



**NEbraskaCERT**

# RAISING A NEW GENERATION OF CYBER WARRIORS

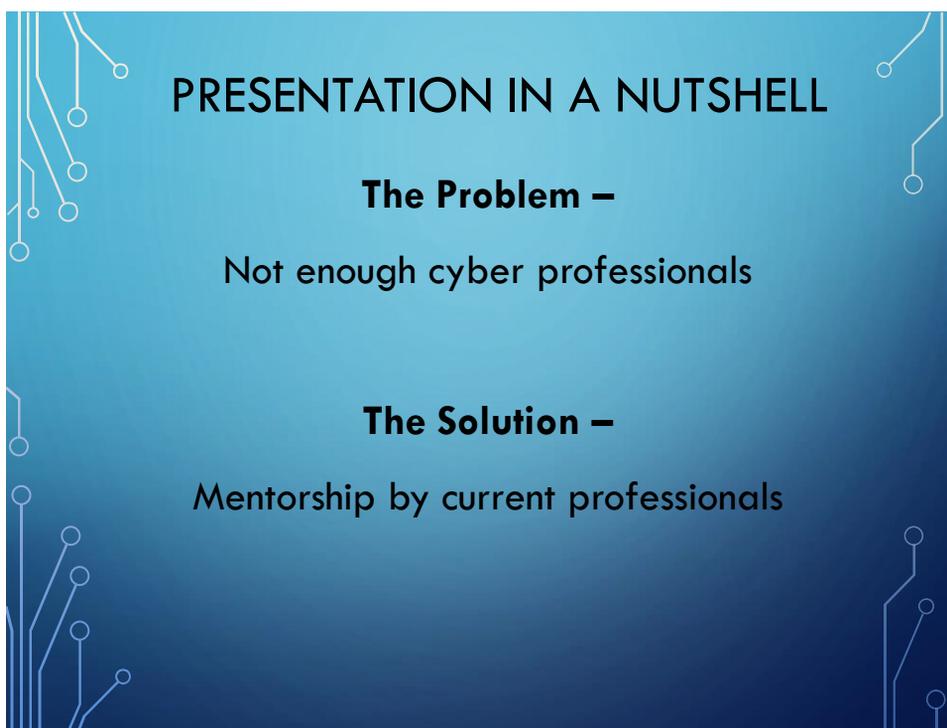
Teaching our kids the right computer skills

A DISCUSSION OF WHY HIGH SCHOOL STUDENTS SHOULD LEARN MORE THAN JUST SIMPLE APPLICATIONS AND WHAT SECURITY PROFESSIONALS CAN DO TO HELP

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**BELLEVUE UNIVERSITY**  
CENTER *for* CYBERSECURITY  
EDUCATION



## PRESENTATION IN A NUTSHELL

**The Problem –**  
Not enough cyber professionals

**The Solution –**  
Mentorship by current professionals

**SO WHAT'S THE PROBLEM?**

[http://www.rand.org/content/dam/rand/pubs/research\\_reports/RR400/RR430/RAND\\_RR430.pdf](http://www.rand.org/content/dam/rand/pubs/research_reports/RR400/RR430/RAND_RR430.pdf)



**H4CKER5 WANTED**  
An Examination of the Cybersecurity Labor Market

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**SO WHAT'S THE PROBLEM?**

Hurdles for students to overcome:

- Academies don't answer the shortage of technology knowledge.
- Multiple technology courses are not required for graduation.
- Students aren't inclined to take technology courses that don't sound fun or have a sexy name.
- Students are worried about GPA and will take electives that will boost it (not technology courses).

## SAMPLE SCHOOL DISTRICT – MILLARD PUBLIC SCHOOLS, OMAHA, NE

Approximately 23,000 students

- 25 Elementary Schools
- 6 Middle Schools
- 4 High Schools
  - 14 Honors Courses
  - 16 International Baccalaureate Diploma Courses
  - 23 Advanced Placement Courses
  - No Honors or AP Technology Courses

## SAMPLE SCHOOL DISTRICT – MILLARD PUBLIC SCHOOLS, OMAHA, NE

Students must earn a minimum of 230 credits in order to graduate from a Millard High School. The subject areas and the minimum number of credits a student must earn in each area are listed below:

Area:	Credit:
English (including 5 for oral comm.)	40
Math	30
Science	30
Social Studies	30
Physical Education/Health	20
<b>Technology</b>	<b>5</b>
Fine and Performing Arts	5
Human Resource	5
Financial Literacy	5
Electives	60

## THE PROBLEMS

1. The general public understands that most jobs out of high school, and specifically wanted careers, are based in knowing and having IT skills, but they are leaving it up to the schools to teach these skills along with their district objectives.

- Technology is fastest changing facet of our working world
- Most parents hand off their kids to be taught for real life learning to schools starting in 6<sup>th</sup> grade assuming all areas of education are covered.
- Home school graduation requirements are usually as stringent, however there are no teacher certification requirements for non-paid teachers.

## THE PROBLEMS

2. High schools are trying to answer the call for more IT workers by adding technology classes to their curriculum.

- They don't have a lot of room for a variety of courses because of school year length, teaching expertise and availability, and their nature of school environment.
- "No Kid Left Behind" stigma is still there calling for the dumbing down of all courses to bring up graduation rates

## THE PROBLEMS

3. They work with the “If we build it, they will come” mentality of offering courses, but then they don’t change requirements

- The answer isn’t to offer 100 IT courses. Because of student numbers, to be efficient and for full classes size, they limit to a few offerings.
- They sometime will offer what they think is sexy, instead of what is necessary to develop an IT skillset they can use. Buzzwords are crucial for enrollment.
- Even though a school offers 5+ courses in IT, there is a limited requirement for technology courses toward graduation.
  - Sample school district only requires 5 credits (1 class) for graduation

## THE PROBLEMS

4. High schools are more concerned with getting students ready for college or working by teaching life skills

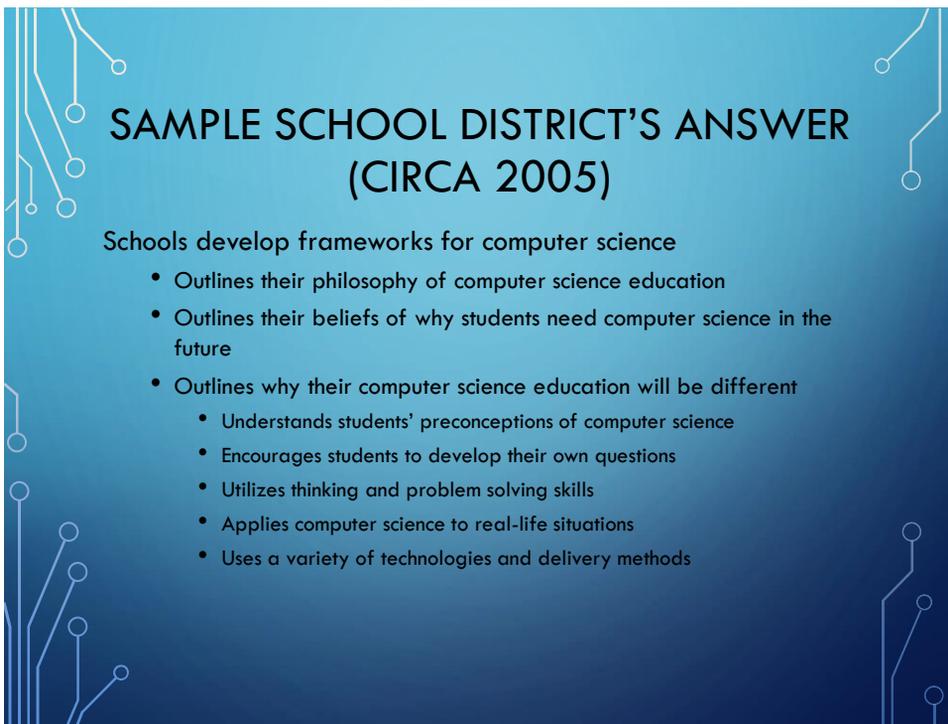
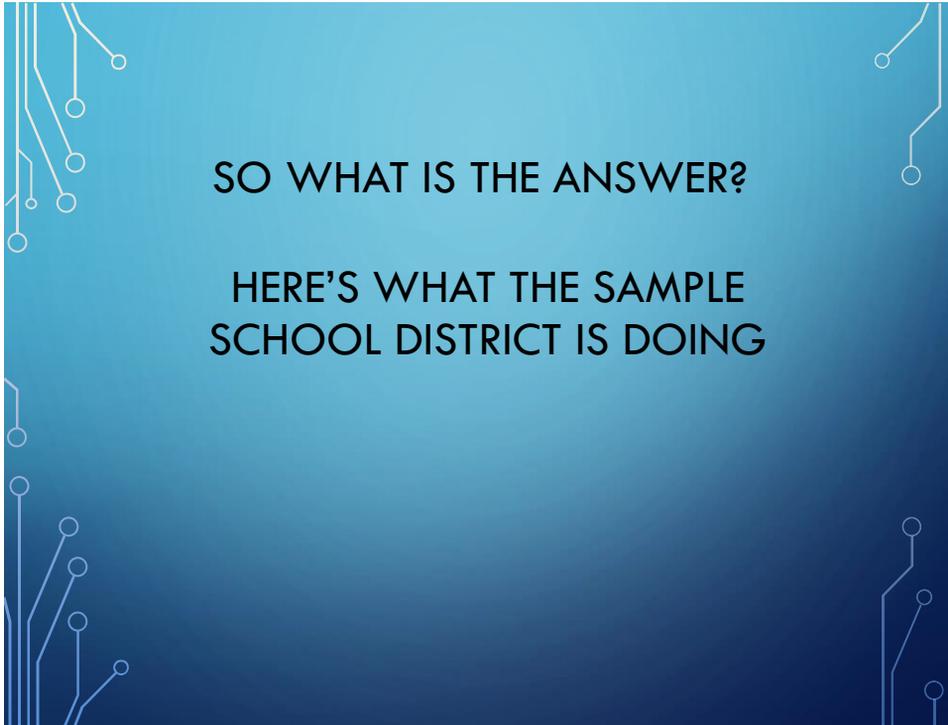
- Poll taken asking what educators think are the general skills students need:
  - Reading
  - Typing
  - Writing
  - Communicating effectively, and with respect
  - Questioning
  - Being resourceful
  - Being accountable
  - Knowing how to learn
  - Thinking critically
  - Being happy

## WHY DON'T THEY ALREADY HAVE THOSE LIFE SKILLS?

- Intimidated
- Lack of Maturity
  - Thoughts are not of technology other than games and communication
- Need to be spoon-fed information and directions
  - Society has taught them to only do what you are told
  - Complexity of machinery has forced industries to build simple, easy to use applications and machines
- Don't have the ABC (Always Be Curious) attitude
  - Older students generally have lost this attitude, except if it pertains to entertainment

## THE PROBLEMS

5. Teachers at the high school level are overworked, generally underpaid and have little or no incentive to work more with students to expand their skills in technology
  - They do the extra work with the life and academic skills, but not with technology – generally. That is because technology changes so rapidly, they can't keep up enough to feel comfortable with mentoring them in addition to teaching.
  - Any extra work is usually on their own time; a commodity that is precious
  - If there is a monetary incentive, which if it exists, it is not usually much, it boils down to pay per hour, which is poor.
  - Most teachers don't know enough about hacking to teach it on a technical level.



## SAMPLE SCHOOL DISTRICT'S ANSWER (CIRCA 2005)

### Developed Academies for specialized study

- Education
- Entrepreneurship
- Finance
- Health Sciences
- Distribution and Logistics
- Culinary Skills

## SAMPLE SCHOOL DISTRICT'S ANSWER (CIRCA 2005)

### The sample school district added and now supports the following Information Technology courses in the high school curriculum

- Computer Technology Applications – 5 Credits
  - Basic Office Applications
- Introduction to Computer Science – 5 Credits
  - Visual Basic and Web design
- Computer Topics – 5 Credits
  - Basic programming languages, robotics, work applications
- Java Programming – 5 Credits
  - Intro to Java
- AP Computer Science – 5 Credits
  - Advanced Java

## SO WHAT'S THE PROBLEM?

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## THE UPSIDE

- Job security
- Salary increase for existing technology professionals
- Educational institutions have more students in entry level courses

## THE DOWNSIDE

- Additional training at every level
- Working hours increase for existing technology professionals
- Educational institutions have more students in entry level courses that aren't prepared for upper level material

## MORE DOWNSIDE - COLLEGE DEBT

The Project on Student Debt states: "Seven in 10 college seniors (71%) who graduated last year had student loan debt, with an average of \$29,400 per borrower. From 2008 to 2012, debt at graduation (federal and private loans combined) increased an average of six percent each year. "

Nebraska's state average student debt:

- \$26,473
- Ranks 23<sup>rd</sup> in the nation

## YAHOO QUESTION: "WHY IT IS IMPORTANT TO STUDY AND UNDERSTAND INFORMATION TECHNOLOGY?"

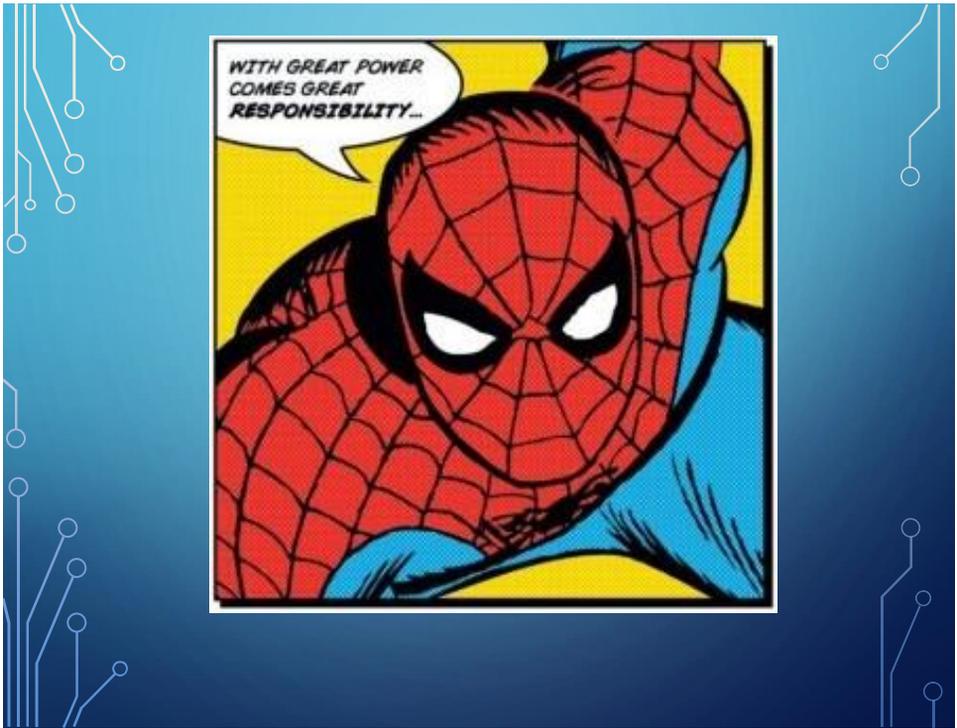
Best Yahoo answer:

"I think of information technology jobs given to managers. Managers help organize talented people together to complete technology related projects. The manager is the backbone to any job.....Technology does not have to be understood fully. Most technology wonders become obsolete within a few years of service. Keep in mind our world is in a technology boom when it comes to the more affluent societies. Try researching technology of the future. Good luck. "

## 10 TECH SKILLS EVERY STUDENT SHOULD HAVE – BY THE EDUCATIONAL TECHNOLOGY GUY

1. Internet Search
2. Office Suite
3. Self learning of tech and where to go for help
4. Typing - yes, typing
5. Social Media
6. Netiquette - Internet/Email/Social Media
7. Security and Safety
8. Hardware basics and troubleshooting
9. Backup data
10. Finding apps and software

WHAT CAN WE DO?  
HERE'S YOUR HOMEWORK



## THE HIGH SCHOOL UTOPIAN ANSWER

Talk to the person in charge of technology curriculum for the district and have them redesign it to include:

- Introduction to Applications course (pre-req)
- Multiple foundation technology courses to include computer hardware/software configuration and maintenance, running client and server operation systems, data maintenance and communication technologies, social media and security, basic database and programming, and Web design. (some required)
- Multiple advanced courses for those students that want to specialize and get pre-college credit

## THE REAL WORLD

But let's get real....

It's up to current professionals to help bridge this gap.

Insanity: **doing the same thing** over and over again and **expecting different results.** - Albert Einstein

## THE REAL WORLD

### Mentoring

Student mentoring is a proven approach to engage students and improve job placement rates upon graduation.

- One-on-one discussion of security issues, employment, technology, etc. will keep students interested in real-world problems and experiences.

## THE REAL WORLD

Competitions – Teach them “Hacking” with CyberPatriot  
(notice the sexy name?)



## WHY IS A HIGH SCHOOL CYBER DEFENSE COMPETITION NEEDED?

- America's economic prosperity in the 21st century will depend on cyber security ...this is also a matter of public safety and national security.
- “We will begin a national campaign to promote cyber security awareness and digital literacy from our boardrooms to our classrooms, and to build a digital workforce for the 21st century.”
  - **President Barak Obama, 29 May 2009**

## WHAT CYBERPATRIOT IS...

1. The national high school cyber defense competition.
2. Carefully structured to excite, educate, and motivate participants.
3. Designed to instill in all participants the importance to our nation of cyber, cyber security, and good computer security practices.
4. Designed to motivate all participants to consider STEM academic disciplines to meet our nation's needs.
5. Designed to motivate many participants to become the next generation of cyber defenders and our nation's “digital workforce.”

## WHAT CYBERPATRIOT IS NOT...

1. "Hacker" training. "Hacking" in competition is strictly forbidden.
2. A recruiting tool for the Air Force, the Department of Defense, or the Federal government. This is about building a strong national foundation for cyber skills throughout our high schools.
3. Boring academic instruction. *CyberPatriot* is designed with **extremely high fun and excitement quotients.**

## CYBERPATRIOT DEMO



## PLEASE HELP!!!!

1. There are 5 teams in the Omaha Area and 6 mentors.
2. The kids need the direction, or else they'll turn to the dark side.
3. You learn a lot
4. FREE CPE's

## LINKS

- Bellevue CCE Blog – <http://blogs.Bellevue.edu/cybersecurity>
- US CyberPatriot – <http://www.uscyberpatriot.org>
- How To Geek School – <http://www.howtogeek.com/school>
- Pico CTF – <http://www.picoctf.com>
- Nullify CTF (UNO) – <http://nullify-ctf.com/>

# THANK YOU

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