Proponent Testimony – HB 33
Chris Orban
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Members of the Senate Workforce and Higher Education committee—my name is Chris Orban and I write to express my support for the computer science education provisions of HB33, including funding, and to suggest a few small but significant changes to the language of that section.

Who I am

I have been a faculty member at Ohio State University since 2014 and I have served in a number of capacities with the Ohio Department of Education (ODE). My training is in computational physics and so my expertise has been useful in contributing to ODE committees and working groups on science, computer science and math education. In 2017-2018, I made important contributions to updating the astronomy section of the Ohio Science Standards. In 2022, I proposed some minor changes to the Ohio Learning Standards for Computer Science that were integrated into the revisions to that document. I have also worked closely with Metro Early College High School which is the STEM magnet high school connected to Ohio State University. In January 2020, I began serving on the discrete math "writing team" at ODE in an effort to design a new high school course that includes connections to computer science.

While I work and teach at Ohio State University, it is important for me to note that I am writing today in my capacity as an individual with knowledge of computer science education. None of my testimony should be attributed to Ohio State University, or the Ohio Department of Higher Education. I also do not represent the Ohio Council for Teachers of Mathematics, although I am a member of that group.

I submitted written testimony on HB33 and my understanding is that the funding for computer science education has been stripped from the bill. With companies like Intel coming to Ohio, the idea that **the Ohio House approved an $88 billion dollar budget with essentially $0 for computer science education** is so absurd that I struggle to take it seriously. I can only hope that the Ohio Senate will be more discerning. But that is only part of the reason why I am submitting testimony.

Brief Summary

The message that I would like to send to the Senate is twofold:

1. If you do allocate funds to computer science education, **these funds should support a wide variety of computer science related activities**
2. **Computer science education in Ohio is not going well,** in part, because computer science funding has been narrowly focused

I also worry that a successful **Ohio Department of Education program to train math teachers with CS skills will be unable to tap into computer science education funding** as support from covid19 relief funds expire.

In analogy to the business world, my message is essentially to diversify your portfolio. Let's continue that analogy and talk about what the returns have been on computer science education so far.

Computer Science Education in Ohio is not Going Well

Some of you may remember HB 170 from 2017, which was landmark legislation on computer science education which had significant funding attached. Here is a statistic that would have spurred those efforts: **In 2017, for every 100 Ohio high school students, only about 3 of them took a computer science class in the previous year.** Ideally the number would be closer to 25 so that every high school student can be exposed to computer science before graduating.

Six years have passed since HB 170. Millions of dollars of state funds have been allocated. According to the 2022 State Plan for Computer Science, which was a document produced for the legislature by the State Committee on Computer Science, **for every 100 high school students today in Ohio, only about three and a half of them took computer science last year.** According to code.org this is below the national average of about five. Code.org also says that in Ohio **the number of public schools offering computer science declined slightly over the last two years from 50% to 48%.** Maybe the needle isn't even moving in the right direction.

House Bill 33 (current session)

HB33 includes a number of ideas to jump start computer science education in Ohio. **HB33 proposes to create an Office of Computer Science Education** within the Ohio Department of Education and a Council on Computer Science Education. There are also changes to make it easier for people to transition from software engineering to becoming a computer science teacher. **I would love to see these initiatives stay in the bill and receive funding** from the general budget.

Is HB33 as it is currently written is going to significantly accelerate the growth of computer science in Ohio? Personally, I do not think so. **The issue comes down to teachers.** According to the 2022 State Plan for Computer Science there are **only about 1,100 computer science teachers in Ohio**. As discussed earlier, only about 3.5% of high school students took computer science last year and 25% would allow every student to take computer science before they graduate. So **we need more than 7 times as many computer science teachers as we currently have** to reach the goal of CS for All, or roughly 6,500 new teachers. To put this number in perspective, this is probably more than half the number of high school math teachers in Ohio.

There are ideas in HB33 to make it easier for software engineers to become computer science teachers, but there is already flexibility in state law that exists for people to transition from industry to education, and I personally know teachers who have taken advantage of the flexibility that already exists. I am not against increasing this flexibility, but **we need to be realistic about how many people are actually going to step away from a software developer salary to teach at their local high school**. More broadly, I think we need to pivot away from focusing most of our efforts on increasing the number of computer science teachers, which I think is a big reason why the progress on computer science in Ohio has been so slow.

New strategy: Integrating Computer Science

HB 170 began a process that produced the Ohio Learning Standards for Computer Science. These standards do not just describe goals for high school computer science classes. Here is a quote from the introduction:

"*The high school computer science standards provide both foundational and advanced opportunities districts can use to design as separate courses or, when appropriate,* ***integrate into other disciplines****.*" Ohio Learning Standards for Computer Science Page 6.

Computer science and data visualization skills can be integrated into a wide variety of courses and it is important that we do this because **every student has a math or science or art teacher** for example but not every student has a computer science teacher. Currently less than half of all public high schools in Ohio have a computer science teacher. I estimate that **if 1 in 10 high school math teachers integrated computer science into one of their math courses, then the number of students significantly engaging in computer science skills would roughly double**.

Although we are behind the nation in computer science, **Ohio is one of the leading states for integrating computer science into high school mathematics**. In 2020, Ohio Department of Education began an initiative called Strengthening Ohio's High School Math Pathways to design two math courses – discrete math and data science – that would align to both Ohio's math standards and computer science standards. I helped to design the computer science aspects of the discrete math course and I worked closely with a teacher at Metro High School who put the curriculum in front of students for the first time in 2022. Interestingly that teacher is now thinking about getting credentialed to teach computer science in addition to math.

In summer 2023, these efforts will expand to train dozens of teachers to teach these courses from districts across Ohio. Many of these teachers teach at high schools without any computer science teachers. Unfortunately, **the exponential growth of this program is unlikely to be sustained into 2024 and 2025** because the funding for this program has been through covid19 relief funds and not through computer science education dollars out of the general fund. Even though these courses align to Ohio computer science standards they are listed as math, and as a result the Ohio Department of Education has not had the flexibility to direct computer science education dollars into this important program. Even when HB33 seemed like it might receive the

$18 million per year funding that the Coalition for Computer Science Advocacy and State Committee on Computer Science were pushing for, my discussions with house staffers indicated that discrete math and data science (which are not currently mentioned anywhere in HB33) would still languish from lack of funding.

Recommendations

1. Restore computer science education funding to HB33

Although Intel has broken ground on a new chip factory in Ohio, at the time of this writing the state budget for computer science education is essentially zero, except for the salaries of a few staff at Ohio Department of Education. This is not acceptable for a state that is below the national average in access to computer science.

2. Change the name of "Office of Computer Science" to "Office of Computer Science Integration"

This small but significant change would make explicit the value of integrating computer science into non-computer science classes, and the need to give Ohio Department of Education flexibility in spending funds allocated for computer science.

3. Require that one of the 11 members of the proposed Ohio Computer Science Council be a math educator, and require a standing committee to monitor efforts to integrate computer science into high school math

Although staff members from Ohio Department of Education regularly speak at conferences and webinars about the Math Pathways program, a persistent problem that I have noticed is that computer science professionals and educators often have no idea that programs like discrete math and data science exist in Ohio. An important way to recognize the importance of these programs is to require that the 11 member council include one math educator with experience integrating computer science into mathematics coursework, and to have a committee tasked with monitoring that work.

4. Make explicit in HB33 that computer science funding can be spent on efforts to integrate computer science into non-computer science classes in general

Unless it is put into writing in HB33 that computer science funding can be spent flexibly on efforts to integrate computer science into non-computer science classes, this is very unlikely to happen. The text of HB33 will be what the Ohio Department of Education will use to create the Office of Computer Science Education and Ohio Computer Science Council. I have worked with Ohio Department of Education in some capacity for six years and I can tell you that they are not in the business of assuming to know what the legislature was trying to say when a bill is written and passed by the general assembly. Presently in HB33 there is no explicit or implicit mention of

efforts to integrate computer science into non computer science courses, even though Ohio is home to one of the largest national efforts in this regard.

Follow up

Thank you for the opportunity to provide feedback on the proposed Ohio Computer Science Council and Office of Computer Science Education. I would very much like to further discuss this with you, and/or your staff. Please do not hesitate to contact me if I can be of additional assistance. My cell is 614-557-9387.

Regards,

Chris Orban