

Information and Communications Technology

College Panel

Friday, November 8, 2019

IDEA at ATEP 1624 Valencia Ave. Tustin, CA 92782

College Representatives:

Russ Alizadeh, Cyber Security Instructor, Cypress College

Michael Warner, Department Chair, Coastline College

Anna Carlin, CIS instructor, Fullerton College

Cristian Racataian, Professor, Golden West College

Roopa Mathur, Professor, Irvine Valley College

Bill Saichek, Professor, Orange Coast College

Alan Foote, Instructor, Saddleback College

Jason Sim, Assistant Professor, Santa Ana College

Charlotte Augenstein, Regional Director of Industry Engagement, Los Angeles Community Colleges

Jacob Poore, Research Analyst, Orange County Center of Excellence

Kathy Johnson, President, Vital Link: Welcome to CTEOC Regional Advisory Board in partnership and collaboration with the Los Angeles County.

- We are dealing with 23 school districts and is difficult to meet everyone's requirement. Our goal is to have you network, share ideas, meet and connect with new industry representatives and hopefully get some initial support for your own programs.
- Learn more about what is going on in colleges so that you can make those relationships, if they have a unique program, you are able to potentially articulate with them or have students go there.

Russ Alizadeh, Cyber Security Instructor, Cypress College: We have a cyber defense program, an associate of science degree in cyber defense. We have 2 certificates. One is the cyber defense and one is cyber security.

- We are fully accredited, we do the continued certifications for A plus, network plus, IT net plus, security plus, security analyst, and penetration testing.
- We have computer science part of information systems. We also have office application.
- We have 2 new certificates, one is the cloud computing and we are partnered with IBM. We also work with Amazon web services, we incorporate their programs into our classes.
- I have systematic administration and technical support working with Azure and Microsoft and computer forensics.

Michael Warner, Professor, Coastline College: I am department chair for CIS, TGA and computer services technology.

- We are a center of academic excellence for the NSA and Homeland Security. We were first community college in California to have that position.
- I teach Cisco network, academy, and basic Comp TIA classes but other instructors are teach different classes. We have 5 AS degrees, 2 new ones. One in digital forensics. We received an NSF grant to write 6 courses in digital forensics; have a whole program and a degree that goes with it. We have a new one that is called data analytics,

- We have 3 other degrees, in Microsoft, and cyber security, one in Cisco, along with many smaller certificates that students can earn.
- We have partnerships in dual and concurrent enrollment with La Quinta, Corona Del Mar High School, and Santa Ana Unified School District. We have a summer program for young ladies, usually have 40-50 people come. It is a week-long training session with female professionals in different areas, especially cyber security.
- We host the Cyber Patriot competitions. We just moved to WRCCDC, it is a statewide competition. In the previous competition 2 weeks ago, we came in first among the community colleges.
- Digital forensics- has job data, entry level positions starting at 58,000 dollars a year.

Anna Carlin, CIS instructor, Fullerton College: We have our associates of science degree in computer information systems and we have created certificates in certain areas under it.

- First is office applications, which most companies are going to have individuals that need to be familiar with those tools; as well as building on programming, which has been out since the 70s. It is morphed in that we have more languages that we can create applications in, but also the devices that they are going to run on.
- Networking is the foundation for everything that we are doing in IT. Students need to understand how networks function before we start layering things on top of it; could be applications, IOT devices, it could be anything that is on that foundation.
 - As a part of that, we have a healthy program in cyber security, my area of expertise. I worked at Cal Poly Pomona and cofounded the western regional collegiate cyber defense competition.
 - We are trying to build individuals with the skills that they need to get into entry level positions in cyber security, every organization is concerned about how secure their data is, making sure that their competitors do not intercept their designs for the products, etc.
 - It is a career path where there are not enough people to fill the open positions, we are calling on everybody to start integrating security into all of their classes, so that it becomes pervasive. No matter what job you hold in a company, security will be a part of that.
- We also have a certificate in web design for the creative side, being able to put together what an organization wants to market online and make sure that that is effective. Comes into some of the data analytics that we are working on as well.
- We have a game design program, more artistic side and then how to program this. Because we are starting to see organizations using games as a training tool for new people coming into the company, but also trying to refresh their existing workforce.
 - Some organizations in cyber security are using this to evaluate how good they are in cyber security, using some challenges that numerous competitions are exploring right now.
- We are working on articulation agreements with 4-year schools. If that is their aspiration or that they need to get a certification to take back to work and be eligible for a higher-level type position. We have multiple entry points, multiple exit points.
- We are trying to provide pathways for individuals to get what they need at the community college level to meet whatever their career aspirations are.

Q: Kathy Johnson: The other certifications?

Anna Carlin: We have students coming in for one certification, and in cyber security we definitely stacked them.

- First level is for entry level type positions and organizations, we are building the foundation, which is understanding networking, operating systems, the 30,000 foot view of cyber security, as well as some of the programming or scripting they need in order to complete that certificate. Then if they are interested in pursuing it, we have an analyst as well as masters, so they are all building on top of each other.

Cristian Racataian, Professor, Golden West College: We are a small college with a small program, but very robust.

- Recognized by the chancellor Office in Sacramento, we're in top 10 colleges for transfer.
- We have certificates and degrees in software and gaming development; we have an associate degree in computer science that is geared towards people who are transferring.
- We are successful in transferring because we work closely with the counseling department. Students are well guided by both the counseling department and us, in what they need to do, what they need to accomplish.
- We have Esports, gaming competitions that are organized, we facilitated computers, room, spaces, parking, everything they need, and now we have an opportunity to connect with this esports. We are tailoring our gaming courses to work closely and see if we can capture some of the students that are coming to participate in esports.

Roopa Mathur, Professor, Irvine Valley College: I worked in computer information management for 14 years, I am now interim director of economic and workforce development.

- I placed one of our students into a local IT company that manages networks and monitors computer security for small and medium sized businesses, as an intern working 20 hours a week. He works in their network operations center; writing scripts with their database, writing SQL, Power BI, learning presentation skills, and he is doing wonderful. If you are business partners, please let me know how I can help you. Because the student was placed by IVC, we are paying the student, the company does not have to pay the student. The student is part of cooperative work experience course, workers comp is covered.

Bill Saichek, Professor, Orange Coast College: We have computer science, CIS courses and office administrations, applications, the business information working certificate.

- Also have certificate programs in most areas of the IT arena.
- Almost 10 years ago, I developed a course on simple residential networking. The whole IOT arena has exploded over the last several years, residential is a good target, because it is easy technology to teach students with in bringing networking technology, IP, other protocols, and the infrastructural things.
- But you are playing with toys that are easy for students to understand the workings, thermostats, light switches, content distribution systems, etc.
- We have built that into a core level curriculum, the feed to that is, CompTIA. We are a CompTIA center, we offer A+, Net+, and Security+ for those going to school there. We are trying to bring students into the IT arena, not just from traditional IT programs, but also with cooperatives, with other departments on campus, where IOT, especially layered

on top of security. IOT devices have zero security, first it needs to be made aware, and then be added on the devices themselves, the protocol themselves are not security related.

- We have a new set of courses coming into play, students that will be taking that class would not be the traditional students. This is a course but we will bring them in through the more standard A+, Net+, bring them into the IOT, and there will be 2 additional classes. Will be vetted and supported by SoCal Edison.
- We also have pathways from IOT from architecture, interior design, construction management, HVAC, environmental control systems, all kind of areas where the technicians and the workers who will be working in these areas will have to use these technologies, they need to understand it, the ramifications and implications.
- We are proud of our unmanned aircraft systems program, euphemistically drone; we are looking at and beyond flying drones. Drones can be anything that is autonomous, where it is automatic control systems, could be vehicular, surface or sea crafts, etc.; but we are trying to get away from the drone.
- Focusing on pilot training 107 certification, we have about 10 of our students passed their 107 after completing the course, but we also approach it with other things as part of that program, primarily because of its security aspect, it is telemetry and communication aspect of it, and this coming spring it will be off by the 3rd side of that triangle, which is adding the autonomous part of it. We will be teaching students how to program, manage, and control completely autonomous flight systems that will be very heavily used in everything from geospatial to agricultural.

Alan Foote, Instructor, Saddleback College: I am in the computer information management.

- We have the computer science program, which does a lot of the programming in software and gets our students ready for transfer into other computer science areas.
- In the computer information area is the Cloud, and we have a program that is getting into developing Cloud. We also have a lot of our everyday students that are getting opportunities to work with applications like that in the Cloud. In the future, everybody is going to be working with applications that are in the cloud and getting prepared for that.
- We have an emphasis on doing things in the cloud, looking at Microsoft background in the Cloud and some of the tools they have; of course, Amazon and some of the things they are doing, as well as Google.
- We are trying to incorporate that and bring that into some of our computer information programs that we are doing at Saddleback College.
- We are also developing things in the Cloud, gets down to a basic concept of networking. We have a networking program, have Cisco and Microsoft certification. Once you get that foundation with networking, which will also lead into cyber security and some other programs.

Jason Sim, Assistant Professor, Santa Ana College: We have computer science and information systems. Our programs can be found on our bulletin, UCR mind and programming.

- We use typical portals now, we have an office application division that is striving.
- We are working on data certificate, trying to use Python courses and others that are skyrocketing now. Also, trying to use a security certification.
- I am a part of Hope builders, a program where students are given options in their lives, come to the classroom, complete a course and complete a degree.

Q: Audience Member 1: Do you have programs that teach students to develop applications?

Michael Warner: Dev ops? No.

Q: Russ Alizadeh: Can you elaborate, as far as dev ops, what kind of program languages and application you mean?

Audience Member 1: Depending on what sector for the Cloud, but seeing the Cloud requires a continuous integration and continuous, so there are various tools. There are a lot of numerous tools available for engineers. I am trying to see if the colleges have prepared students to become dev ops engineers.

Q: Michael Warner: Would you be willing to come to our colleges if we were interested and advise us on how to set up programs, classes, or at least portions of what you are looking for?

Audience Member 1: Sure, absolutely.

Alan Foote: I would also like to comment that there is a lot of confusion, actually in the business world, on what dev ops is. Once we get consistency in industry on what that is, it is going to be a easier for us. For some organizations, dev ops is just another name for programming in the software development environment.

Audience Member 1: Dev ops is an integration of operations and software development. We are working together to develop and deliver system continuously, not like they are merging.

Alan Foote: It is still evolving, is what you are saying.

Audience Member 1: Right.

Alan Foote: I think most of us are probably in this position that we would be looking at that as part of our software development program environments, and being only the 1st and 2nd year, that may be something that evolves even more for students that are in the 3rd and 4th year.

Kathy Johnson: The chancellor's office identified a sector database. Were at the state level, and then each region had a deputy director. Last year, they changed the name, and we have regional deputies for Orange County, one in LA County. Changed their name to regional director for IT.

Audience Member 2: We are regional directors tied with employer engagement. 4 specific sectors, our sector is ICT and digital media. I was full time faculty of Sierra College up in Northern California for a couple of decades, have been teaching cyber security. I was adjunct in the CSU system, my undergrad within engineering, and I was used to programming with IBM key punch cards.

- Cyber security is a great field to get into, number of available jobs, and in our metropolitan area, Department of Commerce reported, 10,589 open cyber security positions. I am constantly being queried on LinkedIn whether I would be willing to work.

- You have to be a lifelong learner, I am constantly studying.
- We teach along the lines of Cisco and CompTIA in the 2 year system, and you have got your IP fundamentals, which is now ITF Plus.
- I get funding to do things, in Orange County, we produce a free course. I had faculty members for Rio Hondo, myself and a high school teacher put it together. It is available online, and we have a mechanism to provide free access to that course, because it is free. It was produced with grant funding, also your students can get that that 1st level certification. It is IT fundamentals, it is broad, and it covers security, data bases, networking. They can actually take the exam in the classroom.
- The Department of Defense insists that you have some of these certifications in order to work on a DOD computer.
- I retired in June of 2017 from teaching. I had no intention to continue working; the chancellor's office asked me if I would be willing to associate with my colleagues here in Orange County, and I agreed to do that as I moved to Southern California.

Charlotte Augenstein, Regional Director of Industry Engagement, Los Angeles Community Colleges: I came from Microsoft, I will discuss what we are doing with the Cloud; as Orange County is about to roll AWS, Azure, and all of the different flavors of Cloud.

- We will have all 19 colleges up and ready by the end of 2020. Started in Santa Monica, which has been very successful, and you will see the numbers in, 2017 with Santa Monica at 83 and as the years go by, the interest increase, and the participation from each of the campuses.
- We currently only have AWS that we teach. We are in the final curriculum phase of Azure, which we will be bringing on. There has been over 2 million dollars spent on this, but the outcome is amazing.
- Santa Monica's basic curriculum of what they have for their first certification offering encompasses 4 different classes. We have a high success rate on passing certification, and we are moving more towards that.
- Solutions architect will be the next one, maybe going into a specialty; because there is such a dynamic need for cyber security, as well as anybody wants to work in the Cloud or a different specialty.
- Los Angeles is in the curriculum phase of bringing AI, big data in the next 10 years I was just at a Microsoft event and that is where the jobs are going now towards is big data and I know we are cut for time.
- We work with our career pathway folks and counselors on the K through 12, we host different events.
- For our PIW, we are that information worker. It is awesome to go to Microsoft Cyber. For those who are in the LA area, I am giving them a donkey cart. They are going to learn how to program a little bit with Python scripting, they are going to set up on different modules on their phone, so that they can take this out into their classrooms, and to their partners, their K 12 pipeline partners, and start to engage students, and build.

Kathy Johnson: Jacob is with the Center of Excellence, their lead researcher.

Jacob Poore, Research Analyst, Orange County Center of Excellence: We are a technical systems provider for Orange County community colleges, and we provide labor market

information to each of you. You can plan your programs and know which kind of jobs your students would be able to get once they finish your program.

- Over the summer, we did a sector project; so that we can focus on our efforts, that we know where to train our students and what programs to be providing, so they can get jobs once they finish. We are the number one source for labor market information for the community colleges. There are 9 centers all across the state,
- Our sector analysis project, we were looking at the different priority and merging sectors for Orange County, and something that Orange County faculty and administrators put together a number of years ago. ICT and digital media is one of those priority sectors. We wanted to understand and identify where there are labor supply gaps, and what programs currently exist to fill those gaps, whether those are community colleges or not community colleges institutions as well, because we need to know what our competition is and who our students are going up against.
- Breaking labor market information down to 2 parts, that is demand and supply. Demand is what the employers are asking for, the number of job openings that they need to fill. Supply is what the community is or anyone is producing, whether that is high schools, ROPs, community colleges, universities, and so on.
- Some disclaimers, we look at only middle skill jobs, so we are not looking at everything here in the ICT and digital media sector. It provides a basic analysis of demand and supply. And supply does not always translate to exact numbers, because a student can earn a living but not necessarily be qualified to enter a position, for example. Looking at some of those top middle skills jobs. You can see the supply and demand differences. What we wanted to focus on here is the jobs that had the most labor market demand, along with those that paid living wage.
- Living wage to meet basic necessities estimate for Orange County is 17.39 dollars per hour, 36,000 dollars per year. That is to have a roof over your head, not necessarily a rent or own your own home, but have a room. Not necessarily owning your own vehicle
- For all these occupations you see, there are supply gaps, meaning that Orange County is not producing enough graduates to meet the demand that employers have for these various occupations. Things like graphic designers, computer user support specialists, computer network architects.
- Everyone is talking about good wages, being able to meet that living wage, and being able to get students into jobs where they can support themselves and maybe support their family as well. And so, you can see all those wages meet that living wage standard, and then maybe with some more education and experience, they would be able to earn more money. As they get more experience, we can push them into additional education.
- We found from our sector analysis project, there is a supply gap of 2,641 awards, so that means that even if some of our numbers are off in some way, even if there is additional 600 awards that we are missing, we are still off by 2,000 graduates to be able to fill those supply gaps. This is the information that was provided by faculty administrators at Orange County community colleges. There is IT, so employers had to focus on skills and certifications.
- A lot of people are talking about merging areas, whether that was AR and ER, cloud technology, data analytics, cyber security, traditional labor marker information is not good at capturing new information, so people reported that it is sometimes hard to find data for those emerging areas, and it makes it difficult to know what skills to teach in

those programs, we encourage you to work with employers and your advisory groups to start identifying some of those.

- Many working areas, such as video game design, acquire skills from a variety of discipline. If you are going into data analytics, you will need some sort of background in business, whether that is marketing, so you know the marketing KPIs maybe.
- There are similar programs at different colleges for these emerging areas, but some colleges have existing infrastructure and existing programs that maybe their specialization can expand in some way. We can direct students once they have skills into another college where they can get a specialization in cyber, data or cloud computing, whatever that might be and then, finally, the knowledge, skills, and ability for the sector have now been validated by employers. That is the next step, to work with employers, to work with our colleges, to see those knowledge, skills, and abilities that employers need. How we can work that into our community college programs, so that we are training people to move into those jobs that employers are hiring for.

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Carolina Kussoy, Professor, Irvine Valley College

Darcy Gassel, Global Alliance Executive, IBM

Ryan Kincer, President, Keen IT Services

Christina Cala, Vice President, Think AI

Carlos Oregon, Managing Partner, Thinkbox Technology Group

Sarah Copeland, Founder, OC Tech Life

Carolina Kussoy, Professor, Irvine Valley College: I have the wonderful privilege of being with you, with my team. This session is more of a practical one where you talk about job requirements, and what kind of things they do as employers to support our incoming candidates coming out of high school and college.

Darcy Gassel, Global Alliance Executive, IBM: I work in strategic alliances for them, but I've done a number of different roles through the years, mostly in marketing, sales, and business development. I spend most of my time working outside IBM, but I have been with IBM for 18 years now.

Ryan Kincer, President, Keen IT Services: We provide outsourced IT services to local small and medium sized businesses. We would be what you call a managed service provider, we provide tech support, IT infrastructure, management, networking, and security.

Christina Cala, Vice President, Think AI: We are a software development firm focusing on artificial intelligence, custom applications and mobile applications.

Carlos Oregon, Managing Partner, Thinkbox Technology Group: We're an IT consulting firm that specializes in IT project management. We have an international presence in Europe, Florida, Texas, California and Washington. I'm also an executive board member of The Irvine Chamber, and a 16 year Air Force veteran supporting military intelligence, Special Forces, and Air Force base command.

Sarah Copeland, Founder, OC Tech Life: We are a local networking group, and we're dedicated to facilitating people, sort of networking, and getting in the door, in the tech industries area in Orange County. What I didn't share last time was my background is, I was most recently the executive director, delivery over at Irvine Technology, and 25 years of hiring for all the global and national technology companies.

Q: Carolina Kussoy: What entry level jobs could students leaving high school or community college be hired for at your company?

Christina Cala: Right out of school we can hire individuals for tech support, and business

development. As much as technical skills are in demand, there's also a big demand for the sales and business development side of things in the technology industry. There's a need for the people who are going out there, talking and interfacing with clients, with the CEOs of companies, and with IT to be able to bridge that gap of that communication that really is lacking today.

Q: Carolina Kussoy: Ryan, would you agree?

Ryan Kincer: Yes. It's called a help desk technician. Also have a position, called help desk dispatch. When people are calling in for support, they're on the front lines, answering the call, putting in the support request. All they're doing is logging it, and then trying to leave it in a queue. There's not a lot of technical necessity for them, they're not getting in to fix the problem, they're just there to interact with the customer, get the ticket in the system, and then a technician can pick it up.

Q: Carolina Kussoy: Sarah, you listed positions like web developer, UI UX design, or front end development, are any of these positions appropriate for high school or college students?

Sarah Copeland: Yes, absolutely. The actual term has turned into probably front end development, as opposed to just web developer; but essentially they're very similar, and you see a lot of people doing contract work for web development, getting into projects, getting their feet wet, and learning more of those front end skills.

- They used to be very separate, but now it's more synonymous, because the design pieces come into the development side as well. You'll hear, the front end UI UX essentially very similar to a web developer. They can get into beginning type of web development skills on projects, just the very basic to start getting in the door.

Q: Carolina Kussoy: Is a community college degree welcomed over at IBM?

Darcy Gassel: Yes. 5 years ago, IBM funded a few high schools a combination where kids go through high school and get 2 years of community college in 1. There are 2 programs in the US now, where kids go straight through to doctorate, takes 5.5 years, and they get internships with IBM through the process.

- We also hire a lot out of the junior colleges. A trend across technology, you're seeing is the folks being hired at younger and younger ages, with less experiences, but with that intellectual curiosity. With some good skills in 1 technical area that they can grow on.

Carlos Oregon: We have the consulting 1 and 2 positions that revolve around project management, project coordination.

- Obviously in the IT world, understanding that they're going to be sitting in meetings where they're discussing networking architecture, voice infrastructure, data center, application migration aspects of a project. We're looking for people who understand that now, and to teach that right out of the gate. It takes a special type of person to be able to sit there and have that self-confidence right out of community college and high school. To sit in a room with executives, or senior engineers, and have that conversation.
- We have a stringent vetting process for interviewing candidates, have some tests, but we have folks that have community college degrees on staff, so it's not impossible.

Q: Carolina Kussoy: Does your company have internships, what's the process? Do you pay your interns?

Carlos Oregon: We don't have internships. Due to the clients we work with, and the NDAs that we deal with; it's hard to get interns in, but we're looking to do that in the future. It most likely will be a paid.

Q: Carolina Kussoy: It's hard, because there's security clearances to be overcome?

Carlos Oregon: Yes. Looking at our social media, we don't advertise exactly what projects we're working on with specific clients. Having that exposure through an intern, being exposed to those types of things, it's not something clients are open to. We have confidentiality we need to keep with our clients.

Ryan Kincer: We don't have an internship program, that's something we're starting to look at.

- I can tell you that other managed service providers, and IT service providers, is very common because there's so many easy positions for people coming out of school to gain experience.
- Not at the moment, but we're heading that way, I know MSPs in the area that are.

Darcy Gassel: We do and we pay more than 6,000 interns every summer; a lot of our full time hiring comes from there, a lot of our offers go out to those interns because they have the experience with us, or we'll hire folks that have interned with our competitors.

- We do internships in a number of areas, we call "stream blue internships". They are project based and more on small services engagements; where they'll work on a team. We put a couple of computer science students with an MBA student, maybe somebody studying math or physics, and we'll tackle a problem together.
- CIO office, HR, basically every group you can think of in the corporate ladder has their internship program. Visit ibm.com/intern, or google IBM internships, you'll see a listing.

Carolina Kussoy: I'm sure very competitive too for the summer internship at IBM.

Darcy Gassel: They are competitive, but it's a good process, they go through an internship interview process just like they're going to need to go through for a job. They do need to have the technical skills as well as soft skills. It isn't just the kids with the best grades, and the most technical expertise, they are looking for that well-balanced student that has the soft skills and the technical knowledge.

Sarah Copeland: Yes. I've worked with many students over the years, connecting them with people in my network to get in the door for consideration of different internships. Some unsuccessful, some successful.

- Example of an internship that's happening next year from Blizzard, summer 2020, and they wanted to look for somebody with a passion for video games, and user interface design. They need strong graphic design skills, an understanding of Blizzard's artistic sets, and fluency in Adobe Photoshop. Adobe Photoshop is the front end that UI needs to

have, that's a really a software tool in our technology students.

- Then I go to recommended talents, with Unity, 3D software. This is super exciting, if you have students that want to plan out their road map. You could be instrumental in helping them, say well this is the internship you want in 2 years; this is what you need to start learning.
- Go on the Epic Games website, this is a whole new world you can introduce to your students, and they don't necessarily have to be very technical. They can tell you all the cheats, hacks you can do that programmers messed up, well there are jobs for those kids.
- There are jobs for Epic Games to tell, basically to do cheats, to help the development team make a product better. Even have landscape artists, somebody who is creative, visual, and right brained, but also interested in technology and gaming, there's a job for that.
- This is huge, and from an internship standpoint, these are internships that are here. Also for Epic Games, for example internships have a lot of background in C Plus, it is a core language that is sought after, still very important in the schooling, especially for gaming companies.
- There's a lot of these types of internships, and I'd like to let you know that if you do have somebody that is driven or excited about getting an internship, I am helping people connect.

Q: Audience Member 1: How can faculty do job shadowing within industry, over a week or 2 during the summer, and bring it back into the classroom for the students. Has that ever been done?

Ryan Kincer: We don't do job shadowing, but I can see the value of it, and I'm certainly open to discuss something like that with you. There's a lot of MSPs that would use something like that. Ours is easy to do in the sense that we have field technicians that go out to the field, or they can even be at the back office, and just kind of do ride along to see what's going on. They would be sitting and watching a technician try to solve and fix a problem; see how they interact with the customer. There would be some great value for teachers that are interested in stuff like that specifically from an IT support and management perspective.

Audience Member 1: Also, looking at how they can talk about the day to day, talking about things that you've done, seeing how the whole ecosystem works, and how would the educator to relay that to their schools. That's what I'm looking for. In some type of office setting that they can come in and just immerse themselves for a week.

Ryan Kincer: Yes, over the last couple of years it's been brought up at a couple of different events that I've attended. I would be open to that if someone wants to reach out, we have that capability. We work, I have conference calls with Europe, London, Tokyo, and internal as well within the states, and we deal with agile different project management aspects of IT initiatives with every one of our clients, so I'd be open to that.

Darcy Gassel: I would add, is kind of the reverse of it. I have been asked sometimes to come in and speak to classes on what it looks like, what the job entails, what skills are important. Even if you can't get the teachers embedded into the work force, 1 other way is to pull people out who

have those different kinds of jobs, gaming developers, and someone like myself to come in and talk to the students about what a career in this type of field looks like. Most of us would do it for free.

Q: Carolina Kussoy: Christina, as an industry partner, you're previous firms, we had a David Center tour, and you made it happen; your industry partners are really also a great field trip partner, and if they can make that happen for you. The type of technical skills you mentioned that are needed for an entry level are Microsoft Suite, Amazon Web and Google?

Christina Cala: Yes. Any cloud knowledge, and certifications would be super helpful, especially now since you have Google Azure, which is Microsoft cloud, and then you have AWS. How the cloud is expanding to not just in data centers, but outside data centers. How all 3 are connecting and working together. Lots of companies are using all 3, and not just 1 specific.

- Also, Microsoft is everywhere; Microsoft Suite with Office 365, and specifically Teams, because that's a big collaboration software tool that, it's gaining a lot of speed, and everybody is starting to use it. A great collaborative environment for students to understand, learn, and know how to be efficient with that environment.

Sarah Copeland: Certainly, with cloud skills, AWS, Google platform, or Microsoft Azure are highly sought-after certifications.

- AWS has a great footprint in Orange County, there's a free annual AWS summit at the Anaheim Convention Center; I would recommend any students that are interested in learning about AWS technology, new products in that showcase this year, their augmented reality, as well as their virtual reality programs.
- Anything AWS, Microsoft Azure, the O365 is huge, there's a huge push for those migrations, and everybody will be moving to Office 365, so there's a lot of support, that knowledge is very valuable in going into the market in the next couple of years.

Ryan Kincer: Everything with technology, you've got a runway before you take off, and a lot of what we do is on that runway. Things that they need to have skills in particularly are operating systems, you have Windows 10 operating system and Mac operating system. These are the type of things young people can get involved in where they're at.

- Things like Azure cloud, and AWS, they may not know; but things that they're using everyday are things that they need to get familiar with from a technical perspective, like networking. There's a consumer side of IT, and then there's a business side of IT; everybody gets familiar with the consumer side of IT, because that's where you've got your wireless router at home.
- There's a lot of applied technologies on the business side that you will never find inside someone's home. Things like Office 365, Azure Active Directory, and Microsoft's General Active Directory Implementation, so any of the Microsoft technologies, even for small businesses. Are all things that are applied, and necessary for people to enter the work force, and these are entry level type jobs that they would need.
- They must be familiar with different firewalls, networking protocols, and they'll eventually get into some of the server operating systems, so they'll start to get involved into Windows servers operating system, Linux operating systems.

Q: Carolina Kussoy: What should we be incorporating into our courses? We need specifics, coursework and anything that's relevant. Now looking at the short term.

Darcy Gassel: I think technology is so broad that there's room for folks to sub specialize, you can't provide the curriculum for everybody. Just have to pick where some of the big themes are, as students get into the entry level jobs, some are curious and they'll keep on learning.

- Looking at where the key jobs are, there's a lot around IT and data. Students understand that, we're helping them get the skills they need not to just code but actually understand IOT.
- Blockchain technology in the future, getting them exposed to that, there's a lot of roles in it.
- Artificial Intelligence is another key theme, but there are so many jobs around it. Need a curriculum allowing students to try out those different skills. A lot of it is free, Microsoft; where they can get out and try, as long as they're not commercializing that technology. They can explore all of it. The more hands on you can get in those areas, and cloud technologies especially.

Ryan Kincer: Although they may sound benign, or unnecessary, but simple things like typing, I'll have people come in and they're not doing their fingers properly, they can't do it as quickly. They should be spending time, if they are interested in technology, in IT; they should be taking time to learn the 2nd language of the keyboard, and how to navigate around it.

- Make sure you're teaching them basic skills like Word, and Excel. Just doing simple spreadsheets,
- Junior high is a perfect age to start introducing concepts of coding. You have programs like tynker.com and Scratch, developed by MIT, just show kids what it can do. They can sign up for accounts, the school can sign up for a school account, and assign it to their students. But they start to grasp concepts of what it's like to code without typing out all the crazy stuff. Maybe it sparks something, and they know where they want to go. Those are great things to be teaching.

Christina Cala: Business intelligence is a big one, there's a lot of data out there, and data science.

- It used to be where we would have the data, we have the information on Excel spreadsheets, and we already knew what has happened.
- Now with artificial intelligence, and all the different forms of data that's coming in, we have to be able to understand where it's been, what's happened; but then how we analyze it, move forward, and predict future actions. Knowing what to do with the data, understand and analyze it.

Q: Carolina Kussoy: Could I probe a little farther, which software is best to practice?

Christina Cala: We use all Microsoft shops, the business intelligence platform Microsoft has, is great.

Q: Ryan Kincer: Also, there's Tableau, is that one of them?

Christina Cala: Yes.

Carlos Oregon: AI, security, business intelligence; I'd like to see if there's a way to do it, whether it's simulated, or some type of cross pollination between IT, and maybe business.

- Where there's product-based training around initiatives within IT, or the technical side, but overlapping that with business, and letting those 2 different types of students interact with one another. Get that feel for working on a project, having to translate, be able to speak the business, communicate, present, ask the questions,
- That's key for what we do, and we actually train that on site in our own internal training.

Sarah Copeland: What about mobile development? Obviously, there's the required foundation of software development.

- There's hiring of software global developers with 3 key areas, MiOS is the very versatile, you have a lot of companies now looking to program and hire specific IOS, and/or they hire a native crew.
- There's also the Android, IOS, and they have different technologies associated with that. Introduction to those as career paths, and those different languages built upon your C Plus Plus, built upon your Javascript is very valuable.
- I'd say that overall Javascript didn't seem as important, but now it's really fundamental, and the base language for all the suite technology, which is the React framework, and these are critical languages that big companies are basically changing all their tech to accommodate their data, and digital transformation, customer user experiences, this is what's happening. I think that may be helpful, and also really concentrating on the front end development. Front end development has that creative, and that Adobe Photoshop, think about the 3D languages and so forth. So those are all very exciting, and relevant to this age group.
- Everything they do is immersed in user experience, and maybe they don't actually understand individual businesses intelligence data on the back end, this is something that is relevant to their lives. How to use that app you're using every day, there's a designer who is a user experience designer, up front designer who puts a mock prototype; and decides exactly what to put where, and that's a whole career path, and it's relevant to them.

Q: Carolina Kussoy: I'm not sure if any of you know a company and that is employing students right out of the gate, with certifications. In addition a lot of the students earn project management certifications; in order to be able to work in the industry, learn, contribute and grow with that.

Audience Member 2: 1 of the challenges of community colleges is the way they're setup in departments. Departments are silos, and I know that there's an advocate for program management up on the stage, and it's such a challenge, because where do you house that? That's probably the reason we don't teach students in that. I wrote an article about that for Certification Magazine, the fact that we need to be teaching it but we're not, because it's a soft skill. I encourage all of you to think about those, go into that, probably best to be housed in business; because that's the general area, but there's IT project management. There's healthcare project management and it is such a necessary skill.

Carlos Oregon: I'd add that same sentiment in business, you have enterprise project management organizations that overlay project management into the enterprise infrastructure on how they manage things. Then they will break off, especially in healthcare. IT is separate from that just because IT project management is such a specialized skill set, outside of standard project management. There may be aspects where you guys would be able to do that separately, but it should be a marriage between business and IT. That ability to translate, and communicate across that bridge is huge, biggest side of an organization is the business and IT. That's why we have a company, and we have jobs, because they don't do that well.

Ryan Kincer: That is true.

Q: Audience Member 3: I teach at Orange Coast College. About the silo departments, I agree. Something I noticed about the IT program from earlier when I was talking about our IOT program busting through those siloes, meaning a combination of this course, and this program could be used by many of the other areas, and other programs on campus, this should be a trend. How can we get business colleagues to push that idea to a system that will entrench in this business mind set; only something like that can be broken by business and we understand as faculty talking to people above us?

Darcy Gassel: This is an age-old problem, this isn't a business IT problem, you have all of these people graduate, become doctors; they go and run a small business with no background in business. I think it's no different than that.

- I encourage educators to let the kids design their own curriculum; you've seen that at Stanford, they have an entrepreneurial program. A freshman comes in, comes up with a business idea that they're going to cultivate for 4 years. They go through with an advisor, determine they have to have physics help, have to learn how to code in computer science, they have a curriculum based on business that they have to graduate in 4 years, and the skills they need to get there.
- If you can let kids design their own curriculum, they're going to get much farther. Let them sit back and decide they want to come out and be a security consultant. They will know they need to take business classes, security classes, computer science classes, and let them have that flexibility to design their own curriculum as long as they meet the standards. I know that's very hard sometimes in our systems, but if we think of the end goal of graduating students that have competitive skills, then we'll find that perhaps we can do something that's going to be right for that 1 particular student, you have to turn the paradigm backwards, and you have to let them design it with their own goals in mind.

Christina Cala: Important to remember, in the business world, IT has now become a business decision.

- Before we used to have CTOs making decisions for the things that were happening in IT, now the CEO is involved in it, it's a business side of things. As much as the technical side is important, it's also important to have the students start thinking about how does this apply to the corporate goals, the corporate revenue side of things, the whole business end of it, and how to marriage those 2 together. That's really what's happening out in the business world.

Carolina Kussoy: To Christina's point your struggle, your feeling is every CIO in America right now. They are doing the same thing, they have IT departments, all they had to do is think about technical; now they have to think of what the chief digital officer is going to want, CEO wants, and what the CTO is allowing. Their worlds are changing. From that perspective, the business, the enterprise companies are going over the same thing right now. Unfortunately, I think it's going to take some time, because we need the CIOs, we need the enterprise businesses to get that together, and teach people the business side of IT.

Carlos Oregon: We build PMOs for company, and we'll revise for them. 1 of the key factors that we put in place is an IT steering committee, where every particular department head comes to this meeting with the CIO, and the CEO; they determine this is the business piece, these are compliance and regulatory, here is the IT piece, the budget, and the resources, how are we going to manage all this.

- I don't know if that can translate into the education world, but having something that maybe overlays all of your departments that states this is what we need to do with regards to the curriculums, or different departments that we have to establish maybe something; to do something to build customize curriculums for students. There are ways to do it, it's just really what your organization is open to, and how you guys can manage it.

Darcy Gassel: If we can't make it work within the educational system, I think you can encourage students to dual major; do something technical and take business classes with it. Because they're 2 totally different languages, if they can understand the computer science side of the house, and they can understand the business side of the house, they will always be employed. My friends who make the most money are the ones that straddle that line. They don't go deep on 1 side or the other, but rather they just help the 2 sides talk to one another.

Q: Audience Member 3: Are there any programs to guide instructors as to the curriculum they should create for the students to keep them up to date with company and industry levels?

Darcy Gassel: With IBM, there is something called the “academic initiative”; it is to address that issue, to try to help professors at the college level make sure they're producing the skills, because IBM needs to hire them. Also, if our customers can't hire the skills, we can't sell anything to them, I'm not getting successful selling to companies that don't have the skills to run the products that are there.

- There are programs like the academic initiative, a lot of the large tech companies have, that develop curriculum for you; when you go back to your college, you can have a curriculum.
- It's not just college level, there is also content for teachers from elementary level up that is available free for teachers to use to teach a lot of those technical skills.

Ryan Kincer: We have a hard time keeping up in the industry with everything that changes, it's not just you guys, and certainly I can understand, you probably feel like you're on the very tail end of it, but even those of us on the front lines, it just feels like a locomotive train running at high speed, and you're just always trying to find out what's coming up next. Darcy's answer is more practical and influential.

- Maybe inviting others that are in administration at the universities, or the education

programs you guys are working with. Getting them to hear from what's happening on the business, and technology side of things. Ultimately, they're the ones that are going to influence that change.

Q: Audience Member 3: Old system administration jobs and old IT help desk jobs; now, as we move into the cloud, the helpdesk function] is changing. If we have the helpdesk people offering up skydrives to replace hardware, so you don't have to fix it anymore. The whole IT help desk, which is the most basic thing for high school, is now costing those jobs. I think this is old fashioned, but that attitude towards the cloud is needing a different type of tech support.

Ryan Kincer: Well that's true in a sense, you still have people that are going to have a computer that needs fixing, and help desk still has to be there. People will have their email break, whether it's in the cloud, or on the premise server, and need help to get that fixed. It is changing in the sense of maybe the resources that are providing those services, or the hardware is at a different place; but you still need those resources to be able to help people fix the problems.

- Just because your server is now on the cloud, doesn't mean that it's not running a Windows operating system, still need system administration. It still needs to be tuned, setup properly, it's just running on infrastructure that's out on the cloud, but practically speaking it's still running a Windows operating system. The way that it's managed is a little bit different.
- You're separating the hardware aspect of it from, it still has to be administered from a system perspective. I know that gets into a lot of detail, but if you said you're a sys admin, maybe that answers your question. It's not changing as much as you think, there's still a lot of.

Audience Member 3: There's hope still.

Ryan Kincer: Yeah, there's hope still, you're on the right track.

Christina Cala: There's still a lot of legacy hardware, network setup out there, especially in manufacturing.

Ryan Kincer: Yes, on premise servers have not gone away, still there. But a lot of it has been offloaded to the cloud. Most small businesses will still have something small running from a long time ago that needs to get upgraded or migrated to the cloud.

Darcy Gassel: The only other thing I'd say is mainframe skills are still very hot, go back into that, and get hired immediately, because you still think everybody can set-up a mainframe. Watching is based on the mainframe, that's what keeps the encryption code secure, you're embedded in the hardware, the mainframe hasn't died. But none of the college kids want to go into mainframe skills, because they don't think the jobs are out there, there's no skills coming out, but every bank is still going to run on a mainframe for.

Audience Member 3: Nobody teaching it either.

Darcy Gassel: Know you have a 2nd career coming.

Audience Member 4: Will business help push colleges and high schools to teach the teachers as to what's needed in the industry, so we can teach it back to the students? If we get training, get educated with what you guys right now then we need can translate it to 30 or 40 students at once. By either sponsoring education, opening workshops where we can go learn. My other concern is software development, because the motives of technology. How can we assure our students they will have a job after they complete this work? Because we're competing against China or India, where they develop for pennies?

Darcy Gassel: I think development skills are a foundational building block.

- I agree, at least for IBM, you're probably not getting a developer in the United States, because the rates are too high, even the Canadians can do it cheaper than we can do it here. But the ability to program is one of the fundamental blocks, you can't go on to the higher-level jobs without it.
- Even developing video games, if you're going to be a designer; you still have to understand how the coders do their jobs. The developers do their jobs underneath.
- I would encourage your kids to understand that it is a building block, it is not necessarily the end game, it's just the foundational skill you need to have to move on to the higher level jobs that you're going to get here in the US.
- I encourage you guys to get them out to hackathons, there's many free hackathons that high school and college students can compete in and win prizes from a lot of local tech companies. It isn't the idea of hacking, or trying to develop it, but it teaches social skills, project management skills, group work in a short time frame. They also get exposure to mentors, and people that work in the community, that have different sort of jobs that they can speak to.
- Offer extra credit to do some of those hackathons on the weekends to get them exposure.

Sarah Copeland: In my experience in the local community. Beachbody, is in Lakewood, and Santa Monica, they hire Android developers, and they hire IOS developers. Irvine Company, they hire recent projects needed for React.

- There's a lot of companies that don't do offshore development, they have critical needs here, and most of my clients, and in my network cannot fill. There's still a lot of opportunity here, and with Android, just recently there's a company called Psych 101 in Orange County. They recently folded, and there's an IOS guy from that, and he's getting calls. He was laid off, and I talked to him this week, he probably has a new job already, and he only has a couple years of experience.
- It's more about learning what you'd like to do, and getting immersed in that community, whether it's mobile, front end development, back end development; we have a huge technical resource here in Orange County, and it's tight knit.
- There's a lot of opportunity for students apart from the classroom. I would always be pushing them out, what have you done, who have you met, what have you learned? Research and find out who hires this for this project that they like. You can do a quick search on Google and find out all the companies that are hiring the skills they like. Makes them think beyond the classroom.

Carlos Oregon: If there's a way for you guys to incorporate some type of open architecture in

the curriculum to where you have an annual project, or something that is cutting edge, not part of your 3 to 5-year plan. That opens them up for you guys to do something that's standardized through your department, university, or school that lets you do something that's active and current.

- I'm an executor for the board of directors for the Irvine chamber; I'm responsible for business work force development vitality council. We have a myriad of different education institutes here that are represented, go to your chamber. Over the last few years we've done a lot with the life science community to go back to the education side of Cal State Fullerton, of UCI to look at revamping how they teach CAD, and manufacturing processes for the life sciences; because it is antiquated, it is old.
- That's a good champion to integrate the business, and education, your chambers out there, and if you need connection to the greater Irvine chamber, I can do that for you. We're talking a lot about marrying the business and IT together, how you can change that. Getting businesses to talk to the educators, is the first step, but I think going to different networking events, economic vitality council, or work force development council meetings and committees that happen at the chamber; where you're exposed to folks like us in a room. You can talk for hours if you want, they talk about current trends in the city, and in the area, what's happening, and what the needs are, and you have a voice in those committees, and the chamber can take that back.

Christina Cala: I would agree with that; I'm on the board of directors for the International Association of Microsoft Channel Partners, and we would love to have every one of you come to our meetings, and experience what that's like with all the different partners. They have the real world experience, always looking to help students, or to talk to them, some of them probably have internships, but it's a great way to get involved in what's going on in the world of technology with people that are actually out there doing it. That's key in getting the 2 areas married, and understanding what's really needed.

Ryan Kincer: You were asking about how students could figure out if what they're studying is going to make a lucrative career for them, and often times you just kind of need to know what's needed in the market. We certainly can speak to each of our industries as what we know is kind of needed. To get an overall picture, you've got placement agencies doing research on this kind of stuff, and they publish it; I know Robert Half does, and there's probably other organizations. If Vita Link was able to bring that information to groups like this, people would have an idea of kind of what the opportunities are in the market; this would be something good for Vita Link to do.

Audience Member 5: My name is Tony Smith, high school teacher at Portola High School, I teach seniors computer science.

- I teach mostly seniors, and juniors, and the kids are just lost as to where should they go, should they go to a junior college, to university, and the number of students who want to go right into a university, as opposed to going to a junior college, getting their certificates and what not is just, it's really issue of cost of the major universities.
- For me, the information you provided is relevant in the nation, and where we are going as a school, and what kind of classes that we need to bring to the school is important. I would love it if we could get some people to visit the school; something that either the

advisory board, or the colleges would be interested in.

Darcy Gassel: I know Mission Viejo High School does in fact, I think there is an educated member in Mission Viejo, right?

Ryan Kincer: You got 1 right there.

Sarah Copeland: Mission Viejo High School, has had parts where people from different companies come in and talk about their technology, and their real-life experiences to get the kids excited. I think most people are here, this means they care about the community, and are willing to do those types of outreach. I think all of us are willing to do that. I have a network on technology-based people that are also wanting to help the community and meet students.

Q: Audience Member 6: I heard the initials AI, BI, data science, and something else, could someone please broad stroke the differences between all those things?

Darcy Gassel: AI, artificial intelligence is about modeling. Creating models with data, to collect data and then make decisions within the computer, in applications. BI, business intelligence is taking the data, organizing it, and displaying it on the dashboard. Because the dashboard will make it relevant, to make important business decisions using the data, and using data for decisions.

Christina Cala: AI is like an umbrella; you have machine learning and cognitive learning underneath it. Everybody is already using AI, they don't realize how much AI that we're using. The business intelligence too with all the data that we're creating, all the data that we have, we do need to disseminate that to be able to make intelligent decisions.

Q: Audience Member 6: How about big data?

Christina Cala: When you have artificial intelligence, you need to have clean data. You must clean your data up, have good information going into the artificial intelligence; it is then going to be learning when you're programming something such as a chat bot. You put a chat bot up on a website, it'll ask you questions, and then as it goes along, 3 months from now it's going to be learning all the different questions it's being asked. If it's getting new questions, it's going to put that into the database, and so it will learn as you go.

Information and Communications Technology

Trends Panel

Friday, November 8, 2019

IDEA at ATEP 1624 Valencia Ave. Tustin, CA 92782

Trends Representatives:

Sam Sukhon, Founder, Intelligints

Darcy Gassel, Global Alliance Executive, IBM

Ryan Kincer, President, Keen IT Services

Sarah Copeland, Founder, OC Tech Life

Carlos Oregon, Managing Partner, Thinkbox Technology Group

Kathy Johnson, President, Vital Link: We have a broad range of folks here today, we will have you introduce yourself, your company and the nature of your company.

Sam Sukhon, Founder, Intelligints: We are in the business of cyber security. We handle security assessment, security remediations, penetration testing, manage security. We have our own security operation center, and we do forensics as well.

Darcy Gassel, Global Alliance Executive, IBM: Hundred-year-old Tech Company who has its heritage around hardware, software services; also in a deep transformation into new areas of AI. Watson is a big area for us and Cloud, security making a big transition.

Ryan Kincer, President, Keen IT Services: We are an IT service provider to small and medium sized businesses in Orange County and Riverside County, can include tech support, IT infrastructure management, networking, and security. Also serving some across the country. We are commonly known in the industry now as Manage Service Provider.

Sarah Copeland, Founder, OC Tech Life: We are a network group in Orange County dedicated to helping new graduates, junior developer software, professional business, facilitating their networking, introducing them to mentors, and higher-level hiring managers and companies in the area. I started a group to help facilitate that networking for those people.

Carlos Oregon, Managing Partner, Thinkbox Technology Group: We are an international IT consulting firm, specialize in IT project management.

- We deal 3 different types of services.
 - One is project management for large network projects that can be data center or mediation, asset recovery, migration, networking, system upgrades, voice system upgrades.
 - We also do PMO service, IT project management organization within our client space, where they do not have the band width and, or the skill set to manage the products they have.
 - Our last services is strategic partnership, where we will come in, do an IT infrastructure assessment, and IT organizational assessment, or project management organizational assessment and we will marry those 3 facets of the

organization and build a strategic road map for that organization for the next 3 to 5 years to get them on board with business operations and handling IT.

Q: Kathy Johnson: On the top strategic technology for 2020 trends; hyper automation, multi experience, democratization experience, human augmentation, transparency and traceability, the empowerment edge, disruptive cloud, autonomous things, AI security, and then practical blockchain. Those are some interesting trends that I was reading about, it goes to the point that we do this every year, and a majority of those names were not listed on the 2019 trends of what was happening. This is 2020 so this is going to be another bold list. Carlos, you have a bigger picture with some of your clients, what are the trends that you are seeing today that are moving forward; that the instructors and faculty need to be aware of?

Carlos Oregon: One of the key things you will find across the panel is security. Ransomware has become a huge issue, someone takes their information and holds it hostage, they cannot run their business, and then request Bitcoin or some type of other denomination of payment, and your company is basically frozen until you pay or you get a security company to come in and handle that.

- Another key item moving in 2020 is AI. We are working with a lot of organizations or client using AI in data science to help assist with possibilities, proficiencies and making the process more efficient. Also assisting on how to build some of their technologies and their pharmaceuticals in a way where scientists can come together and collaborate locally using IT technology.

Q: Kathy Johnson: Darcy, can you share what direction that you are going?

Darcy Gassel: I see a segment of it, the trends you discussed are some new names, but there are some themes that we have seen for the last few years.

- Biggest themes are around block chain but more of a practical blockchain. Block chain in theory has been great but I have been doing a lot of work lately around food trucks; the security of our food and how we trace where it came from.
- Another big area for us is around IT and the censoring of everything. Data is key and what we do with that data and how we harness that data. I see a lot of jobs and work around AI, artificial intelligence. How do we make things smarter or augment the worker to have the data they need when they need it and be able to consume it?
- I work in the healthcare space a lot with my partners. How do we help a clinician or a nurse know more about the patient through records from all of the other doctors they have seen? There is a lot of data that can be harnessed to help us make more intelligent decisions and see a bigger picture. Those are the areas where I see work coming in and the jobs being hired for, besides security.

Sam Sukhon: From a cyber security or information security perspective, there is chaos as far as the number of tools out there and the confusion.

- I spoke to a number of students I used to teach in the extension services at UCI and there is always the question of where do we start, what did we learn, how can you be marketable and knowledgeable in this field? There is really no secret way to be marketable and what to learn.

- However, there are certain things that are crucial to know. There was an early rush to move to the Cloud and then later we needed to maintain some of the footprints on print. Now we have this hybrid component. How do you maintain security knowing that you have the hybrid model in place? How do you defend against insider threats? What is outsider threat? How do you ensure your employee who has access to company OneDrive for example Microsoft is also not able to inadvertently download certain documents to their personal OneDrive? Is this even doable? Knowing that knowledge whether it is this tool or that tool does not matter as long as you know that.
- The other component in all of this is knowing AI, it is not something that functions on its own, it is something that you program and use. So how do you learn AI machine language and what it does so that it does not replace human as well in a security operation center for example? In the early days the analysts looked at a monitor and did certain things manually. Today it is artificial intelligence, telling them out of the 10,000 alarms look at 20 or 30 alarms that are critical but you still need the human factor. So how accurate is this AI and what are you doing from a human factor is critical as well?

Q: Kathy Johnson: What is going on with trends and from the service side for your customers and your company?

Ryan Kincer: We work with small businesses specifically, security for small businesses, in 2018 60 percent or more of small businesses were hit with some sort of attack.

- It can be a radical attack or something benign, and of those businesses that do get hit with a ransomware attack are out of business within a year. Small businesses now are a target.
- They are not going after Fortune 500 or 100 companies.
- Important to have people coming into the workforce that understand what those security risks are and being able to put in procedures, technologies that can protect those businesses and they are certainly affordable.
- Serving small business- we do a lot, there is a lot of human interaction where we have people providing tech support. We are there to help people but a big trend in our industry is moving into artificial intelligence where people who are needing help, do not have to get on the phone all the time with someone to help them, they can get on a chat session tell them what their problem is and there is a computer on the other end that is just analyzing what they say the problem is and coming up with their solution telling them what to do.
- Ultimately there is still a lot of human interaction required because some of that stuff has to get handed off to an individual but that is a trend that we are seeing. So, there is a lot of automation coming into tech support and IT management.

Q: Kathy Johnson: I personally get annoyed when I am talking to machines when I am on hold for tech support. Are the artificial intelligence learning empathy?

Ryan Kincer: One of my important soft skills is empathy, because when people have a problem they are usually in a high state of emotion and you have got to work with them to focus on the problem and resolve it; ignore the emotion that you are getting over the phone.

- But what is interesting about AI, I would rather just get on the phone with somebody but you have this whole generation coming up that is millennial. They would much rather just tap on a support button on their phone and not have to talk to anybody.
- They communicate via text rather than talking to each other. That is the generation that this is focused on and that is why AI is such a big trend in that aspect.

Sarah Copeland: From trend standpoint I was here 2 years ago, the components and the variables have changed significantly.

- Digital transformation is really the umbrella we are talking about. Digital transformation is what is pushing and really getting all this new technology. From a student perspective and people joining the workforce really need to pay attention because it used to be that just was under the marketing department. That is not the case anymore, it is under the CIO, it is under the chief product officer.
- Basically, how we approach our education and how we approach our skills learning changes, because when you get out everything is data centric but there is also this on the digital side. There is this huge use interface piece which is really exciting for new students and people where you have got this creative you have creative students who would not consider technology and now there is this huge opportunity for them
- I like to talk about digital transformation with students and junior developers, it is hitting every single part of technology and even the security because we need our data secure as everything is moving to the digital space.
- While Cloud technology has been important in the last 2 years you are seeing the initiatives for digital transformation. You are seeing new jobs being created to satisfy those initiatives.

Q: Kathy Johnson: When I was doing my workforce demand research I pulled up some marketing information from the US Department of Labor stating; software had a 32 percent increase, database administration 31 percent increase, network and computer system administrator 28 percent increase, the computer system analysts 22 percent and then information security analysts, web developers, computer networking are basically all at 22 percent. The others were creeping up in there at 18 and 17 percent. We are seeing lots of growth in this area. Where do you see demand for those interns and where do you see the demand in the growth from there industry perspective, where are the current needs?

Sarah Copeland: Certainly, software development is probably one, a situation where we have severe lack of talent.

Q: Kathy Johnson: Is this global?

Sarah Copeland: Yes. 2 years ago, I would have said NET, Python, there is where your sweet spot is going to be for your technology and skills development. It is changed, now React, Angular frameworks, Node.js. That is where all that has been driven by digital transformation.

- 2 years ago, we were talking about maybe some PHP, we were talking about some Java right now JavaScript and JavaScript frameworks are in extreme high demand. The right here in Orange County a React developer is big bucks, and if you even a junior guy or

woman with one to 2 years' experience will get that right in the door 90K base plus bonus and so forth. It is a sought after skill right now.

Kathy Johnson: Carlos, what is your perspective on where this movement is going? What are those job positions and employment positions for that entry level position?

Carlos Oregon: We have gotten into more of an augmented reality data science realm with one of our clients, we have been looking for a UI, UX analyst, user experience analyst, and I am dealing with Visa issues, because we do not have talent here. It is a big gap that we are seeing from a hiring perspective and we are getting into the Visas. We have not really done that.

- The other piece is data science, we are big into life science base and there is a lot of data science on how organizations can better document and analyze their data that they are collecting year to year and how they are going to use that.

Q: Sarah Copeland: Are you talking about front end development.

Carlos Oregon: Right.

Sarah Copeland: So not necessarily the designers but the developers who have that React or Angular framework and the front end JavaScript.

Carlos Oregon: The thing is that the clients do not want people with 10-20 years of experience, because they want them to be creative, to think out of the box, and looking for new trends. We are looking for people right out of college with zero experience. I have 3 on the team now that have maybe 6 months of internship.

Sam Sukhon: one a lot of companies are developing agile type of development or dev ops right where the roles of the engineers are no longer defined right? You are doing development and you are pushing things into production, but then the trend right now for dev sec ops or dev ops which is basically injecting security into that process, and the injection of security and the demand for people who know that stuff it goes all the way back to the basics of code security all the way to your propagating something to the Cloud, what is happening in the Cloud, and who is policing that, and what is happening if there is malicious code in the Cloud, and how fast can you detect that? So this area of dev sec ops is definitely evolving. There is we see heavy demand in that space. But again I just want to emphasize that security is a major component of that and we personally or I personally see this lack of the focus on the security aspect of the coding component. So there is definitely demand there. The role of the infrastructure engineer is changing and it is no longer someone who is maintaining a server behind you know a data center or in a closed room somewhere, it is getting that certification or that knowledge of you know AWS Cloud or whatever Cloud it is out there is definitely evolving as well.

Darcy Gassel: I see more of our hiring from kids that have technical experience, but yet have done the internships and projects through their education.

- I encourage kids to go through whatever they decide to study in college or in trade school, that they go out and have those internships in large companies, because the hiring

that we are doing is not so much just on the technical skills, but do they have the soft skills, and do they have the experience of working for us; a large corporation.

- A lot of our development is done overseas or it is done in development shops, where we have foreign talent that comes to the US but works out of a shop, because of Visa issues.
- The kids that we are hiring here, in California are doing consulting work, sales of technical solutions or project-based work. The skills we are looking for might be a little different, but we do we take 6,000 plus interns every year; in California alone, there is close to 10,000 open jobs with IBM, because the skills are not there.
- The kids that are getting hired or the younger folks that are getting hired it is because they have that mix of technical skills, the soft skills and the project-based experience.
- As for the larger corporations, it is not so much go learn how to code a certain way or a certain language, it is more can you work with technology, because what they are doing today is do 6 months from now and 12 months. So, can you learn the technologies, can you keep your skills current and can you work in a group in a project and.

Ryan Kincer: Be adaptable.

Darcy Gassel: Have that experience and be adaptable.

Kathy Johnson: That takes us to my next topic, which are soft skills.

Ryan Kincer: What my company does is a commodity now, manage services.

- These are the types of companies that exist. There are hundreds of them in Southern California. They are all over the country, will be around for a long time. People need stuff fixed when it is broken, or it needs to be monitored and managed.
- We are a great spot for entry level positions, even high school kids can get some experience working at a help desk or working as a PC technician. One of the most important things is, you get a lot of young people who play video games; that translates into they build their own computers, and they think that translates into I can help people with their computers, and that is not always the case.
- They kind of think that they operate at a higher level of thinking, and when you work at a help desk where you have business users calling you to get assistance with their problem, these are people that are usually very frustrated.
- Most of them are not familiar with how to use a computer. They are a little embarrassed, that adds up to emotional tension.
- The soft skill, what you lack with artificial intelligence is empathy. When you have someone calling up it is easy for you to take it personally, but you have to learn how to diffuse, focus on the problem, just listen to the person and then you finally solve their problem and get through it.
- Obviously, patience. I look for people who are kind or want to help other people. When you know what to do with a computer or with networking issues technical folks can often be condescending, and that is not what we are looking for.
- Critical thinking and problem solving, and they have got to think outside the box.

Q: Kathy Johnson: One of the things that I have noticed recently, was that ability to have a conversation with someone. How you ask the question, how you follow up with questions to that

person. If they do not speak tech and they are telling you things and there is that key little piece of information that is missing, how do we make sure students know how to drill them down?

Ryan Kincer: Those who work with me, do take calls and they most often make the mistake of trying to solve the problem and they misuse a lot of terms. I always tell the techs that are working with me, do not listen to what they are saying ask a question to clarify what their problem is. Sometimes that is us just jumping in and actually seeing what the issue is.

Sam Sukhon: From my practical personal experience in the corporate world; for IT folks there is no interest in learning the business and that is a problem from a soft skills perspective.

- If you do not understand the workload, why certain people inside of a certain organization do things differently and you always have a safe answer to the same thing, it does not help anyone. It does not help your position and obviously patience along the same lines, provide alternatives. Once you understand certain business workflows take the time to understand the different alternatives from a technical perspective. Do not make the assumption that this is what our policy is and there is no other way to do it.

Ryan Kincer: That is a good one.

Sarah Copeland: I call it intellectual curiosity. That is what I tell anybody I speak to, who is prepping for an interview, starting their career, or in transition. If you do not have it, there will be somebody you're up against that does. That intellectual curiosity is asking the questions, trying to come up with understanding your landscape, what is around you, so that you can solve the problem in an efficient way. Intellectual curiosity is the feeling like you do not know enough and you need to know more and you need to know more the next day, if students who are early in their career do not feel that drive and do not feel that passion, they are in the wrong place.

Q: Kathy Johnson: Advice you would want to give to a person entering the industry or to our educators here for them to prepare those students?

Sam Sukhon: My advice would be to truly get practical with the knowledge. I know there is always that theory that we learn but then how do you make it practical, learn it and deploy in a way that makes sense.

- Encourage students to build their own labs; hardware is cheap and now things are in the cloud. There are resources out there from a security perspective let us say that you can actually download malware. You can download certain things and as long as you keep it within you know a secure lab you can try certain tools against it or free tools out there, open source, etc., and know the basics. Know how networking, operating systems work.
- If you are looking for a career in cyber security, information security, you have to know the operating system whether it is Microsoft.

Darcy Gassel: Intellectual curiosity is the key in IT. I think anyone who wants to go into tech must realize that technology is going to change. If they do not have that intellectual curiosity it is a very hard career to stay in; because you have to continually learn not just on your job, but you have to continually learn the technologies through the changes rapidly.

- The other thing is, we still have a huge gap in females going into technology. They are particularly good at it when they get there but there are so many blockers in our education from the time that they are little that tells them they cannot be good at math, science and technology. As educators, we have to mentor these girls and I think when they come up and they have a hard time in a math class do not give up on the whole thing. Sometimes they just need a boost, tutoring or a little mentorship to get through that hurdle.

Ryan Kincer: I have a daughter in high school, and they push big time for what career path they want to take. Educators in high school have such an influence on where kids can find their fit in the workforce.

- We are a great entry way, a great place for kids to get in after high school. Gain experience and it is a great pathway for them to land up at a company like Sam's where they have spent years getting all of this experience with an operating system working with the end user, seeing how businesses are using different technologies not just from the operating system perspective, but what is going on the network.
- Encourage them to start in simple things and that is why I say this is when you come across these kids and you see those types of talents; encourage it and let them get started with something simple and they will move into something that you know maybe they are wanting for their future.

Sarah Copeland: For soft skills, I would say networking. That is a skill and unfortunately, I come across people, in their 20s and 30s that have not mastered networking, have not tried it.

- It is totally new to them. It is a new experience. And imagine if our students now worked on that, doing mock networking events in classes. Where somebody says they are going to do a speaker or bring in a speaker, people introduce themselves, talk about what they like, get to know other people, make a connection right that the whole part of having a successful career.
- Introduce them [meetup.com](https://www.meetup.com), there are all kinds of events. They go out of their comfort zone into the community and potentially meet their next mentor or a new internship.

Carlos Oregon: I hire employees that not only need to be technical, but the soft skill and the client basic skills must be there. When we walk into a client space, I might have the vice president, one of the managing partners, and then I will have a consultant, maybe fresh out of college; and they have to sit there at that table with the CIO and the CTO, the CEO.

- We internally have Thinkbox University, where we take those junior folks, and we run them through scenarios of what it would be like to deal with a situation where the CIO comes in and asks questions, how they interact with them.
- Speaking of women in technology we are 60 percent female in our company and we walk through what that is like to be a female organization when you are walking in to a Fortune 100 or 500 company.
- As much as we are talking about technical skills the soft skills piece is huge for a number of reasons specifically for our company on how they focus on the bottom line, how they focus on communicating, the translating from business to IT and how it works together.