is going to live on, and EPUB version can be revised. That way, as the technology evolves, somebody can pick up and up to the book at no cost. This would not be the case with the iBook or PDF format. IBook won't be available because Apple will not support it. To update the PDF format requires a license with Adobe. The choice of using EPUB provides us with the opportunity to make the book edible by users who do not have to pay a licensing fee. And, we hope to get a second draft of the textbook available this summer. But, we wanted to assure people that the instructor's manual will be updated, and hopefully available by fall for those who choose to adopt. Basically, we will have new activities. There will be new chapter exercises. Widget solutions. And, probably some websites that are valuable since we started that process. So, I think at this point, we are ready to respond to any questions that you have before we break out, I would like to think the panel for your work and thank you for your attention. I will turn it back to Mary.

Mary: We do have some questions, I had a couple come in via private chat. I am going to start off with a couple of questions about the let program. The first was what led you to determine the need for the initial logistics engineering? What was the original -- the initial impetus?

Jeremy: and basically came from industry pointing out that there was nobody coming out of school that could speak supply chain management theory, engineering and I.T.. Most of us in the supply chain industry fell into it some point. We probably know some computers well. I would be willing to bet that most people are like me and don't know a ton about engineering. When you propose a solution to an entire group, being able to speak the other languages starts. That is kind of the impetus of where the let initial curriculum came from.

Mary: Is that some of the core differences between the standard program and let? Can you differentiate those a little?

Jeremy: The core program is basically all theory. It can be done 100% online. We have toys, they are really big. You can't bring them into the classroom. It revolves around theory because we know the normal supply chain individual is going to learn a lot on the job. We want them to have a base theory. With the LAT part, there is some hands-on stuff they have to do. So, yes, that is where it diverges greatly. When they start learning the programming and electronics and stuff like that.

Mary: OK, terrific. Anyone else want to jump in on that? OK. Next question. How about the industrial members? What industry, who were your partners, how did you bring them into this? In terms of developing LAT.

Chris: at the original meeting, I wasn't there. That was before my time. I can tell you some of the members that still are supporting the program. We have, not UPS but DHL. It has been a part of the meeting. PepsiCo, we had members from Pepsi there. The limited, we had members of the limited there. The company with bath and body works. As well as gap. We have other supporting members like Abercrombie and Fitch. Oh DW, FST. Partners like that. They may be able to add some more.

Jeremy: When the initial work was being done for the program, at the same time, there were other grants establishing the modern manufacturing. That came from Honda. Honda approached the factory. All of the people we hired are about ready to retire. We can't backfill fast enough. Not anybody, you can't just hire them off the street and have it working. We started partnering with them and their suppliers, and that caught on. When the program came around, we had a well-established base of manufacturers. To tap into, as well as the already submitted logistics industry.

Bob: I will comment on the Oakton industrial partners. Back before we were part of the national Center, the state of Illinois asked committee colleges across the state to get involved with warehousing logistics industry. And helped us point together and automated inventory. Which naturally let us into the LAT environment, before even part of the natural center -- the national Center. As we progress, we worked with groups like CDW, local networking companies. Attempting to understand what role they can play in that. Perhaps our most interesting partner has a manufacturing site near one of our campuses. They were

looking for somebody, not so much to deal with the engineering side but, they had a robotics packaging area in one of the septic cleat rooms. Looking for technicians that could help them with their packaging and maintain the robotics they have so the pharmaceuticals could be shipped in an efficient manner.

Mary: A wide swath of different employers in different industries.

Dr. Young: From the very beginning, we felt like it was important to have industry lead the charge. And, we created a couple of positions. One is an industry liaison. Steve Harrington fills that position. Many of you probably work with Steve in the past. And an educational liaison. Steve created an extremely strong industry group. We meet with them fairly often. I think in the last year and a half, we met with the monthly for the first six months or so. We met within in different locations around the country. They really are the folks that have driven the curriculum. The model program that we saw, the introduction to the warehousing. In fact, many of them have written chapters. Bob mentioned the robotics, Jason and Patty are writing the robotics chapter for that. We feel proud about having the industry lead the charge. They are saying to us -- this is what we need out of technicians. In these automated systems.

Mary: That is where the rubber hits the road. Having the communication channel open. It makes a difference. Which leads me to my next question, which is what kind of jobs are your graduates finding? And are they with the same employers?

Chris: with the same employers and also a lot more -- thinking of a few graduates right now. We have one that became a safety officer for a large transportation company. Another graduate that actually went into the I.T. department of a logistics company. We now have some students placed with a couple of manufacturers. Just for the modern manufacturing work-study. One company is a company that they make a quick but for the food industry. Fast slicing equipment. They make machines and ship them all over the world. This person will be more of a technician for them. Another one actually works for Lincoln electric, which does a lot of distribution for different types of electrical components. He is going to be the supply chain person. It opens up -- I always tell students, you can do anything with this degree from planning, being in purchasing, sales planning, planning your production planning for manufacturing facilities to working as a technician or an

operations analyst to a distribution center. Even mid-management level. With experience in a distribution atmosphere.

Mary: Bob?

Bob: A couple of other companies nearby. From the traditional electronics area, we were recruited to send students to a site adjacent to our district, not in our district. The community college they were and could not provide them with the number of employees that they want. So they reached out to us and we were able to help them. But, again, that is more of the traditional electronics. We have also had students placed into underwriters labs. More of a traditional Becca Tronics strategy to help the scientists at that site. Realize the experimentation.

Mary: We are starting to get close on time. Two questions left that I would like to quickly run by. One was a question that came in. LAT versus SCA technician. Can you quickly sketch out the distinction if there is one?

Chris: The SCA, talking about these certification track?

Dr. Young: I think the model program we have in national Center.

Chris: OK. Do you want to answer that one?

Dr. Young: I think the model program, when we first began a supply technician, we were looking at the technician, the industrial engineer technician. That was the first model I showed you. It had a lot of mechanics. Electrical, hydraulics, pneumatics. Over time, with the addition of a lot of I.T. type of -- I.T. type devices, especially with the Internet, the Cybersecurity, the networking, that is where we looked at what Chris and Jeremy had been doing in the program. Looking at what industry was asking for holistically across the nation of the national Center. That is why we started adding additional modules to the supply chain technician. We also, and the meantime, there will be a whole session on this because, as many of you know, there is a new technician certification for the supply chain technician. Obviously, the national Center was a big part of that. It is sort of the manager. We look closely at that to see what they had determined from an industry standpoint. That is where we started adding some of the networking and robotics, that sort of area. So, different colleges implement , Chris and Jeremy showed you how

Columbus came about this. We have an automation program for technicians that highlights robotics. So different schools have taken different approaches added. But, the important part is these technologies are what we are seeing now in automation. In supply and logistics. And, I think those will become the foundational skill sets that these technicians are going to need. I don't know if it is as important how it looks at a particular college but, what I think we are trying to get at is what are the base skills required of these technicians?

Mary: OK, we are going to have to leave a question on the table. There is a question that just got posted in the chat if you want to attend that once we get finished up here. Our time has run away from us again. I want to say thanks to all four of you. Bob, Chris. Ned and Jeremy. For a great and except for presentation. We will take a short break. Back at the top of the hour. 2:00 Eastern. Our presentation at this time will be the future of the Cybersecurity workforce and how it influences what you are going to be doing. A relevant topic, see you back at the top of the hour. By everybody, thank you again, panelist. -- panelists.