

ICT Educator Webinar Series

How to Get Higher Transfer Rates
in Computer Science Pathways

March 6, 2020

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[00:00:00]

Welcome

STEVE WRIGHT: Good morning. I'm Steve Wright. Welcome to the ICT Educator Webinar Series. I'm the Statewide Director of the ICT Sector Team with the California Community Colleges.

THE ICT-DM SECTOR TEAM



Stephen Wright



Charlotte Augenstein



Markus Geisler



Richard Griggitt



Paula Hodge



Ray Knapp



Steven Morien



Wendy Porter



Steven Luthicam



Suzanne Mata



Dennis Mohle



Duane Rinefort



Nicole Sherman

On our website, you can visit and see our ten Regional Directors, who are throughout the state, as well as many archives we have about different pathways, including computer science.

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Relevant, timely content for you at
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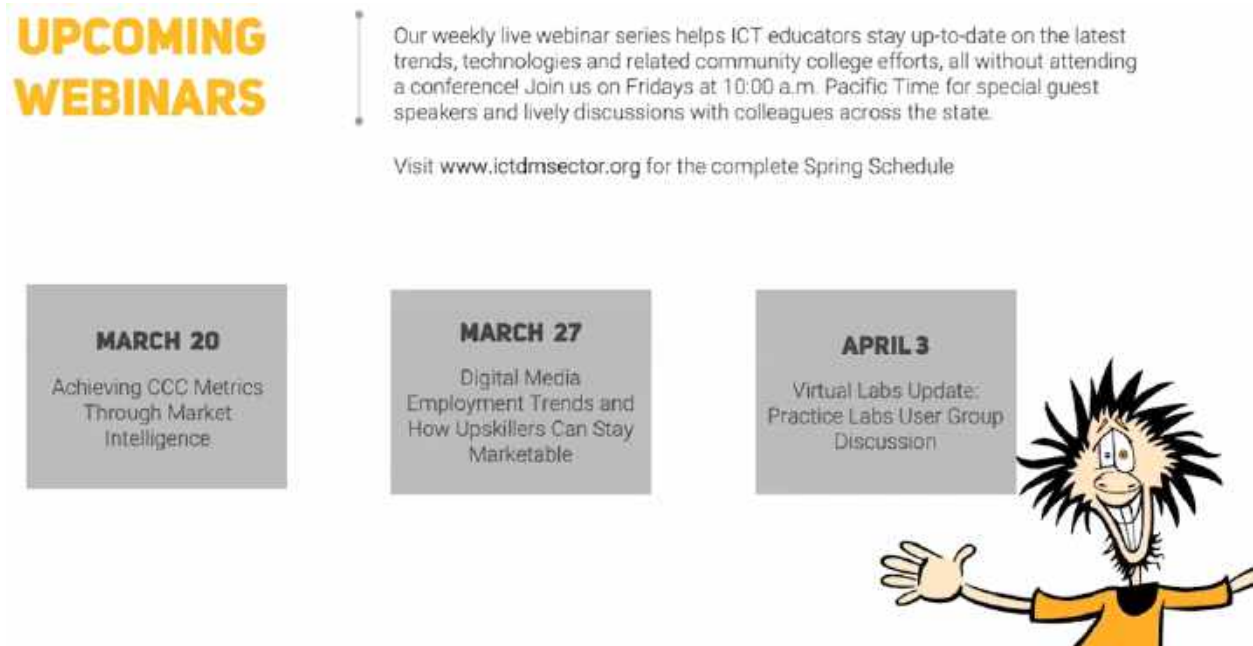
ICT GENERAL

BUSINESS APPLICATIONS

DIGITAL MEDIA/ENTERTAINMENT

VIRTUAL LABS

We've done 27 webinars now, and we record them. They're kept on our website—video chapterized, transcribed, along with a PowerPoint presentation. It's an excellent resource to go back and look at all these different areas and relevant links. They're good for grant writing, use in class any way you'd like to.




UPCOMING WEBINARS

Our weekly live webinar series helps ICT educators stay up-to-date on the latest trends, technologies and related community college efforts, all without attending a conference! Join us on Fridays at 10:00 a.m. Pacific Time for special guest speakers and lively discussions with colleagues across the state.

Visit www.ictdmsector.org for the complete Spring Schedule

MARCH 20 Achieving CCC Metrics Through Market Intelligence	MARCH 27 Digital Media Employment Trends and How Upskillers Can Stay Marketable	APRIL 3 Virtual Labs Update: Practice Labs User Group Discussion
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Coming up in the next couple of weeks... Next week, we're going to look at using colleges to achieve their community college metrics results through marketing intelligence. We're going to take a look at what's out there in the marketplace and how you can use ICT, how that can help you drive program selection, development, and promotion.

Then we're going to be looking at digital media and some of the trends, how upskillers can stay relevant and fresh, with some courses and things they might want to take for that.

And then we'll be looking at our virtual lab capability, educational technology for use in IT—very exciting.

WEBINAR PRESENTER

How to Get Higher Transfer Rates in Computer Science Pathways



ALLISON MARINO

Allison Marino received her Bachelor's and Master's Degrees in Electrical Engineering and Computer Science from the Massachusetts Institute of Technology. During her Master's degree, she worked for the David Sarnoff Research Center.

After school, she worked as a R&D Engineer at Hewlett Packard and as a Strategic Marketing Engineer for Agilent Technologies. Allison also worked as a Project Manager and ran a startup.

Allison currently does software development and contract research. Her technical research report, Software Development Hiring Criteria is posted on the ICT-DM website.

This week, we're going to focus on computer science best practices. Allison is with us. She's done a study previously where she looked at software development in the Bay Area and tried to tackle the myth... Can you just take a coding class and get a job at a big tech company? Among many things she found out, which is in a report she wrote at that time, is that it's still pretty nice if you've got a computer science degree.

Since we have such a developed pathway transfer model curriculum between the community colleges and the CSUs, we decided to go ahead and take a look at who is doing that well and who can do it even better.

So, Allison has taken some time. First, we went to WestEd and got them to give us the data on who is transferring from different types of schools, and we got our representative sample of some of the more heroic undertakings, and then Allison went ahead and talked to everybody there, and she's going to share that with you today.

I don't want to take any more time from her and what she's going to tell us, so I'll turn it over to you.

[00:02:24]

How to Get Higher Transfer Rates in Computer Science Pathways

ALLISON MARINO: This webinar presentation is all about how to get higher transfer rates in your computer science pathways.

What does that really mean?

[00:02:34]

What is the Computer Science Transfer Best Practices Project?

- Your chance to find out about the best practices at 'Transfer Champion' community colleges
- It's *not* a checklist
- Something to take inspiration from

In the context of this project, it means you'll hear about best practices at other community colleges that we've identified as transfer champions, but the presentation is not a checklist. It's not a list of things to do because there's tons of research... A lot of people are looking at computer science from all education, from all directions, from all age ranges. This really gets at the question of 'What are we already doing right in the community colleges?' I'll go into some specific examples so that it's something that you might take inspiration from or get an idea from. Maybe it will spur some collaboration. Basically, we want to spread these best practices around.

[00:03:26]

Who Created the Computer Science Transfer Best Practices Project?

- Conceived by Steve Wright, State Director of ICT-DM
- Data Research by WestEd, Karen Beltramo

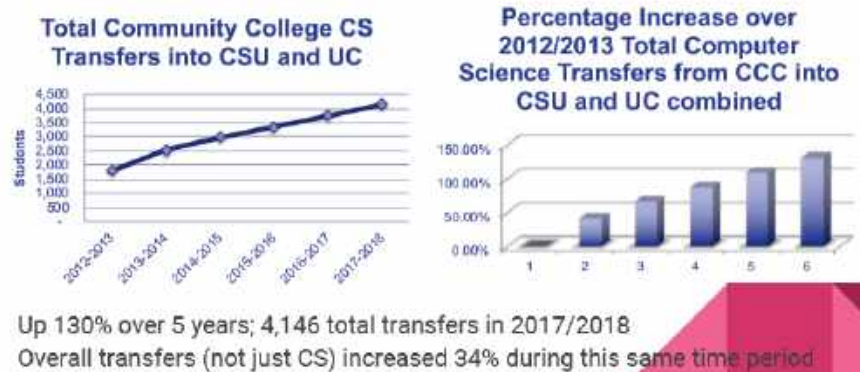
- Interviews by Allison Marino, BS & MS, Electrical Engineering & Computer Science
- Start Contributors: The CS Faculty and Department Chairs that shared their time and experience for these interviews, despite already full plates guiding students along the transfer pathways.

Who created this project? Steve Wright, our beloved ICT-DM Statewide Director, conceived of it. Karen Beltramo, who I also worked with on a previous project, was a great resource for staying on top of really understanding the data as it came to me. Then I conducted the interviews, and I relied on... I have my own electrical engineering and computer science degree. It's from a while ago. I'm not going to say how long ago, but I do have some experience going in and out of tech, and I've even taken a few... I actually took data structures and algorithms at my local community college a few years ago because I just wanted to get up to date.

The real star contributors of this report are the CS Faculty and Department Chairs that shared their time and insights for these interviews, despite their already really full schedules. They're already participating in transfer model curriculum, teaching—actually teaching—and helping students with the content, helping students get out of their logistical jams, and then all of the other administrative activities, as well as professional collaboration.

So, there's a lot going on, and it was a little tricky to track down some of you people! That's the background about who was involved.

Good News: We Are Scaling Up



And I have good news on how the colleges are doing already in terms of our transfer! This really focused on the transfers. The community colleges have grown the transfers significantly over the last five years, much faster than overall growth in transfers for the same time period.

This little graph on the left shows that... This covers a period of five years. At the beginning of this period of five years, we had fewer than 2,000 transfers into four-year bachelor programs, and this number only represents transfers into CSU and UC, so it doesn't actually represent... We didn't capture transfers into private universities, so I just want to point that out. And now we're over 4,000 in the most recent year we have data for. So, good job, everybody! And that represents everyone. That's not just the colleges that we targeted for these to find out more about these best practices.

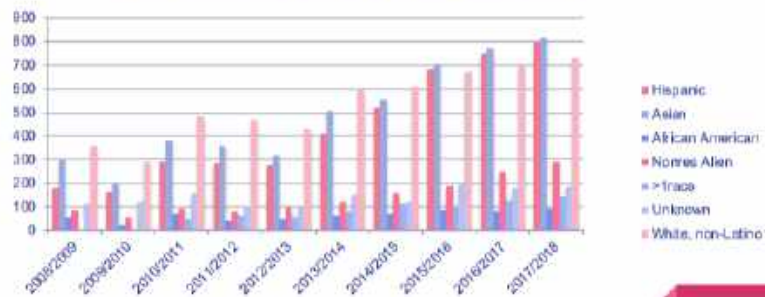
Who is
actually
transferring
into 4 year CS
programs?



So, that's the good news. There's a lot of inquiry around who is actually in these classes. Do we have a nice diverse, gender-balanced group of students like this picture? Not exactly, but there are some bright spots to report on...

Ten Year Trend by Ethnicity

Computer Science Transfers into CSU



Noticeable progress for Hispanic students

26% of 2017/2018 transfers, up from 16% in 2008/2009

I pulled this info from the CSU database on transfers, and I have a little more detail on that at the very end of the presentation, if anybody wants to really dig into the data. But once you get oriented to this chart, it basically shows ten years with the categories that were visible, like that would show up on this scale—there are a couple other categories—and their relative proportions.

So, these are actually absolute student numbers, but you can look at them relatively. In 2008, you can see this dark red column is the Hispanic population. The blue column next to it is Asian transfers, and then the light pink column on the far right is white students transferring. If you follow that over time, you can see a decade later, at the far right, Hispanic students are about equal with Asian students. What that means numbers wise is that they represent 26% of total transfers up from only 16% ten years ago. That's solid progress, so we should celebrate that.

And just for one more reference point, there are a lot of ways to look at these numbers. This is not the only way to look at them, but the Hispanic population in California is something like 39%, so it's still not representative of the overall population, but we're moving in the right direction.

Women Still in Small Numbers, but Tracking

**Computer Science Transfers from CCC to CSU:
Total and Female with Percentages**



There is a common citation that CS classes are 30% women, but only 15% are transferring in this dataset.

How about women? This is near and dear to my heart! I definitely remember being the only woman in some of my classes.

This picture is a little more complex. This is from the same data set that only represents transfers into California State Universities, and the blue line shows total transfers—that’s the same number we already looked at—but just for CSU on the Y axis. The red line is a scaled version of female transfers.

You can see we’re tracking, and there’s a little split between the lines as you go farther off to the right in time, but to really understand what’s going on... This is subject to interpretation, but if you look at the grid at the bottom of this slide, you can see there’s a percentage listed for female out of the total transfers.

One way to look at it, if you looked at the last five years, you can see that we’ve grown from roughly 12% five years ago up to almost 15%. That’s a small amount of growth, but it’s growth. However, if you go back ten years, you can see that we were at 15% ten years ago, so there’s work to be done here. I don’t think that’s a surprise to anybody.

I wanted also to acknowledge that I've seen other presentations with a 30% women in computer science kicking around, and that just... You know, I have yet to actually see the data on that. That may be true, but for the numbers I was looking at, we're really only at 15%. Putting that out there.

[00:10:17]

CS Transfer Champions by the Numbers

- Greater than 20% transfer rate
- Greater than 50 students transferred in 2018
- Successfully serving URM

Secondary Criteria

- Location (wanted representation across CCC regions)
- Willingness to be interviewed

ALLISON MARINO: Moving right along to our project, how did we identify the transfer champions? As you can see from the data, the colleges are really succeeding as a whole. When you look at the transfer numbers, there are transfers coming from just about every college. That is impressive. Students are finding a way through to get to their four-year programs, to get to their CSU, UC, and private universities through the community colleges. Whether or not there's an identified computer science associate degree or other milestone on the way, they're doing it, and that's collectively.

So, with this data from WestEd, Steve kind of honed in because he knows the whole system and how things interrelate. We honed in, and it was really easy to figure out who had greater than 20% transfer rates. We also looked at who was passing through greater than 50 students a year, and the last year we used the data for was 2017/2018. The other criterion, which was a little trickier to identify (and that's where WestEd really came in), was figuring out which colleges were really serving underrepresented minorities well.

We started with those three criteria. That represents a lot of the colleges, so if your college is not on here, don't stress out. We also used secondary criteria. One is location so that we could get representation across the whole state and not just concentrate on tech hubs in the heart of Silicon Valley and really expand a little bit, going further north, going Inland Empire.

And then the last criterion, which actually kind of makes or breaks the whole thing, is willingness to be interviewed because CS department chairs and faculty have very full plates. I talked to one professor who said he was teaching seven classes, and he's available in April for an interview. Needless to say, that college's input didn't make it into this presentation. But like I said, I felt like I connected with a variety of types of schools, and I'll actually flip to the next page to show you that.

[00:12:53]

Transfer Champions



ALLISON MARINO: Our transfer champions... On the left, you can see the colleges we identified as excelling in CS transfers, and we reached all of them. Then the ones you can see on the right, the little red pointers, those are the schools we actually connected with. Like I said, a variety of locations, variety of college, variety of models.

Success Philosophies

Happy faculty, happy students	- Mary Pape, De Anza Dept. chair
Focus, focus, focus	- Caleb Fowler, Folsom Lake
Be excellent and they will come	- Henry Estrada, Evergreen
Host coding competitions & travel to them	- Mark Lehr, Riverside
Outreach and remove administrative obstacles	- Sathya Narayanan, Hartnell, CSUMB

What we found is that different things worked for different departments, and the colleges really exist in a constellation of other colleges. Anyway, moving on... Yeah, I'd like to get into the success philosophies because I have tons to present, but I want to also leave time for a little conversation with all the participants and questions, because I know some of you attending actually have a lot of experience and expertise to share, particularly in some of these programs that the bottom quote on here, the success philosophy of 'outreach and remove administrative obstacles,' creating these partnerships between the community colleges and a nearby CSU. It's quite exciting both in terms of creating a cohort and increasing how well we're serving underrepresented minorities.

So, going back to the first success philosophy... What I found is there wasn't a one-size-fits-all answer. When I talked to people, I really did a lot of listening. I asked a series of questions about faculty, curriculum, scheduling, requirements, tutoring, industry presentations, outreach—all these questions—but I also asked department chairs and the faculty that I spoke with, "What do you think has contributed to your success?" There was all this information coming in, and I just listened. What came through is it's really not one-size-fits-all, but a few philosophies kind of bubbled to the top, so I'll share some of those.

This first one, 'Happy faculty, happy students,' seems a little simple, but it's really not because it acknowledges that educators don't exist in a vacuum, and that it's a real thing for an adjunct to get burnt out, or for a faculty member to be overwhelmed. DeAnza is actually our largest transfer

school. There were 249 transfers in the last year of our data out of a department that has FTEs over 1,000, so really a large department. There are, I think, eight full-time faculty there and something like 38 adjuncts, so keeping the faculty engaged and creating a community really made a difference to that department.

The next quote I want to share, a success philosophy, from Caleb Fowler, who is on this call and is at Folsom Lake, which is a smaller department, really chose to focus... So, they took stock of where they existed in the constellation in their district and actually ended up eliminating some courses to elevate a focus on their core programming classes. That's how they achieved their results. Really, students couldn't complete a whole sequence because it wasn't being offered enough. They just said, "Well, SQL is offered somewhere else. We're going to let go of that class." That was pretty bold and rewarding.

And some of these, I'll actually go into more detail on DeAnza and Folsom Lake. I want to comment on Evergreen, which actually has a really high percentage of transfer rates—something like over 40% of the FTEs transfer. And just to reiterate, this percent of transfers, the ideal is not 100% because students come into these CS departments, the CIS departments with different objectives. So, a student coming in that does not have an objective of transferring, you can't force them into transferring, so the metric... We're not trying to get to 100% with transfers, but we're trying to get at how is it to meet the needs of more transfer students and successfully get them through the system, because we still have a demand in the state for more employees with full CS bachelor's credentials or higher.

Getting back to Evergreen... I spoke with Henry Estrada, and he just took kind of a classic approach philosophy to how to draw students in is to hire the best people, just teach the best material, just be excellent, and they will come. So, to distinguish the school and build the school's reputation... Again, they exist within a constellation, and that's true. There is a higher percentage transfer rate at Evergreen.

The next success philosophy I'd like to share came from Mark Lehr at Riverside. It was really about hosting and creating environments where students could actually put their skills to the test,

sparkling that excitement in creating and coding. So, they've been hosting the ICPC (I hope I'm getting the letters for that right) competition for 20 years. They travel to competitions.

What that does for them is it throws the community colleges in an environment where four-year schools are coming to the coding competitions, and they're seeing where they will be, and it starts to feel accessible, and really there's nothing like coding in a team, being part of a team. It's different than solo work, so I think this starts to get at some of the common threads, which is our next slide. Building community and collaboration came through at every college I spoke with as critical.

I already mentioned this last point on the slide, but it's worth going into more detail, this 'outreach and remove administrative obstacles.' For the CSN 3 program... For Hartnell and CSUMB, there are two things going on here. About half of the Hartnell students are in the CSN 3 program. There's an outreach program. Students are identified, invited to participate, provided funding, and they're in a three-year program, so they're taking classes in the summers. At the end of the three years, there's one summer they're available for internships.

It's this super intense progression, but there's this emphasis on building a cohort. Also, they're able to focus on the serious, intense learning that happens because they're not distracted by administrative obstacles. They're automatically registered for their classes. Rather than helping them solve administrative obstacles, the administrative obstacles are obliterated and removed from the whole playing field, which is pretty powerful to think about.

So, no discussion of these success philosophies can really happen without mentioning that approach, and I did speak with Sathya quite a bit. He's at Hartnell and CSUMB and is really a great resource and is, in fact, sharing these practices. Let's move on to common threads.

[00:21:52]

Common Threads

- Better success with in-person programs than online

- TA program matters – looks quite different for large and small
- Project collaboration builds good programmers – opportunities for collaboration are built into the program
- Attention to scheduling

ALLISON MARINO: One thing that I did hear across different colleges was they were having better success with in-person programs than online. Now, all the colleges were offering both. Not 100%, but there were options – evening options/daytime options. They had found a way to provide enough seats for the critical classes, but in terms of success, people staying in the courses in person really made a difference.

So, is that because we haven't dialed in exactly how to successfully do online learning? That was a topic of a previous webinar hosted by the ICT-DM seminar series with Lance Ford. I attended that, and that was pretty interesting. But getting off track here...

What actually has been working is in person or a combination. So, I heard some stories about students taking the first class online and then surviving it but switching to an on-campus class for the next programming class in the sequence.

Another common thread that turned out was endless variations of TA programs with either peer-led TAs, some paid, some volunteer, some happening inside the classroom, and sometimes there was a STEM mentor... But there was this real emphasis on making sure tutoring opportunities were really, truly available for the students.

Collaboration, as I mentioned, already came up. That builds good programmers and also helps students work through their challenges and not feel so isolated. There were quite a few schools that had collaboration built into the classroom, so students wouldn't necessarily even need to participate... Many schools also had coding clubs or industry speakers, but you didn't even have to... At these schools, you didn't have to even go beyond your core coursework, which is pretty intense to find some of that collaboration and make the connections that are supportive when you need them, when the code isn't going well.

Finally, there was definitely an attention to scheduling, and that looked different for different departments, simply because the size of the department mattered, but anything from keeping the math and CS courses offered back to back in the evening, that was something LA Harbor did. And just making sure, again, there are enough spaces available so that people can progress through the required courses without getting stymied by a course not being available.

Now, that still sometimes happens, and that's where the network of colleges can kind of fill the gaps. A student could take, say, a required math course at another campus, but that's really not optimal, so attention to scheduling was a big factor.

[00:25:42]

Inclusivity Threads

- Visibly placed diverse instructors
- Meeting real-life upperclassmen at ACM/ICPC (International Collegiate Programming Contest). This event mixes two-year and four-year colleges.
- Incentivized enrichment events (e.g., extra credit to attend industry speaker talks)



"We're not trying to weed people out, but meet them where they are."
*Caleb Fowler, Professor & Dept Chair,
Computer Information Science
Folsom Lake College*



*Dr. Suha Al Juboori, Asst. Professor,
Computer Information Science,
Folsom Lake College*

ALLISON MARINO: A few inclusivity threads also came up, and those included visibly placed diverse instructors. I like this quote... One of the very first things within two minutes of getting on the phone with Caleb Fowler at Folsom Lake, he said, "The hardest thing people need to understand is we're not trying to weed people out but meet them where they are." I definitely

know firsthand what the weeder class experience is like. You know, they're trying to make you suffer so that you give up.

Grit is valuable. We want students, programmers, software developers (really, everybody) to have some grit to get through life, to be tenacious, but there's a difference between challenging people and not supporting people. We want to challenge people where they are and also offer support. It's a balance.

Other inclusivity threads... I already mentioned providing programming competitions, creating opportunities to mix with other universities, so students start to see where they're going along the path, either to their CSU or UC—that's their next step.

Or this last point, incentivized enrichment events, basically meaning, if you're going to go through the trouble... Many of these colleges had women in computing speakers or industry speakers. Or at Hartnell, it was called ABC, which somebody probably knows what that stands for... Anyway, it was beyond computing, seeing the bigger picture of where computer science fits in the world and in industry.

So, the people that are super into it will go to these talks. The students that are into it will go to these talks anyway, so we need to schedule them wisely, as well as offer things like extra credit and, really, the oldest trick in the book, feed people! Feed people so that they show up at events that are good for them.

It seemed wrong to just have a white guy on the picture of our inclusivity page, so I just wanted to show that, at Folsom Lake, there is a full-time faculty here. Dr. Al Juboori is the other full-time professor, so a little male/female balance happening there, and that sends a powerful message to students.

[00:28:57]

Large Department Focus: DeAnza

249 CS transfers in 2017/2018,
the most of any CCC

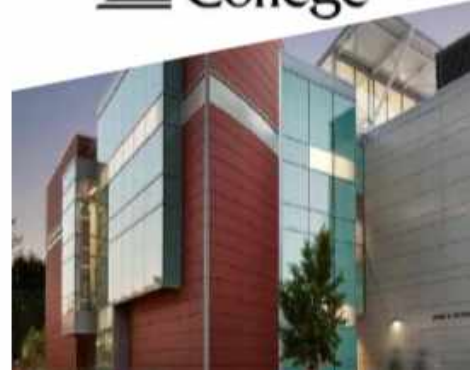
9

Fulltime Faculty

38

Adjuncts

DeAnza
College



ALLISON MARINO: So, let's dig in a little more into DeAnza. I said DeAnza does the most transfers of any college in the system. They have 9 full-time faculty and 38 adjuncts. There's a little picture of DeAnza. I don't think that's the engineering building, but it's at DeAnza.

1. Meeting Students Where They Are
2. Started a Peer Tutor Program *in the classroom* (in CS 22B)
 - a. Students learn to help other students
 - b. Some peer tutors become paid TAs (Strong Workforce Funding)
 - c. Well-published office hours and TA hours, can sign up for a block of time
3. Didn't jump into online, created a community in the lab with 2 coordinators
 - a. Made the path clearer to students

Very easy-to-find office hours for all faculty

Our Faculty & TAs

Numerous CS faculty come to us from industry and teach a variety of courses related to their expertise.

- Read about our instructors
- Teaching Assistant Schedule



I spoke with Mary Pape, and she talked about... She's been there a while. Her top-3 success strategies were meeting students where they are. This is the #1 success strategy: meeting students where they are.

And going hand in hand with that, starting a peer tutor program in the classroom. The previous TA program went away. They created a new one, and this happened early on in the programming class cycle. What she explained to me was an important part of this was giving the students that are the peer tutors the right philosophy to understand that they're really there to help and support, just propagating this meeting students where they are to the whole community, not just coming from the faculty.

Some of the tutors did end up becoming paid TAs, and they made an effort to show really well-published... really make the TAs and tutors accessible, and this photo I've included on the right side of the slide... All I did was Google 'DeAnza Computer Science.' It went straight to the computer science page, and a single click away is the teaching assistant's schedule on that page. It's really accessible. DeAnza really does a nice job of that. If I go through the faculty directory and click on a professor, I can see the professor's... I can definitely see Mary's schedule, when she's available, when her office hours are. There's an updated schedule of office hours for the entire faculty. That doesn't happen by accident. Getting all that organized has a real priority.

The third reason she shared behind their success was that they didn't jump right into online. They worked on creating community in their lab with multiple coordinators, and they really made sure to make the path clearer to students to help them avoid taking the wrong classes,

understanding how to get the right support at the right time. So, making the path clear. It's all about pathways... Well, let's just get the junk out of the pathway. Let's provide support to keep the path clear.

I actually met a few DeAnza students just on Thursday night that had transferred to UCSC, so I'm going to share a little DeAnza story...

They were all excited about participating in this Hack-A-Thon, but I asked them if they participated in coding clubs when they were at... It was actually a team of four—two from DeAnza, one from City College, one from Las Positas, and they all ended up at UC Santa Cruz because I was in Santa Cruz, and that's where I met them in the vicinity.

I asked, "Did you participate in coding competitions when you were in community college?" and they said, "No, we were too busy trying to survive the coursework!" They said they felt a sense of community because they ended up in class with all the same people, because they were taking their math and their computer science...

So, for the students that are going through in a two-year schedule that know they're going into computer science, I think the savvy students coming in with an idea of what they're expecting are able to find their way to a cohort. In fact, so much so that they said they missed the small classes at community college. This is coming from the largest transfer school—they still felt that sense of support. I thought that was pretty cool.

All right, let's move on to a smaller department focus...

[00:33:46]

Small Department Focus: Folsom Lake

20% transfer rate, with 42 transfers in 2017/2018, up from 10 in 2012/2013

Most students are full-time and work part-time

2
Fulltime Faculty

7-9
Adjuncts



ALLISON MARINO: Folsom Lake was included because they had a 20% transfer rate with 42 transfers in the last year we looked up, which was up from 10 five years before that, so it's a pretty significant growth. Most of their students are full-time students, traditional age group, working part time. I should mention, for most of the schools I spoke with, except for a few exceptions, the students were in the traditional age group, but also working part time definitely is a reality.

Success Approach for Content:

Focus on programming and eliminate classes well-represented at nearby colleges (SQL offerings)

Required core CS courses offered every semester, in multiple formats

Embrace risk when exploring new course offerings

Success approach for Sustainability:

CCCAOE in the Spring in Sacramento

Success Approach for Teaching Methods: ACUE (Association of College and University Educators) Facilitation

Interactive, project-based class environment with less lecture time

More inclusive, especially with mandatory partner switches

Success Approach for Outreach:

Diversity in hiring

Led to summer outreach programs for women, and refugee women

So, Folsom Lake had quite a few varied approaches for success that... Some of it, I touched on. So, approaches for content – honing in and eliminating classes, which is definitely scary. Eliminating classes is scary, so there was an intentional embrace of risk taking, and they applied

that when exploring new course offerings as well. So, trying different material to bring excitement to students and faculty. Not all of them stuck, but they ended up with a software testing course.

Again, coming back to the scheduling point, the core CS courses were offered every semester in multiple formats so that there's no barrier to proceeding through the program, whether you're with a cohort or passing through at a different rate.

Now, Caleb talked to me about attending California Community College Association for Occupational Education conference in the spring—I think that's actually next week—as a great way to stay connected and just receive the flow of ideas. That interest in just furthering, always taking the skills to the next level, innovating... Even though I think schools did it differently, I continuously heard of efforts at trying new things, measuring the success of the new things they were trying, whether it's attending this conference or otherwise...

In terms of approach for teaching methods, the AQ facilitation has really changed the way the classroom looks, and it's turned what were traditionally lecture-based classes into these interactive project-based class environments that have a lot less lecture time. You might have an example code, and then students have to figure out the output. Or a pointer problem, and then you need to add a feature.

And what's interesting about the mandatory partner switches is people grow by being forced to switch partners, but it's really an amazing tool because it means everyone is included, so it is definitely possible to attend the course, particularly if you're not exactly aligned with the main cohort and, in the traditional lecture format, not actually talk to anybody. Making sure of the partner switches really forced this community to happen. You can't force people to be friends, but it really created this intention to the community.

And then I already mentioned the outreach approach, with intentionally trying to create diverse faculty. Then that led to summer outreach programs for women and, in particular, they have a program coming up for refugee women. I haven't talked too much about outreach. That has really varied among the transfer champions, how much outreach is happening, so at the

moment, it's not correlated across the board with the transfer numbers. I think that means there's a huge opportunity for more outreach, and I just wanted to share that one particular example.

So, that is a small department focus...

[00:38:43]

Tiny Department Focus: LA Harbor

All-adjunct CS instruction within a CS & Math department

0

Fulltime Faculty

3

Adjuncts



ALLISON MARINO: Now we have a teeny-tiny department focus. LA Harbor does really well serving underrepresented minorities, but it is tiny! There is not even a single full-time faculty at LA Harbor, so the whole department exists within a math and CS department. There are 3 adjuncts. Two of them are working industry nearby. One also works for another community college.

Math & CS Department Chair: Farah Saddigh

24 students transferred in 2017/2018, up from 6 transfers 5 years ago

Included as CS Transfer Champion for

Transfer percentage out of CS FTEs:
28%

Success serving URM

Success Factors

Strong, diverse math department that is 50% female

AB-705 embedded math tutors

Coordinated scheduling of math and CS courses

STEM Mentor (through a federal grant) that really knows the students

Strong sense of community in math & science department; and connection between faculty

I spoke with the chair, Farah Saddigh, and she had their numbers. Despite having zero full-time faculty, they transferred 24 students the last year we looked at, which was up from 6 transfers five years before that. They got included for CS transfer champions both for their percentage of transfers and, like I said, their success serving underrepresented minorities.

How is this even possible to send so many people through to transfer? Well, on the surface, it looks crazy, but really the CS students were very supported by the math community, far outside of the strong, diverse math department that's 50% female, as a place that really supported the students, and they have embedded math tutors. They also coordinated the scheduling of their math and computer science courses. They also used a federal grant to get a STEM mentor to kind of fill that gap for the CS students where there isn't full-time faculty, just to make sure they have enough support.

So, somewhere that small, a TA program with peer-led tutoring might work, but it might be tricky, so they found other ways to support their students. There were talks about the department potlucks, about the openness and comradery between the students and the faculty, both before and after class. I think that's one advantage of being a small department, is you really can't get lost in a small department. But hopefully, when done well, students... It's just almost like a family.

That concludes the focus on the departments. I'd like to share a few unexpected findings.

[00:41:30]

Unexpected Findings

- Best practices look different in large and small departments
- Programming language is not a determining factor for success
- Transfer Model Curriculum isn't driving transfers (yet anyway)
- High-level sponsor – optional

ALLISON MARINO: I mentioned that the best practices do look different and are impacted by the constellation of community colleges nearby. If your neighboring school is specializing in game design, don't duplicate that. Just be aware that we exist in this larger community of schools and of CS departments and just take that time to intentionally create the department's focus beyond the core curriculum.

So, regarding the core curriculum or the Transfer Model Curriculum, the bulk of these classes, it turns out language... We thought, when we asked these questions, we might find that there was really one particular programming language that drove the success. That was not true, although there were some strong opinions around C++. There's quite a lot of variety, and I think the exposure to multiple languages was also cited as valuable.

The Transfer Model Curriculum isn't yet driving the transfers. Not all these schools had Transfer Model Curriculums, and students are finding their way through. There was a generally positive vibe about the Transfer Model Curriculum, but it wasn't cited as a driving factor for transfers yet.

And then this last point... At some places, it's pretty helpful to have a high-level sponsor, particularly these partnerships between the community college and the local CSU, when there's something like a CSN 3 happening. But many of the successful programs didn't cite a high-level sponsor. Some cited a well-trained guidance counselor. Many students and faculty said, "Oh, we just go to Assist.org." That's a tool people are really using.

[00:43:40]

The Real Student Obstacles

The soul-searching and self-doubt that comes from a late night when your code isn't working is real, no matter how much support is all around you. It's important to feel like you belong when that happens.

ALLISON MARINO: Let's see... So, the real student obstacles come when there's the late-night soul-searching and self-doubt. You can see the computer off to the side of the picture. Some of that is going to happen, no matter how much support you have, no matter how many teams you're participating in, so it's important to feel like you belong in your community in your department when that happens because that's just a real part of making your way through a computer science degree.

[00:44:20]

Top Four Practices to Get Higher Transfer Rates

1. Schedule: optimize it for your students so they can progress through in 2 years
2. Require student collaboration and interaction in every core class along the way
3. Meet students where they are, with genuine faculty connection and availability
4. Stay connected and fueled professionally- that is the wind in your sails for outreach, innovative programming, and whatever it is that the students ask you to say "yes" to next



ALLISON MARINO: So, if I were to wrap this up with some top-four practices, I would be remiss if I did not list schedule first because you really want to optimize it so students can get through,

and that it takes into account their actual schedules and doesn't leave behind people that are going through it at a different rate.

That comes to this second point of really requiring or strongly inviting, creating opportunities for student collaboration and interaction in every core class. That could be happening not just at the beginning classes but along the way, because if somebody is on a different schedule, they need to be pulled into the fold, pulled back into the community, if somehow they're out of sync with their cohort. Then that class time, whether it's in person or online... So, finding a way to make that happen is really important.

I talked a lot about meeting students where they are. When I spoke with faculty, I really got a sense of genuine connection and care for the students. Mary Pape at DeAnza actually said that the full-time job of the faculty is to nurture and support the students.

So, how can you do that? How can you continually be giving? Well, this fourth point, staying connected and fueled professionally – that's the wind in your sails for whatever you're doing to distinguish your program, whether it's moving into outreach, adding some innovative programming, a new class, or whatever it is that students ask you to say yes to.

And that's going back to the very first interview I had, when I spoke with Mark Lehr at Riverside. He said, "Some of this is just saying yes when students ask, so you want to be able to say yes." That's how they ended up hosting the ICPC coding competition for the last 20 years.

All right, I have a couple more slides...

[00:46:37]

Further Reading

From CSforCA.org:

CS Equity Guide: Section 2.5 "What curricula is recommended"

Grades 7-9: "...engage with CS as a medium for *creativity, communication, problem solving and fun.*"

Grades 10/11: "...Along with the fundamentals of computing, students will learn to analyze data, create technology that has a practical impact, and gain a *broader understanding of how CS impacts people and society.*"

CS For What? Diverse visions of computer science education in practice; values underpinning the drive for CS Equity

Short Story: Journey to an AP Computer Science Female Diversity Award

<https://www.pacificcollegiate.com/apps/spotlightmessages/2284>

STEAM, not STEM

ALLISON MARINO: Just for further reading, if you want to dig deeper, you might do a screen grab of this. If you want to get a little more info on equity, which is another, better way of approaching diversity and inclusion, underrepresented minorities. I think, stepping back a minute to the bigger context, a lot of that is happening in the K-12 arena, where we're bringing CS to the fore.

I like the CSforCA website. If you go to their equity guide, section 2.5, you can start to see some of the language that starts to include people earlier on in the pipeline, really focusing on problem solving, creativity, and communication, creating a broad understanding of how CS impacts people in society.

The other guide at CSforCA is CS For What? Really getting into 'what are some of the values underneath the drive for equity' and pulling them apart and getting into that.

The other reference on this page, I actually stumbled across at my son's school. They got an award for female diversity in their AP computer science classes. You can read about how they did

that. Over a period of two years, they grew participation from 20% to over 50%, and they basically did it by just changing some of the language, creating more inclusive language, around the program and putting it into the context of industry in the area wanting collaborators or creative communicators.

And this point where CS and the things created by CS actually interface with the world made a real difference, and I want to just read you a quote.

STEAM, not STEM – Science, Technology, Engineering, Arts, and Math

Don't forget the A – the A makes a difference. In fact, that really gives context and meaning. I'll offer a quote that came from a longitudinal analysis of community college pathways to computer science bachelor's degrees...

“In particular, computing assignments should be relevant to students’ personal interests, communities of origin, and career goals, and should show how CS can be useful to society. One large-scale study found that these meaningful assignments were the single most important predictor of students’ commitment to a computing major, and this predictor was particularly strong among women and underrepresented minorities.”

So, I think we all can resonate with that. When you have meaningful work, it's easier to really stick with it and make it through the hard parts. I just want to offer that – looking forward.

[00:49:57]

Dig Deeper: Be the Data Scientist

California State University: Community College Transfers by Institution of Origin

<http://asd.calstate.edu/ccct/2017-2018/SummaryYear.asp>

Computer Animation and Game Development	Computer Engineering
Computer Engineering Technology	Computer Science
Computer Science and information Technology	Computer Systems
Information Systems	Information Technology
Software Engineering	

University of California Transfer InfoCenter (2018/2019 data just released)

<https://www.universityofcalifornia.edu/infocenter/transfers-major>

Computer and Information Science, General	Computer Engineering
Computer Science	Computer Software and Media Applications
Computer/Information Technology Administration and Management	
Information Science/Studies	Management Information Systems and Services

For the brave: datamart.cccco.edu

Computer Information Systems-070200 Computer Infrastructure and Support-070800 Computer Networking-070810 Computer Programming-070710 Computer Science (Transfer)-070600 Computer Software Development-070700 Computer Support-070820 Computer Systems Analysis-070730 Database Design and Administration-070720 E-Commerce (Technology emphasis)-070910 Information Technology, General-070100 Software Applications-070210 World Wide Web Administration-070900

ALLISON MARINO: And if you'd like to dig a little deeper into the data, I've included the various sites we used for transfer. The top one is for CSU transfer and the majors we included. The second one is how to pull the UC transfer data and the majors we included there because, of course, they're different. Then, if you're feeling really brave, you can go to the Data Mart site and start digging into the top codes.

And that's all I have! We can maybe take a few questions or some discussion.

[00:50:28]

Wrap-Up and Questions

STEVE WRIGHT: Yeah, we'll take a look at the chat box as well. Allison, right off the bat, I just want to thank you. What I didn't realize is it was going to be an inspirational talk. It does remind me that perhaps quality teaching and education is still the most important product or capability we have in the community college system. I want to thank you for really getting down and taking a personal approach, talking to faculty. In my job, I just get so busy and bureaucratic that I sometimes forget what it's all about, so I want to thank you for taking the time. I hope we have some questions here. You can feel free to speak up, and I can take a look at some of the chats and try to... Can you see the chat line?

ALLISON MARINO: Yeah, I'm just digging into the chat.

STEVE WRIGHT: You might want to skim that or if someone wants to speak up. I think I recognize Caleb now from his picture. Very insightful. Good stuff. Thank you. All right, the floor is open!

ALLISON MARINO: So, we've got in the chat another info on women in computing, which is great to see. And then a question: Do they look at hybrid classes at all, where they meet half the time in the classroom and a bit more on their own online?

I'm glad you asked that. The answer is yes. Those were actually a sweet spot, especially as departments have to continue to grow because the demand is still growing, and buildings aren't just materializing from space. Basically, even though in-person gets these great results, a hybrid is a form of an in-person class, and we will be forging forward with hybrid classes, whether we decide that's best or not, simply because of space. Let's see what else...

“What are your thoughts on computer science degrees versus DevOps...” Let’s see... This is getting probably slightly more technical than I am capable of answering well, but perhaps someone else wants to comment about programming languages and certificate programs.

I would say the focus of this talk is really the transfers, so we could go into that, but I would rather focus on...

STEVE WRIGHT: In your prior study, the one on software development pathways, you undertook going to the coding academies throughout San Francisco. You talked to a number of high-tech firms, and you basically concluded that, yeah, there are a lot of ways you can learn coding as an adult and kind of coming back and regrooming yourself. You even listed the courses at community colleges that might be appropriate for that, even though they’re more targeted for entry level.

But the thing that I remember from that early study is that, gee, if you could just have a computer science degree, wouldn’t that be great? Everybody is still saying that’s like a floor, a basic starting point. Yeah, there are lots of other ways to get there, too. You could already have a finance degree and catch up on some coding and get into the workforce doing that. But I mean, golly, if it’s already there, and the community colleges are offering it as an accessible pathway, that’s pretty good.

So, it’s not really an answer to that question, but it depends on who the audience is. Is it that you were talking about first-time students out of high school? Or relatively traditional age? I like the way you used that euphemism for our students, because a lot of them get out of high school and spend a couple years going, “Wait a second – what happened?” and then they come in, so they’re in their twenties.

So, some people, these things are midlife... About half of our students are this midlife upskiller, and about half of our students are starting off. Depending on the department, you might see more or less of either one. I’m not sure that answers that question at all, but for getting a computer science degree, these pathways are pretty good.

Anybody have another comment on that question?

ALLISON MARINO: I do have a comment on the online versus in-person in Lance Ford's talk before he really... Was it last month? He was talking about distance learning, which who knows with what's going on out there in the world? We might all be doing more distance learning as perhaps schools are closed temporarily. Anyway –

STEVE WRIGHT: Let's all refrain from shaking hands today.

ALLISON MARINO: Right. We can fist bump! Just being willing to put yourself out there on video and make the connection, which I will admit is... I mean, I'm a nerd's nerd. My inclination is not to use the video for this conversation. I just thought, "Well, that's the way we're going. I just have to find a way to be comfortable with it." So, that might be something other people are struggling with, too. It's evolving, and I'm sure there will be more interesting seminars from the ICT-DM Friday presentations on that topic eventually.

STEVE WRIGHT: You know, we keep working on it. I think this particular ICT Educator Webinar Series is also an example – what if we all got together every Friday at 10 AM and had a mini-conference thing? We've done 27 of these now, so we're getting pretty comfortable with it. I've told people before that, for me, it's a matter of lighting and buying a nice \$45 backdrop from Amazon, and people think I'm in a pretty professional outfit here. But in reality, I have a very messy office on the other side of the screen!

But we have to learn how to be in this world, and I think, when it comes to distance ed, what Lance was talking about in that presentation was 'how do you use all the tools?' The texting after hours, the 24/7 accessibility, to help create more of a community around what is, essentially, a pretty artificial space.

So, I think what he was trying to do was say, when you do have the rural distances, and it's impossible to really be face to face, what's the best you can do? So, those of you who want to go back and see that episode, that was Lance... What was his last name?

ALLISON MARINO: Ford.

STEVE WRIGHT: Lance Ford on distance education... That kind of helped with some of those things. I just loved what you did here because the question is, what are we doing in our community colleges that seems to be working? And thank you for finding that out.

AUDIENCE MEMBER: Do we have time for one more question that's come up a couple times in the chat? What is the average class size at DeAnza? Do you happen to know that off the top of your head, Allison?

ALLISON MARINO: I do not know. I did check the current quarter. There are five versions of the data structures class. When I took that same class at Cabrillo, it maxed out at 50 people, so I was estimating that. Does anybody else have a sense of how large those are? We can find out, too, but does anybody here know that?

OK! I did see there's one other question about recommendations for colleges where the math or other departments don't align with transfer colleges for the units, and that is definitely a real challenge. I don't have a simple answer because there are so many pathways through that following checklists and charts, students can get in this mode of death-by-checklist.

As I was looking through, because there's another part of this report that has recommendations for students their parents about to embark on a trip through community college transferring to a four-year program... Basically, I said, "Go to that CSU data site and figure out if anybody... Once you determine your destination college, look up the transfer numbers and see if anyone has ever transferred from the community college near you." So, kind of reverse engineer it.

This isn't going to help the professors, but this is just the state of where we are. There are complex, frustrating disconnects between some of the math/science course scheduling, and this is a real challenge. That's what I can say on that topic.

STEVE WRIGHT: Very good. Well, our time is about up, so we're going to wrap it up now. I want to thank you once again, Allison, for the exceptional work and the way you shared it today. It was very genuine, and I think we all picked up on that.

Next week, we're going to take a week off because of CCAOE, and then the following week, we'll be back with looking at market data on different kinds of sector growth and how that translates into achievable metrics at colleges by emphasizing one course or another, which is... Well, I guess that's where the money is at these days!

Anyhow, thank you all very much. It's been an enjoyable Friday with you. Take care.