COLLEGE of SAN MATEO

Computer and Information Science

CIS Advisory Board Meeting
Thursday April 24, 2014

Advisory Committee Members Present:

First	Last	Employer / Job Description
Chris	Heckart	IBM – World Wide Lead Architect: for Energy and Utility Validation Processes; Data base Specialist (Data warehousing and ETL)
Moshe	Gotesman	Google, Inc. – YouTube Principal Marketing Manager
Sandy	Jones	Los Medanos College
Cory	Putnam	Intuit, Inc. DevOps Engineer
Josephine	Wong	Intuit, Inc. Senior DevOps Engineer

Ex-Officio Members and Guests Present:

First	Last	Employer / Job Description
Kathy	Ross	CSM Dean Business and Technology
Stacey	Grasso	CSM CIS Faculty
Melissa	Green	CSM CIS Faculty
Martha	Tilmann	CSM CIS Faculty
Stanley	Isaacs	CSM CIS Faculty
Ridge	McGhee	CSM CIS Faculty
Zorigt	Bazarragchaa	CSM Instructional Aide II/CIS

BEGIN MINUTES: "CIS ADVISORY BOARD 2014"

Advisory Committee Meeting

Building 10, Room 401

April 24, 2014

5:30 – 7:00 PM

Welcome and Introductions

Topics for discussion

I. Cyber Security and Plans for the Future (Kathleen Ross)

According to this environmental scan done in Cybersecurity in Los Angeles and Orange Counties, there will be a shortage of 45,000 trained people in this field. The trend shows there is a large demand for these skills in these two counties in California. We have a program for Computer Forensics targeted to discovery of wrongdoing inside companies' infrastructure. The problem is that most companies who hire for these jobs need great secrecy such as Lockheed, DoD, Homeland Security and law enforcement. They only want people from the inside with security clearance or arrive with law enforcement background. Our student don't have that. Lack of employment opportunity for students has driven down the enrollment in Forensics. The classes are very weak. I am having trouble getting enough students to run a class to finish their certificates.

We are thinking about moving Forensics program to Cybersecurity. We haven't started working on it yet other than doing the research on job demand. We are looking for an advisory group, who has background in security. We would like some guidance as we start talking about it. I thought we would pull in people from other programs and get a commentary from an advisory group to assess what is current and what is not current. We would appreciate referrals from people on this advisory council. I'd really like to get to work on this during this summer if possible.

Chris: Do you have a working definition for Cybersecurity?
Kathleen: No, because none of us has done it. So, we're going to ask people to see what fits best. Although, what you see in here will help (see handout) because it is part of the

framework we'll be looking at. When I conducted an online research on Cybersecurity among community colleges, there were a lot of definitions and concentrations that were very different from one another. I thought once we get a group together, then we can ask "How are we going to define this for us here in this particular demographic?"

Chris: If we ask employers what they need and want, then that would help guide us.
Kathleen: I am looking for Cybersecurity people who are working in industry, any kind of industry. IBM Cybersecurity people might be good because they are advising industries across all sectors. I would love to get one on banking. There is no industry that is not worried about this issue including government.

Chris: Are you looking at or thinking about security on routers and switches on networks as well as PC's, computers and laptops?
Kathleen: In my opinion, it's going to turn out to be a certificate that is focused on some subset of Cybersecurity because it is too big to address. But it will be a subset with high demand. The UC system couldn't address this entire thing. It is too hot and too moving. I am really looking for short term people who can help us filter out what we should do.

II.   Web and Mobile Application Development (Melissa Green)

At our last meeting, about two years ago, it was suggested we have a web and mobile application development degree. If you see the handout, you can see the AS degree program and also certificate of achievement. The certificate of achievement basically contains the same coursework as AS, but it's for people who already have a degree. One page has our new course in Android programming. I am teaching it as an experimental course right now. Android programming CIS 135 is not listed there yet, but will be added. I am waiting for approval from the state. This is the update on web and mobile application development.

For the Capstone course, we have to get approval from the state. Once we implement the Capstone course, it is probably going to be taught in the spring semester. Android programming will be taught again in spring of 2015. We are already offering Intro to Databases, which is based on the Stanford course. We have a mobile web application development course, which is for mobile web apps with JavaScript, HTML5 and CSS. Doug Putnam is teaching that.

Mosh: How is the demand?
Melissa: The demand is really good. We want to include native apps as part of the course. The web app class has huge demand from people who want to program web apps.

Mosh: Any prerequisite for that?
Melissa: Just about every course except Intro to Databases has a prerequisite intro programming course. Only the Capstone project would expect students to take all of the

required courses because we'd have students working in teams developing real web sites with front-end and back-end. They would have to have taken just about every course in order to get into Capstone course.

Cory: Is there interest in database courses?
Melissa: Yes, Intro to Databases has been very popular. We've been offering MySQL for a long time. The Data Warehousing class has to be redone, and we haven't offered that yet. We had it around for a while, but because of the prerequisite it was cancelled. I will update it and I think we will offer it next year.

Cory: What sort of database technologies you've been addressing for the database?
Melissa: They are NoSQL, MySQL, and XML.

Cory: My experience with students is that they know MySQL or Microsoft SQL, but there is a whole world of database out there to expose students. At Intuit, our company has been going towards Cassandra because it gives you the ability to update and do things to database. DataStax is very important to help people learn more on Cassandra technology.
Melissa: I certainly would like to incorporate it into Enterprise Data Warehousing because it is the more advanced database class and we will offer a certificate in database. Mounjed is our database expert, but he is not here. I will ask Mounjed.

III.   Dev/Ops (Cory Putnam, Intuit, Inc.)

I am on what is called DevOps team previously known as Application Operations or plain old Operations. What is DevOps? If you ask ten people you get ten different answers. When did DevOp start? You'll get the same response ranging about five years or so. You can become an expert in DevOps field fairly quickly because not many people have that long of a background in it. DevOps is continuous learning from others, continuous improvement for oneself, continuous deployment to production. We are not working in a water-fall kind of model anymore. DevOps is very agile environment involving all sorts of tools to get thousands of people all working on same project that is coordinated together and producing something that has value to your customers. One of the engineers on my team, Josephine Wong who is on the phone here wrote this definition for DevOps.

> "DevOps is a combination of culture and technologies, with a bigger portion of it being the former and a smaller one being the latter. DevOps culture encourages us to identify common problems between dev and ops, and solve each other's problems as a team. DevOps technologies help us automate builds and deployments, measure meaningful metrics, and share knowledge and experience."

Josephine: I want to talk a little bit more about the background of DevOps. I am a Senior DevOps Engineer at Intuit. Traditionally operations and engineers were separate but for

about last ten years the transition has been interesting. It is really a culture change. The infrastructure for applications still exists. Engineers and developers still create applications. What is changed is the quality of working together as a team. If we have rock solid infrastructure but poor code then application doesn't run well. On the other hand, if we have rock solid applications but infrastructure lags, then the applications don't run well. The culture of DevOps is to work together, so developers can develop one solid thing. Of course tools are important. Cory will talk about all kind of tools to be more efficient.

In my Venn diagram (see handout), traditionally circles were removed from each other and didn't touch or overlap. DevOps is blending of those and trying to break down the walls and obstacles. We do that with a lot of different tools. Why is DevOps important? Starting in 2011 there was almost no mention of DevOps on LinkedIn, and then it skyrocketed. This is the new way large-scale web applications and SaaS being presented and handled. DevOps jobs are on the rise, and there really aren't people with proper skill set out there. It is hard to find them.

So, what skills need to be taught that aren't? My boss Kyle wrote that our experience with interns and co-ops has taught us that schools are simply not teaching the skills that we need from people. Web automation is a huge thing especially scripting in Python and Bash. With monitoring tools, we can find out what services are running slow and hopefully know why, then do something about it. We are much more proactive then reactive.

Mosh: Do we teach Python and Bash?
Melissa: Yes, we teach Python. Bash is taught in UNIX/Linux course.

We accomplish continuous iteration through tools such as Jenkins and Capistrano. We are moving to Node.js, JSF Page, and HTML5. The last thing Kyle wanted me to mention in this presentation was that students aren't learning the basics of how internet works. They don't understand DMS, simple command like "whois," or basic routing. It is amazing to end up with Computer Science degree and not understand how these technologies work. My question would be, can some of these ideas be integrated into courses that you already teach? Maybe you can have students turn in their homework or programing assignments using GitHub.

Melissa: I think Doug Putnam does that.

You can have students use trial version of Jira, so they can see the real world trouble ticketing system to work on large project as a group. Altassian offers 30 day trial on this software. All of these technologies are essential to what we do as DevOp. We are moving away from physical data centers to cloud, for example Amazon Web Services. Nodus Keynote is our monitoring system. We use New Relic as well. Learning tools is education in itself, because they can drill down to such microscopic level.

Chris: IBM uses variation of DevOps. We have a bunch of tools that we have integrated together. Most of the integrations are open source tools. We think we add value to them by doing the integration. We do deployment to product base rather than online system. Cory mentioned Amazon Web Services. Teaching cloud is very important. Students need to know cloud because cloud is totally changing the infrastructure land scape.

Martha: I teach a course that introduces cloud but how in depth would they need to know?

Chris: They need to know how it works and why it works, what the security arrangements are, and what deployment options there are. For example, in your course you can actually deploy an Amazon EC2 Instance.

Martha: It is a fundamental course. They write a research paper on it.

Chris: It sounds to me that is a really good start, but you need actual hands on experience, perhaps in conjunction with Capstone project.

Josephine: Having a class similar to Capstone allows students to really think and expand their knowledge into use. It will really help students.

Kathleen: We had an offer from ITS to provide us with offsite servers if we wanted to do experimental things. We haven't moved on that. We have the offer and they're willing to make that.
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IV.   Computer Support Specialist Desired Skills (Stacey Grasso)

Last semester the district had put together a committee to identify jobs that might be available to graduates from our existing associates program and looked at what we could do with the associates program. Not everyone wants to transfer or go for masters, or has the time or the money. Some people just want to be employable after two years.

So initially, what we did was to look at the occupation report for the bay area employment region to determine the occupational break downs for the Bay Area jobs in IT. From this, we thought Computer User Support Specialist was something we might be able to address with associate's degree, and possibly entry level programming positions. We thought most big companies were asking for Bachelor's degree, and some had strict policies. Then we started looking at small business model. Small businesses aren't particular about bachelor's degree. They need someone who can get on board and take care of whatever their IT challenges are.

This summer we have three people doing interviews with 90 small businesses in the area and find out what their typical IT challenge is and what their current IT job positions are. If they don't have IT job positions then find out what skills are needed for the job. Then, we pull

all the courses that would address their particular IT challenges. We need to see whether it fits associates degree we have right now, or fine tune them or modify them somehow.

Cory: Small businesses are core of Intuit business. Intuit is trying to reinvent technology for small businesses so they never go back to old ways of doing things. We go out and speak with small businesses just like you are doing. So, you might want to have some courses about Intuit as well.

From the small business perspective, are we right in thinking small businesses need associate level people?

Chris: Yes. For Computer User Support Specialist, IBM would consider an associate degree, but not for the other positions.

What type of skills would a computer support person need?

Chris: Number one on the list is generic problem-solving skill. It is difficult to teach, and it is almost inherent talent. The second is soft skills and communications. Third would be technical skills in the area that they would be supporting whether that is software or hardware. At IBM, we typically term this position level I, and their job is really information gathering. Once they've done that they look it up in the database to see if anybody else has had this problem and what the resolution was. If it is not there it goes to level II, which is a technical person focused on the area that the problem seems to be occurring. If that can't solve this, it goes to level III which is actual product developers.

At Intuit or Google, do you have people answering phone for customer support? Do you have any ideas on what level of education is required?

Chris: A lot of companies, even smaller companies, are moving away from telephone and going towards chat. So, writing and descriptive skills might be something that are in there.

Sandy: We've identified Computer User Support and Network Support as two high-demand jobs in the Bay Area. We estimated that the pay was between $28 and $38 an hour for in-demand jobs. Without a degree, there are 31,000 entry level retail jobs at places such as Apple store and Microsoft store. Anywhere that sells computers, you can get these students in ground level, then they are in the IT arena and they'll progress from retail sales into Computer User Support and Network Support. That's what we are referring our students to in the Bay Area.

Nine years ago, we did have a degree in Desktop Support. For a while, it was a popular degree but when things tanked we pulled the degree because it wasn't leading to a job. We are thinking of putting something like this back together.

V.   Open Discussion

Team skills and communication skills are important in searching for high tech jobs. Community colleges can repurpose people who have Bachelor's degree to IT jobs by teaching them the skills needed. There is a huge demand for IT entry level jobs but many community colleges have problem with marketing to industries. Having nested IT program might help students get jobs. Taking 33 units will get you a certificate of achievement, and taking all 60 units will get you an AS degree. Half of the courses could be offered online.

Cory: How do you balance online classes with classroom interactions?

To substitute online classes with face-to-face class interaction, field trips can be used to get students exposed to jobs in the field. So, students who are taking an online course can meet and greet each other as part of the mandatory class requirement. It might be interesting to incorporate communication tools to online classes such as Campfire, so students will be better prepared to communicate through different tools.

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