Chairman Edwards, Vice Chairman LaRe, Ranking Member Sweeney and members of the House Finance Committee. Thank you for allowing us to submit proponent testimony on House Bill 33 in support of the computer science budget language and funding.

My name is Codeye Woody and I serve as the Director of State Government Affairs for Code.org, an innovation nonprofit dedicated to the vision that every student in every school has the opportunity to learn computer science (CS) as part of their core K-12 education. As I travel across the country, most people ask, what is computer science and why is this important to me and my community?

The official definition of computer science is the study of computers and algorithmic processes, including their principles, their hardware and software designs, their implementation, and their impact on society. In other words, computer science is the CREATION of new Technology and NOT just the use of them. We at Code.org believe that computer science is foundational in transforming the way students think about technology and teaches them essential problem-solving skills.

We want to thank Governor Mike DeWine, Chancellor Randy Gardner, and the Ohio Legislature for recognizing the importance of computer science education in the State of Ohio. Already included in the budget are key recommendations to make computer science education more accessible to all students. Including:

- Creating an Office of Computer Science Education (OCSE)
- Implementing the Computer Science Promise
- Establishing the Ohio Computer Science Council
- Addressing computer science teacher licensure and shortages
- Funding these policies at $18.5 million per fiscal year

Our ask today is simple – we are asking that the policies in the budget that I outlined above stay in the budget throughout the process. Taken together, adopting these computer science policies will position Ohio as a leader in computer science education and prepare young people for high paying in-demand jobs. I am going to highlight two of these policies in more detail and Kelly Gaier Evans, Director of the Ohio STEM Learning Network and John Dutton, President of the Computer Science Teacher Association of Ohio, will touch on the teacher licensure pieces. Dr. Debbie Jackson from Cleveland State University will also about the CS Council and her work in computer science teaching. Dr. Lena Furci, Founder and Executive Director of Her Academy, will conclude our testimony by stressing the importance of accessible computer science education and how these policies help Ohio's workforce pipeline.

As I mentioned earlier, we were excited to see the Office of Computer Science Education included in the executive budget bill. Like many states across the country and some neighboring, the Office of Computer Science Education will be housed in the Ohio Department of Higher Education would be responsible for:

- The implementation of any computer science legislation and regulations and the implementation of the computer science education strategic plan developed by the state
- Outreach to districts that need additional supports to create or advance their computer science programs; and
- Supporting districts in using existing and available resources for districts to create and advance their computer science programs.

Creating the Office of Computer Science Education not only will serve as a hub for all things computer science, but it also shows teachers and students that Ohio is prioritizing computer science and preparing students for the digital workforce right in their backyard.

I also wanted to take a moment to highlight the CS or Computer Science Promise. This new program included in the executive budget allows any 7-12 student to have access to at least one CS course per academic grade level even when their local school district cannot offer the course. In providing these courses, the state would reimburse the school district for any costs associated with a student taking a course not offered in their home district. The policy suggests that the courses could be offered by a neighboring school district, an Education Service Center, an approved online provider, or through College Credit Plus. This program is a crucial first step in giving Ohio students who want to learn more about the computer science field and avenue to do so if their school is unable to resource the class.

Before I close my portion of the testimony, I wanted to point out that the five of us are not alone in supporting the computer science language in the budget. Code.org took the lead on forming a coalition of 43 members statewide that recognize this language is crucial to Ohio's growth. We will follow up with the letter from the coalition and you will see that we have business advocacy groups, major corporations, Ohio small businesses, and chamber of commerces all supporting this effort.

Expanding access to computer science education in K-12 classrooms across America is essential if we want our children to have the skills they need to compete and win in the global economy. Our students aren't just competing with the kids from across the hall, across town, or across the country. They are competing with students from across the globe for the skills that will power the jobs and industries of the future. That's why we need to make sure all of our kids are equipped for the future – not just with basic computer literacy but having the computer science skills so essential for tomorrow's economy.

We would appreciate your support for HB 33 and please let me know Code.org can be a resource. Thank you.

Codeye J. Woody, DPL
Director of State Government Affairs, Code.org
www.code.org

Ohio STEM Learning Network

Thank you, Chairman Edwards, Vice Chairman LaRe, Ranking Member Sweeney and members of the House Finance Committee.

Thank you for allowing us time to share proponent testimony on House Bill 33 in support of the computer science budget language and funding.

My name is Kelly Gaier Evans and I am the Director of the Ohio STEM Learning Network, a network managed as a public-private partnership between Battelle and the State of Ohio.

As the facilitator of the state committee to create a statewide plan for Computer Science education, I had the privilege of working with 26 members from across industry, higher education, K-12 educators, government agencies, and non-profit organizations. We met regularly for almost a year to put together the state plan released in the fall of 2022. I commend the 134th General Assembly for their foresight in creating a state plan for Computer Science education as a part of the last biennium budget.

Today, I urge you to put these recommendations from the state plan into action. One of the key figures that stands out to me from our committee's work comes from JobsOhio: Ohio employer demand for CS talent is nearly 4.8 times the current supply in Ohio. If nothing changes, JobsOhio estimates this gap could widen by approximately 11,000 jobs per year over the next decade.

The Computer Science recommendations included in the Governor's budget lay the foundation for changing this estimate. Access to broad foundational Computer Science education opens doors for students into so many career opportunities. Careers in Computer Science, Artificial Intelligence, Data Science, Information Technology, and many more that are waiting for Ohio's students.

It is crucial to remember that students cannot become what they do not know. Students are asked what they want to be at such an early age, and they start making these decisions well before they step foot into a high school. The current system has left many Ohio students behind, and we must take action now to change that. If Ohio wants a pipeline of students ready to fill these vital careers, we must begin putting the system in place so that students have the content and mindset that these careers in computing are something they can do and want to do. This system must include preparing our PreK-12 educators to teach the foundations of computer science starting in elementary school.

According to the 2022 State of Computer Science report for Ohio, in the 2020-2021 school year, only 48% of Ohio high schools offered a foundational Computer Science course. When we look at that number broken down by geography, we see that 57% of our suburban schools and 55% of our rural schools offer a foundational computer science course. Not great. Yet the picture is even more alarming when we see that only 22% of our schools in urban regions are offering a foundational computer science course.

These numbers only tell the story of who has access to take these courses. It does not even begin to tell the story of who is participating in Computer Science.

To change this picture, I urge you to support the provisions on Computer Science education in the Governor's budget.

While Codeye highlighted two very important computer science policies earlier, we also recognize that we need more teachers who are prepared to teach Computer Science. There is a clear shortage of qualified Computer Science teachers in Ohio. This workforce bottleneck makes it even more difficult for our schools to offer computer science.

To eliminate this bottleneck, this legislation provides needed funding and needed expansions to teacher licensure. It expands teacher licensure in Computer Science from K-12 (all grades) to add more specialized grade bands in PK-5, 4-9 and 7-12 like other core subject areas. This will reduce the cost and burden of the various licensure programs and address concerns that a K-12 license deters teachers from seeking the Computer Science license.

While these changes to licensure are underway, the legislature should extend the existing provision/waiver for teachers to teach CS with professional development and approval by the district.

The Computer Science recommendations put Ohio on its way to becoming a national leader in computer science education and workforce pipeline. Inspiring Ohio's young minds offers our state its best and most powerful pathway to prosperity and innovation.

I thank this committee for their time and support of Computer Science education and welcome your questions.

March 24th, 2023

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To:
Ohio House Finance Committee
Ohio House of Representatives
77 South High Street
Columbus, Ohio 43215-6111

Chairman Edwards, Vice Chairman LaRe, Ranking Member Sweeney and members of the House Finance Committee. Thank you for allowing us to submit proponent testimony on House Bill 33 in support of the computer science budget language and funding.

My name is John Dutton. I am President of the Computer Science Teachers Association of Ohio (CSTA Ohio) and a Computer Science and Engineering teacher at MC^{2}STEM High School in Cleveland.

CSTA Ohio, founded in 2009, is one of 101 chapters of CSTA which boasts over 19,000 members, supporting and promoting the teaching of computer science (CS) by providing opportunities for K–12 teachers and their students to better understand CS and to more successfully prepare themselves to teach and learn.

Like many of you, I grew up in a small town. My high school graduating class was 92. Most events at the high school were get-togethers for the entire community. Teachers were revered and embraced, but I never had a CS course because we couldn't afford a CS teacher. But I knew that CS would be a pathway to a well-paying and flexible career. I studied CS at Case Western Reserve, worked ten years in industry (at Dirt Devil and Hyland Software, among others), then started teaching in high-need schools, which I have done for the last 16 years. I began as a science teacher, and have since transitioned to CS so that I could provide students access to CS and all of the rapidly growing and not-yet-invented careers associated with being able to program a computer.

Despite my degree and being a licensed higher school teacher, it was difficult to become a fully licensed CS teacher, with equally frustrated employees fielding many calls that I made to the Ohio Department of Education. The computer science education policy included in the executive budget will change that and make it easier for future teachers to teach CS.

As mentioned earlier, we need to expand computer science education and access, but in doing so, we also need to build our computer science teacher workforce. For aspiring teachers with little to no CS coursework, which is over 75% of our current CS teaching staff in Ohio, the current pathway to licensure is often complicated and prohibitive. Included in the executive budget bill are updates to computer science teacher licensure to help solve this problem. This policy recommendation would offer grade banding of the CS license so that teachers who are trained to teach early ages can teach CS to kindergarteners and those who are trained to teach older students can teach CS to high schoolers. Additionally, this policy makes it easier for CS

industry professionals like me to move directly into the classroom through the creation of a special industry 40-hour teaching license.

In my role with CSTA, I've had the opportunity to meet with aspiring CS teachers without industry experience or coursework who see the need for CS education in our rural and urban communities. The budget also creates "Teach CS" grants that will fund these teachers' CS studies in order to help them become fully licensed educators. And, as Codeye mentioned, the budget also creates the highly needed Office of Computer Science Education which, among other things, will work with colleges and universities to develop and support CS teacher education programs. Together, these two sections will increase the total number of CS educators who can continue to provide opportunities for their students to pursue highly skilled tech careers.

As you may know, there are over 18,000 open CS jobs in Ohio every month, but only *1800* college graduates in CS to fill those jobs. Soon, tech companies will either look elsewhere for employees or will look elsewhere to exist. Looking briefly at Figure 1, a surprising and urgent number pops out; 61% of CS teachers surveyed are in their late career. More CS teachers are retiring than are being trained. Doing nothing about the already low numbers of CS educators leading to fewer graduates with tech-ready skills will make a bad problem worse.

The funding and the CS education policy are vital steps in providing access to Computer Science for all students, and in particular those in high-need rural and urban districts. According to the Institute for the Future[1], 85% of the jobs that will exist in 2030 haven't been invented yet. The forward-looking CS language in this bill will help ensure that high tech industries move to and stay in Ohio as our workforce becomes prepared for the careers of tomorrow. Thank you for allowing me to testify in support of HB 33.

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1 https://www.delltechnologies.com/content/dam/delltechnologies/assets/perspectives/2030/pdf/Realizing-2030-A-Divided-Vision-of-the-Future-Summary.pdf (2019)

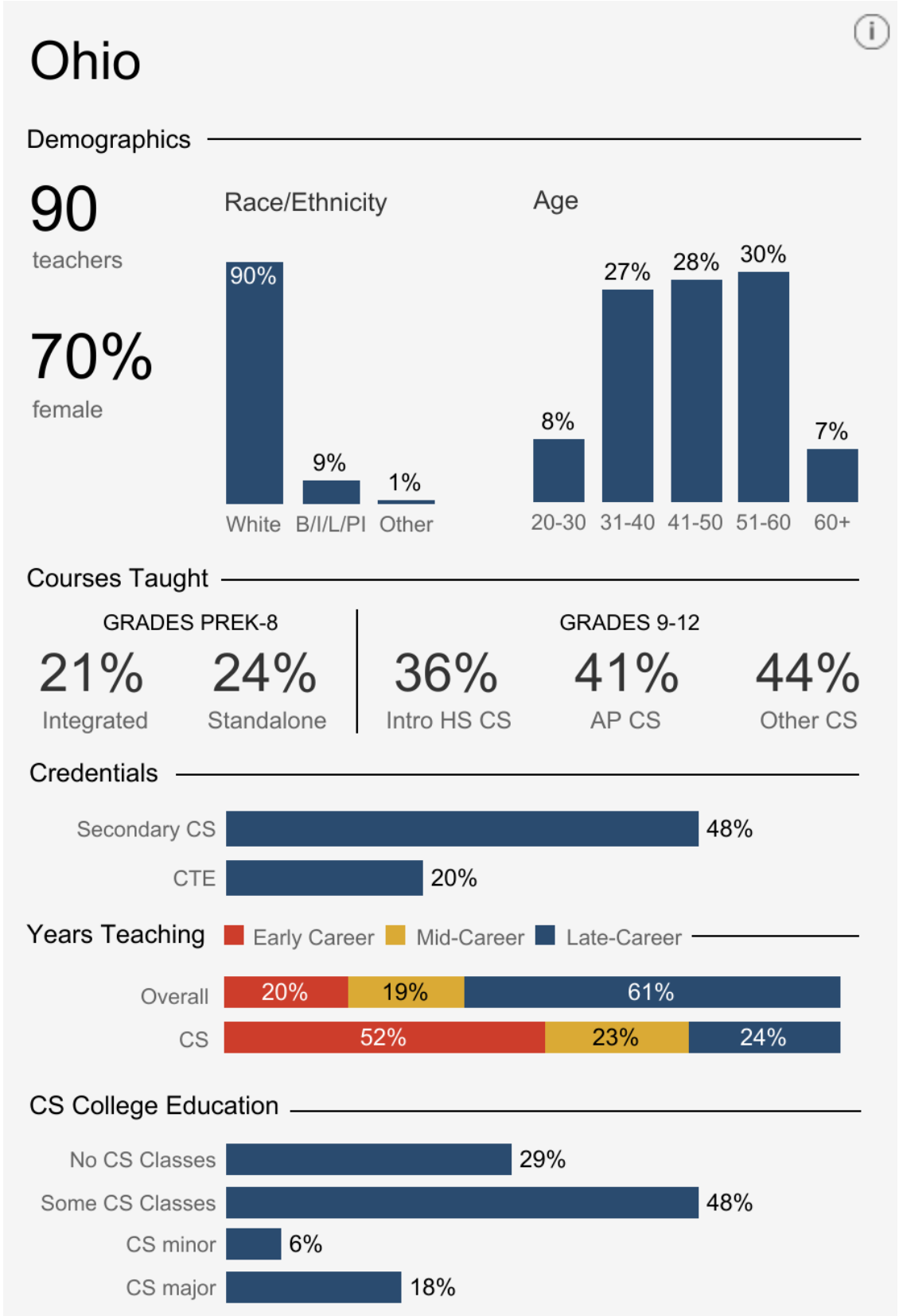

Figure 1. “PreK-12 Computer Science Teacher Demographics: Results of a 2020 CSTA/Kapor Center Survey of CS Teachers Across the United States,” https://csteachers.org/page/2020-cs-teacher-landscape

Office of Instructional Excellence

Chairman Edwards, Vice Chairman LaRe, Ranking Member Sweeney and members of the House Finance Committee. Thank you for allowing us to submit proponent testimony on House Bill 33 in support of the computer science budget language and funding.

My name is Dr. Debbie Jackson, I currently serve as the Vice Provost for Instructional Excellence at Cleveland State University. Prior to this role I served as the Department Chair for Teacher Education, Director of the STEMM Education Center and Professor of STEM Education at CSU. I have been one of the leaders of a comprehensive program on computer science education at Cleveland State University, in partnership with the Cleveland Metropolitan School District, and with significant funding from the National Science Foundation (nearly $4 million) and the Cleveland Foundation (over $1 million) since 2013. In addition to this work in Cleveland, we are a key member of the nationally-funded Expanding Computing Education Pathways (ECEP) Alliance. Our work is recognized both nationally as well as internationally. On a personal note, I also had the privilege of participating in the development of the Computer Science State Plan for Ohio as a member of the State Committee, made possible by House Bill 110. As Kelly mentioned, this statewide committee developed the policies that put Ohio on track to becoming a leader in computer science education.

Today, I urge you to support the implementation of all parts of the current budget bill related to computer science education. My colleagues have discussed the parts of the bill related to teacher licensure, the creation of the Office of Computer Science Education, the CS Promise, and Teach CS Grants which will help provide access for all K-12 students in Ohio to computer science education. Based on my experience in this space, I will advocate for these as well as the Ohio CS Council to support out of school and summer opportunities for all K-12 students in Ohio.

Included in the executive budget is the creation of the Ohio CS Council. This Council will act similar to the existing Ohio Arts Council and will support afterschool programs, summer camps, and educational enrichment partnerships in all 88 counties. As I will discuss later on in my testimony, many students, especially those in urban and rural districts, will experience computer science education for the first time outside of a classroom. An example of this could be additional programming offered to students by private businesses. I'm sure many of you have non-profit organizations in your districts that promote computer science education, robotics or app development and would like to expand services to more students. The CS Council aims to utilize existing programing in Ohio to help more students participate in computer science learning outside the classroom.

When we began our work in 2013, the focus was on teaching teachers to teach at that time, the new, Advanced Placement Computer Science Principles course. During this four-year National Science Foundation funded project, we were able to train 75 teachers to teach this new Advanced Placement course in Ohio. Absent from those 75 teachers were teachers from urban and rural school districts. Therefore, the remainder of our work in computer science education since that time has been to serve the Cleveland Metropolitan School District, where there were almost no computer science courses being taught in 2017. With continued funding from the National Science Foundation and the Cleveland Foundation, we can now report that computer science is being taught in about half of the high schools in the Cleveland Metropolitan School District as well as in several K-8 schools, and expansion and professional development for teachers is planned for next year.

Given we had developed robust support and processes for teacher professional development, in 2020, we turned our focus to providing direct opportunities for students. During summer 2022, we had over 100 students from the Cleveland Metropolitan School District participate in summer programs related to computer science ranging from internships focused on quantum computing with major Cleveland employers like the Cleveland Clinic, and others to basic computer science and web design with Tech Corps and Key Bank. Typically, students from suburban communities have access to these types of summer and out of school opportunities; however, these opportunities in urban and rural areas are lacking. Support for the Ohio CS Council alongside the Office of Computer Science Education and the other aspects of the current budget bill will facilitate the inclusion of out of school and summer opportunities for all students in Ohio. This facet of the bill complements the CS Promise, which guarantees equitable and fair access to computer science courses to all students in high school.

Before I close, I wanted to reference back to my earlier point that major employers in the Cleveland area continue to partner with us at CSU to provide programming for Cleveland students. They partnered with us for a simple reason – they need students learning computer science skills in order to fill their workforce needs of the future. There was a recent article in Inside Higher Education advocating for internships for students in computer science as a way to encourage students to continue to pursue computer science as a field of study. This is intuitive as it gives the college age student direct experience with how the content is used in a career. This is equally important in middle and high school as well. When we expose a student early to a career path they normally would not be exposed to, they see themselves in the career and take steps towards pursuing that career. Students who do not have experiences in school and out of school in computer science will be at a loss. This bill provides the funding necessary for all students in Ohio to be exposed to the computer science content and careers which will help students succeed and help our state fill in-demand jobs into the next generation.

The items outlined in the budget bill related to computer science education in Ohio will allow students from all areas of the state to learn about computer science, computer science careers and ultimately, make Ohio more attractive for businesses.

I thank this committee for your time and support of Computer Science education in Ohio. I welcome your questions.

Chairman Edwards, Vice Chairman LaRe, Ranking Member Sweeney and members of the House Finance Committee. Thank you for allowing us to submit a proponent testimony on House Bill 33 in support of the computer science budget language and funding.

My name is Dr. Furci, Founder and Executive Director of HER Academy. At HER Academy we provide computer science access to students in preschool through grade 12 through curriculum to schools, professional development in computer science (CS) to teacher's, and after school and summer camp programs. We have an audacious goal, and that is for all girls in our nation to graduate high school with the same competency in computer science as she does in math, science, English and art. HB 33 is of the utmost importance to me as HER Academy is headquartered in Columbus, I personally am an Ohio native, born and raised in rural Ohio, and was an underserved girl yearning to leap into the STEM field as early as the second grade. I desire Ohio to be a leader in computer science education so that *all* students in our state have access to the most valuable careers of tomorrow.

The pandemic has shown us all the transformative power of technology to drive innovation in times of turmoil, to enable connection and continuity whatever may come. It's also driven home our collective dependence on tools that some of us understand better than others. I am part of an organization where we aim to reprogram the world, **empowering every child with skills to become a creator of technology**, to not just merely be a user. This starts with CS for students at the K-5 level. I have realized in my industry experience at a technology company the importance of building educational pathways for girls in CS, and CS-related confidence in those who are historically marginalized in the subject. The Girls' Index surveyed girls from 5th through 12th grade and found: girls interest in math and science increases as they age, howeverver, their confidence in themselves decreases and their abilities decrease. The problem is lack of confidence. In the 5th grade, 23% of girls do not feel they are smart enough for their dream career and by high school this doubles to 46%. The problem is not going to solve itself, 1 in 3 girls believe that boys are encouraged more than girls in math and science. We need to change this. 53% percent of HER Academy seniors exposed to the HER Academy curriculum report that they plan to major in STEM fields, where the national average is 12%. The answer is starting as early as possible in elementary school to build confidence.

While HB 33 computer science policy will help our young people access computer science education, the policies are also critical for workforce development in Ohio. Currently we have 14,439 open computing jobs which is 2.0x the state average demand rate, and we know that is only going to increase. In addition, Ohio only has 1,827 computer science graduates (https://code.org/promote/oh). Due to this deficit, HER Academy curriculum design takes into account racial and ethnic groups that are historically marginalized. Of particular concern to us are the ways that systems of oppression are replicated across generations through educational access. Underfunded schools and those serving majority ethnic and racial minority populations commonly steer their students towards careers in informational technology (supporting computer users) while well-funded schools steer their students towards careers in CS (designing and

creating technological solutions to problems). The difference in earning potential between these two career paths is extreme. The national median annual wage for CS was $97,430 in May 2021. This median salary is $51,670 greater than all other occupations (https://www.bls.gov/ooh/computer-and-information-technology/home.htm).

You see, the future is bright, and we have a responsibility to make sure all students reach their potential. Our ask to you today is simple – we, which includes this panel before you, and as Codeye mentioned, 43 corporations and organizations across the state – are asking you to support the computer science policies and funding in HB 33. When enacted, we will make sure students in our state are exposed to the jobs of the future. We will have generations of students taking risks, messing up, becoming their amazing imperfect, totally powerful self. *We* have the opportunity to give our students the best career choices possible.

Thank you for allowing us to testify in support of the CS language in HB 33 and please let me know if HER Academy can be a further resource. We are happy to answer any questions the committee may have.

All my best,

Lena Furci

Lena M. Furci, PhD
Founder and Executive Director of HER Academy
www.theheracademy.org