June 4-6, 2019 | Huntsville, AL

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NATIONAL
CYBER SUMMIT

Faster than the Speed of Threat:
Edge-to-Edge Cybersecurity

Agile Cybersecurity Education: Evolving Demands in the Cyber Landscape

Dr. David Schippers Sc. D., CISSP, PI, EnCE, LCFE

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- **Experience**
- ~20 Years – Technology Experience
- ~13 Years – Technology Leadership
- Speaking Engagement
  - Local, Regional, National & Global
- Industry Involvement
  - Business
  - Government (Education)
  - Consulting

- **Education**
- Degrees In:
  - Networking, Intelligence, Information Systems Management, Cybersecurity

- **Highlights**
- Information Technology/Cybersecurity Program Redesign
- Automotive Cybersecurity Degree Concentration
- Ground Vehicle System Center – MVIC Sub Group 5 Lead
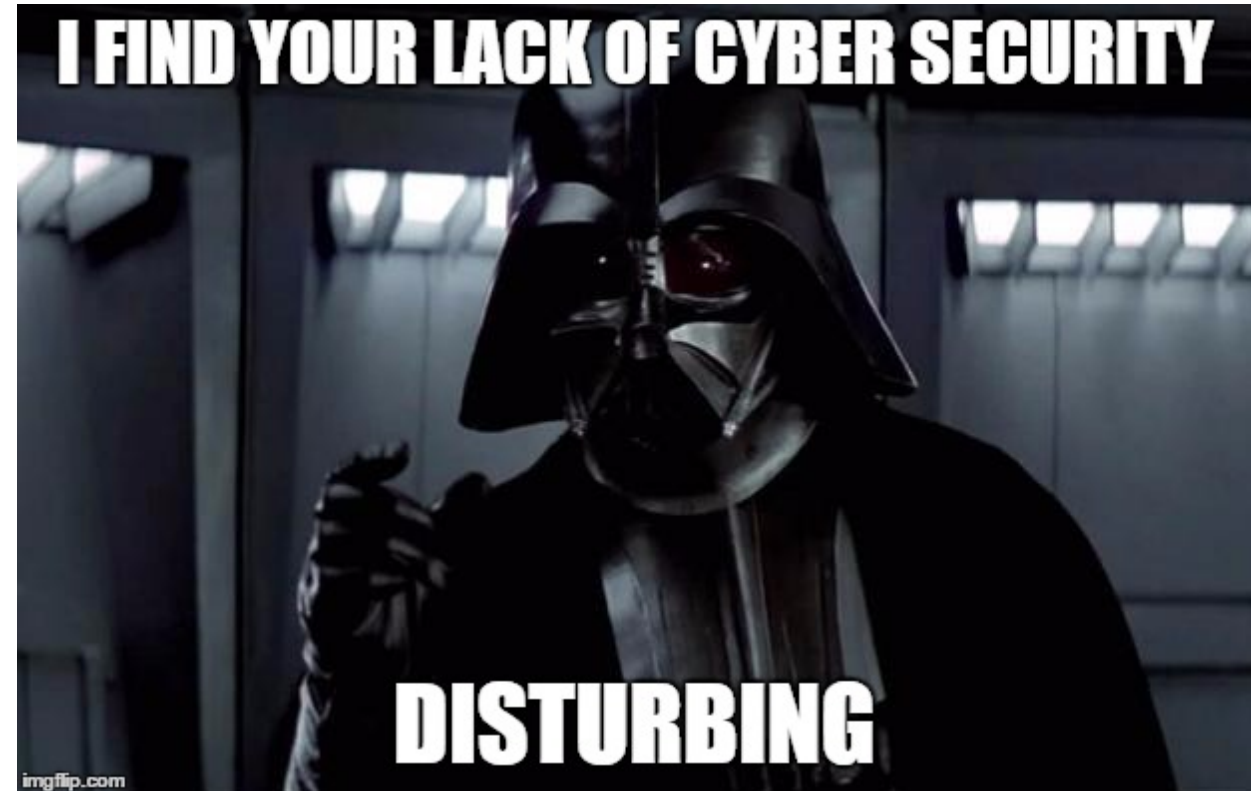- Automation Alley – Technology in Industry Report 2019

WALSH®

Agenda

- Evolving Landscape

- Convergence

- Cyberphysical Systems

- Industry 4.0

- Theoretical Vs Vocational Skill

- Agile Cybersecurity Education - Gaps

https://trushieldinc.com/wp-content/uploads/2015/12/Darth.Vader_.I.Find_.Your_.Lack_.Of_.Cyber_.Security.Disturbing.MEME_1.jpg
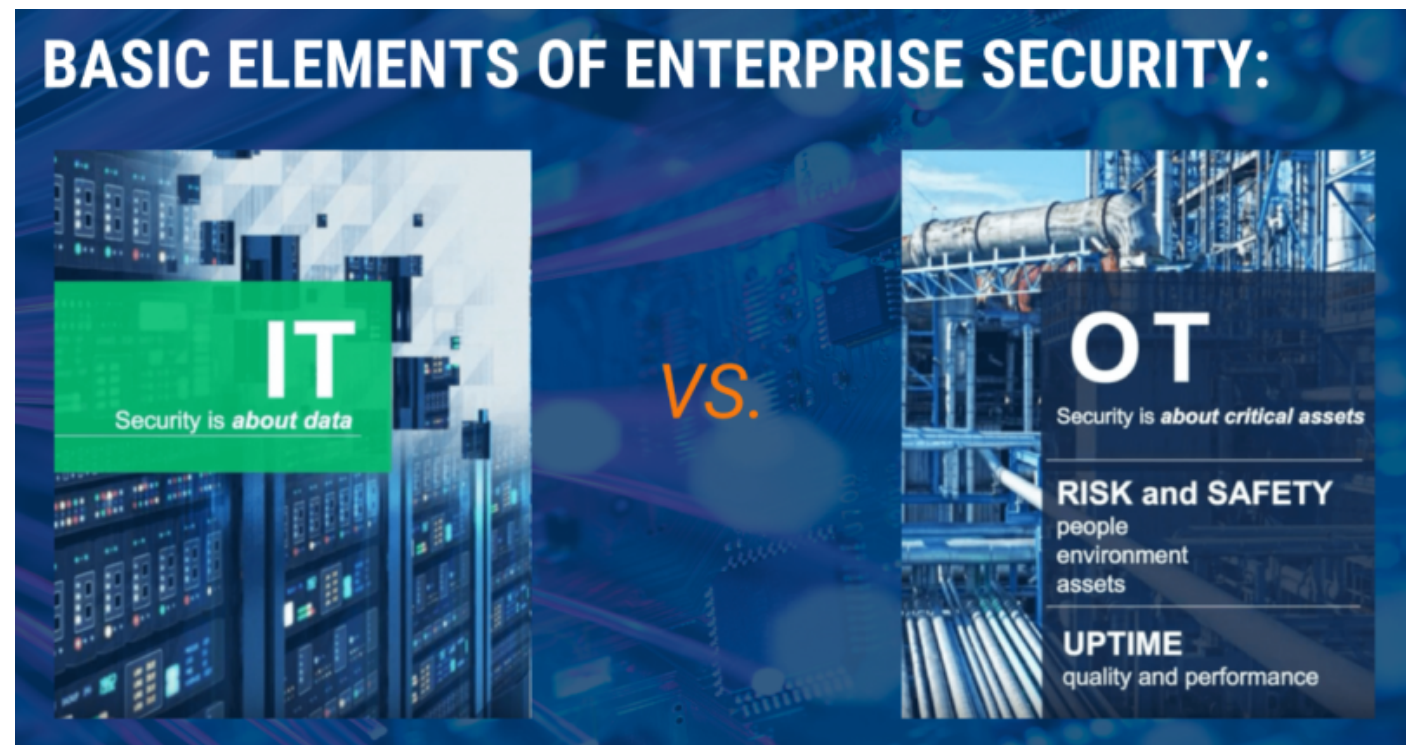
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IT & OT

- Traditional Information Technology
  - Data & Infrastructure Protection
  - Higher Level Knowledge
  - CIA
- Operational Technology –
  - Safety & Operational Availability
  - Deeper Technical Base
  - Involves Engineering Knowledge
  - AIC
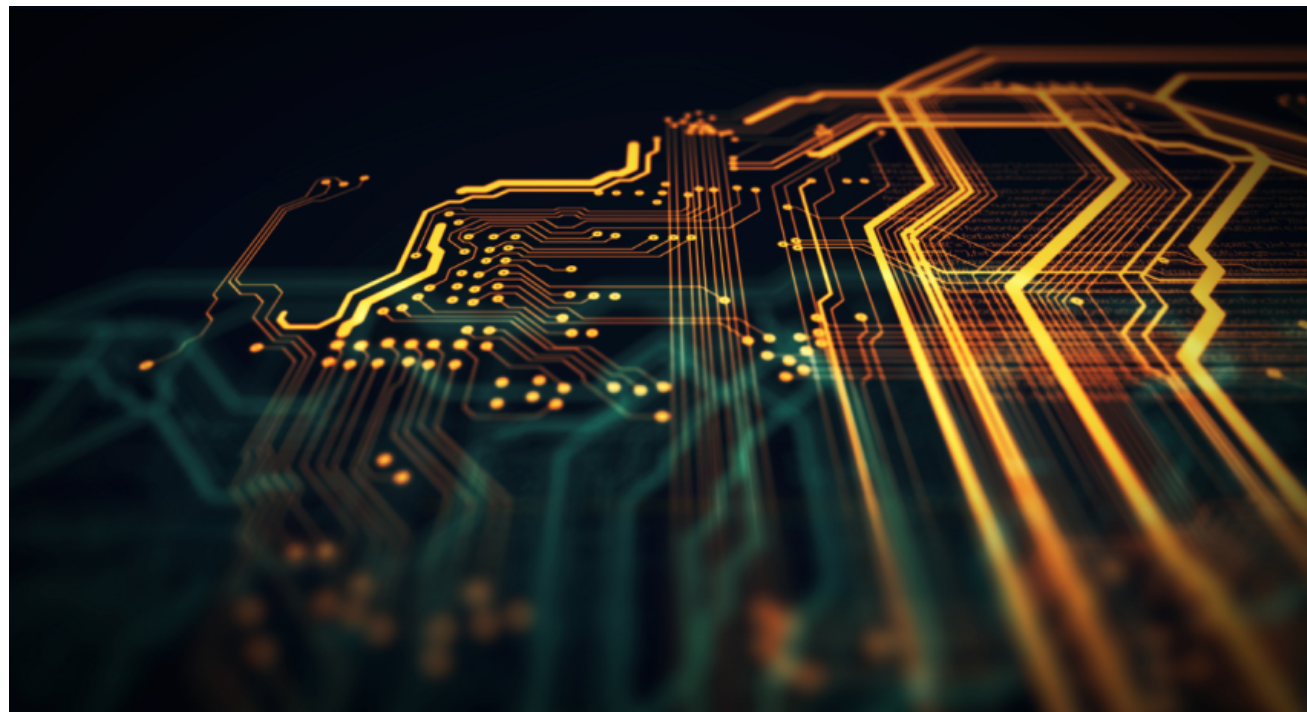- No One in Higher Ed has lived this – How do we teach it?

BASIC ELEMENTS OF ENTERPRISE SECURITY:

IT
Security is *about data*

VS.

OT
Security is *about critical assets*

RISK and SAFETY
people
environment
assets

UPTIME
quality and performance

https://s3.amazonaws.com/cbi-research-portal-uploads/2017/10/30123709/IT-vs-OT-slide-1.png

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Cyberphysical Systems

- Medical
- Smart Grid
- Transportation Technology
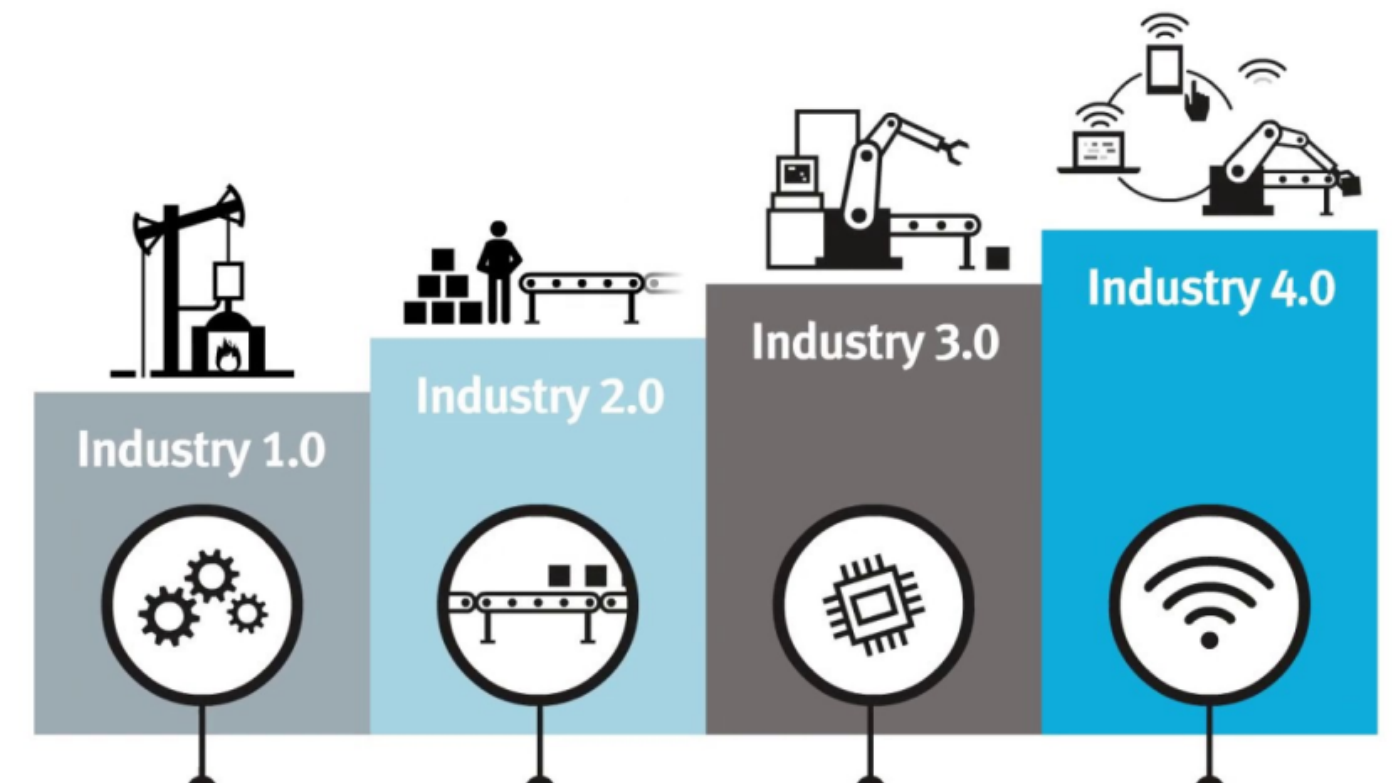- Internet of Things
- Smart Home
- Industrial Internet of Things

https://2xbbhjxc6wk3v21p62t8n4d4-wpengine.netdna-ssl.com/wp-content/uploads/2018/07/567204.jpg

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Industry 4.0

- Automation Alley Technical Report – 2019
  - IT
  - OT
  - IIoT
  - Digital Twin Prototyping
    - Virtual
    - Physical

https://i.ytimg.com/vi/Bo2bu3C6xW8/maxresdefault.jpg

Industry 4.0 – Projected Job Impacts

Table 3: Examples of stable, new and redundant roles, all industries

Stable Roles	New Roles	Redundant Roles
Managing Directors and Chief Executives	Data Analysts and Scientists*	Data Entry Clerks
General and Operations Managers*	AI and Machine Learning Specialists	Accounting, Bookkeeping and Payroll Clerks
Software and Applications Developers and Analysts*	General and Operations Managers*	Administrative and Executive Secretaries
Data Analysts and Scientists*	Big Data Specialists	Assembly and Factory Workers
Sales and Marketing Professionals*	Digital Transformation Specialists	Client Information and Customer Service Workers*
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Sales and Marketing Professionals*	Business Services and Administration Managers
	New Technology Specialists	Accountants and Auditors
Human Resources Specialists	Organizational Development Specialists*	Material-Recording and Stock-Keeping Clerks
Financial and Investment Advisers	Software and Applications Developers and Analysts*	General and Operations Managers*
Database and Network Professionals	Information Technology Services	Postal Service Clerks
Supply Chain and Logistics Specialists	Process Automation Specialists	Financial Analysts
Risk Management Specialists	Innovation Professionals	Cashiers and Ticket Clerks
Information Security Analysts*	Information Security Analysts*	Mechanics and Machinery Repairers
Management and Organization Analysts	Ecommerce and Social Media Specialists	Telemarketers
Electrotechnology Engineers	User Experience and Human-Machine Interaction Designers	Electronics and Telecommunications Installers and Repairers
Organizational Development Specialists*	Training and Development Specialists	Bank Tellers and Related Clerks
Chemical Processing Plant Operators	Robotics Specialists and Engineers	Car, Van and Motorcycle Drivers
University and Higher Education Teachers	People and Culture Specialists	Sales and Purchasing Agents and Brokers
Compliance Officers	Client Information and Customer Service Workers*	Door-To-Door Sales Workers, News and Street Vendors, and Related Workers
Energy and Petroleum Engineers	Service and Solutions Designers	Statistical, Finance and Insurance Clerks
Robotics Specialists and Engineers	Digital Marketing and Strategy Specialists	Lawyers
Petroleum and Natural Gas Refining Plant Operators		

Source: Future of Jobs Survey 2018, World Economic Forum.
Note: Roles marked with * appear across multiple columns. This reflects the fact that they might be seeing stable or declining demand across one industry but be in demand in another.

https://martechtoday.com/wp-content/uploads/cld-assets/convergence-definition-ss-1920_gyf6b0.png

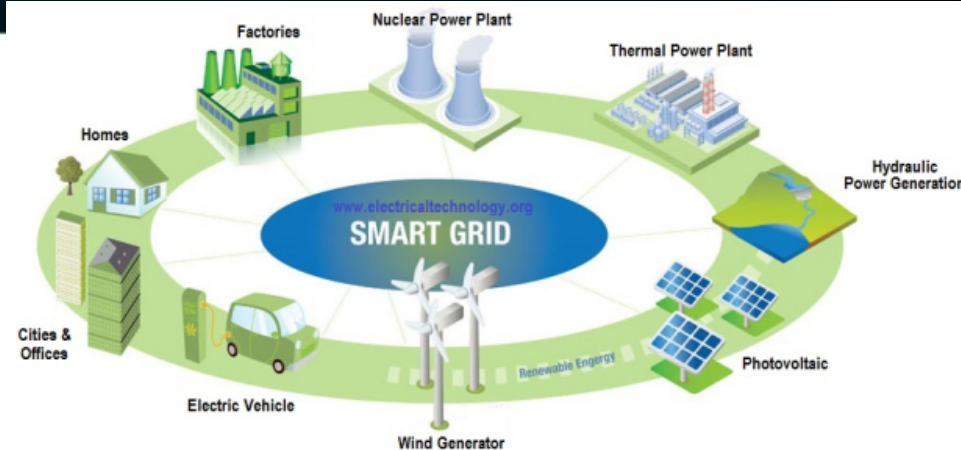https://media.npr.org/assets/img/2016/02/09/medical-devices_custom-6b65e1beaefea49e8fd74e316f963186f28e780d-s800-c85.jpg
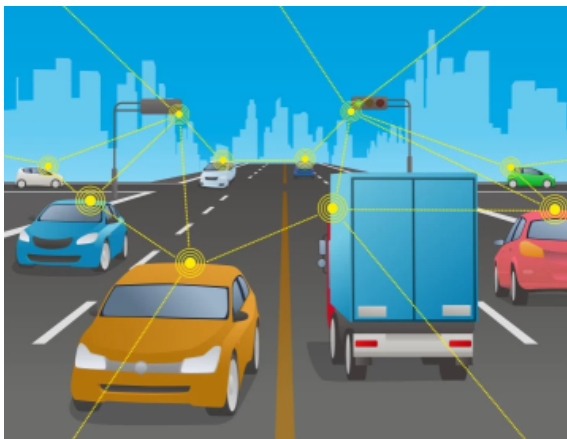
https://073bddbe7aa062defd37fde3-cwzdvdpfea.netdna-ssl.com/wp-content/uploads/2017/05/cloud-computing-logistics-2017-1000x640.jpg

https://www.electricaltechnology.org/wp-content/uploads/2015/05/What-Things-Make-a-Grid-Smart-and-their-operation.jpg

https://techcrunch.com/wp-content/uploads/2016/05/internetcars.jpg?w=730&crop=1

https://2hifsb3xmftr3n8l231c0a4t-wpengine.netdna-ssl.com/wp-content/uploads/2018/01/1-Header-image.jpg

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Convergence

https://regmedia.co.uk/2017/04/24/shutterstock_virtual_reality.jpg?x=1200&y=794

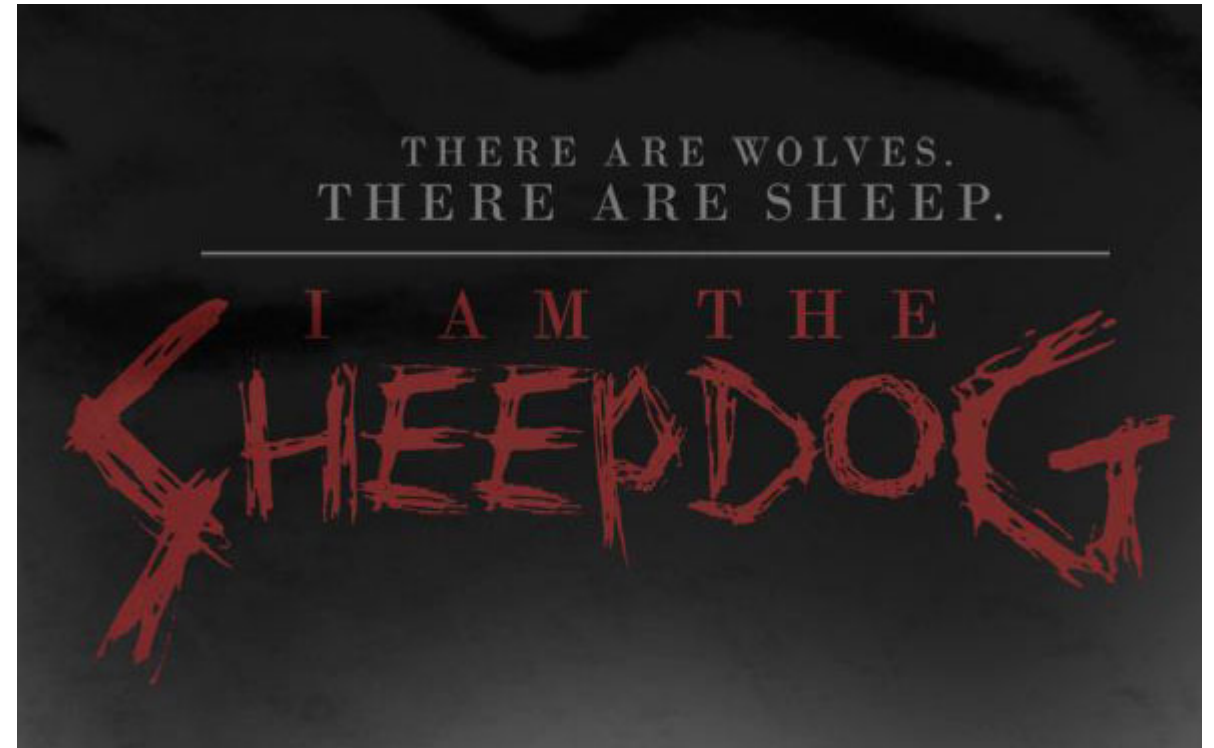https://i.ytimg.com/vi/EI7veb6PuqA/maxresdefault.jpg

- Physical

- Virtual

https://s3-eu-central-1.amazonaws.com/centaur-wp/theengineer/prod/content/uploads/2019/03/26153025/cobot.jpg

Cybersecurity - Convergence

- This isn't just protecting data and IT Assets

- This is protecting lives/our way of life

http://site.lapolicegear.com/blog3/wp-content/uploads/2012/03/n9.jpg

No Degree Needed

Requirement?

- Hiring Criteria -

In 2017, IBM's vice president of talent Joanna Daley told CNBC Make It that about 15 percent of her company's U.S. hires don't have a four-year degree. She said that instead of looking exclusively at candidates who went to college, IBM now looks at candidates who have hands-on experience via a coding boot camp or an industry-related vocational class.

https://www.cnbc.com/2018/08/16/15-companies-that-no-longer-require-employees-to-have-a-college-degree.html

Tales from the Darkside

- Issues Hiring Grads –
  - Long Transition Time
  - Limited Hands On Experience
  - Hands On – Home Brew Tech
  - Enterprise Thinking – Different
- Two Skills Identified –
  - Critical Thinking/Problem Solving
  - Hands On Skill Development

https://i.kym-cdn.com/photos/images/newsfeed/000/954/924/bd1.jpg

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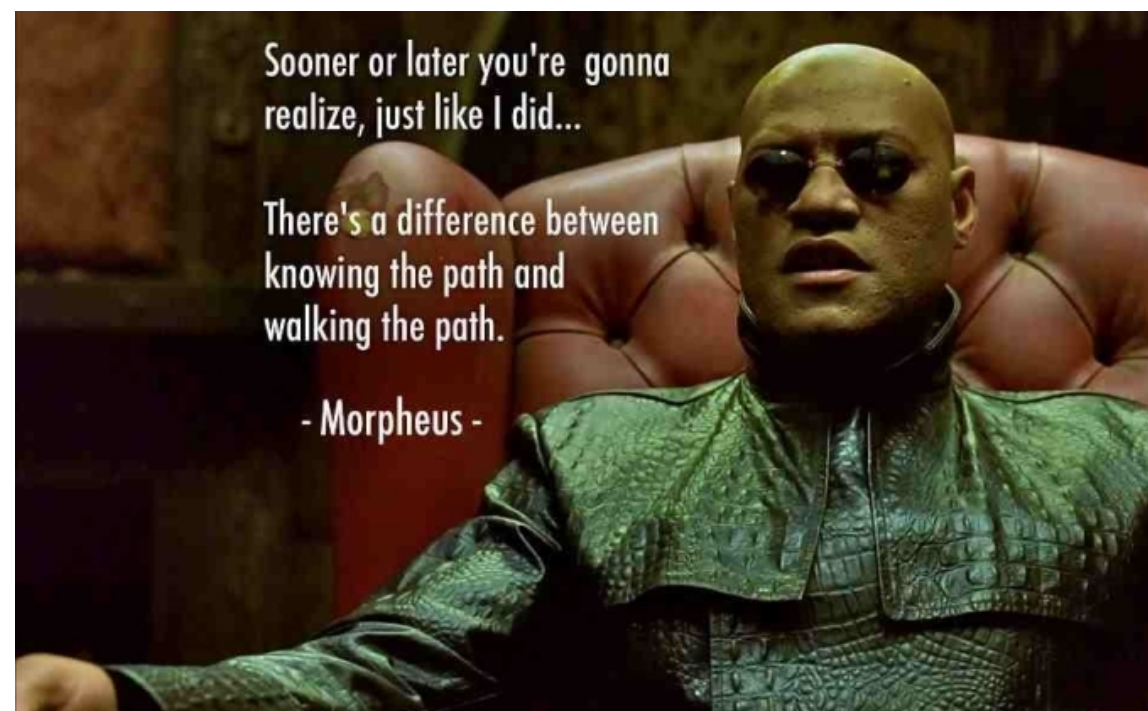Faster than the Speed of Threat:
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Cybersecurity Education

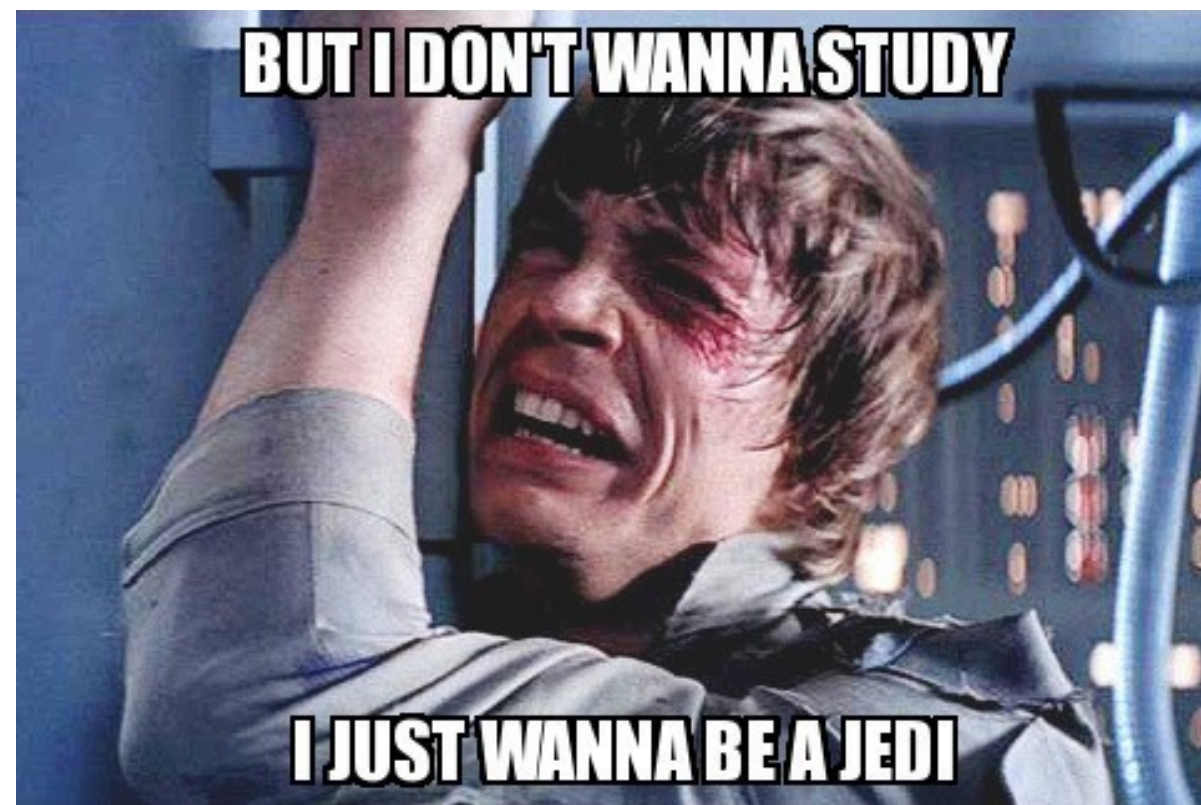- Theoretical Knowledge
  – Theory Comprehension
  – Subject Relationships
  – Management of Cyber

- Vocational/Hands On Knowledge
  – Technical Skill Development
  – Deeper Comprehension of Theory!=Computer Science
  – NSA CAE Requirements
  – Force on Force Attack/Defend

http://3.bp.blogspot.com/-
U4aLI5XZYuA/UQLak2inNcl/AAAAAAAAAhY/qKNXUWp2Nec/s1600/148306_558632520831111_426815750_n.jpg

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Higher Education Considerations

- Test Out – Industry Answer -
  - Drill Based Skills Training
    - Basic Skill Development
    - Massive Gaps
      - Critical Thinking
      - Problem Solving Ability
- Vocational Skill –
  - Problems Occur
  - Troubleshooting
  - Critical Thinking
- How do you draw correlations about divergent subject matter/concepts if you've never been exposed to them?


http://www.jediliving.com/365jedi/wp-content/uploads/2015/02/frabz-But-I-dont-wanna-study-i-just-wanna-be-a-jedi-c710a8-300x211.jpg

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Automotive Cybersecurity

- Industry Approach– Level Up:

  - Cybersecurity Professionals

  - Engineering Professionals

- Educational Approach -

  - Engineering Degree

  - Add-on Cybersecurity Class/Certification

- Industry Backing

  - Intellectual Property

I FIND YOUR ANSWER VAGUE AND UNCONVINCING.

https://imgflip.com/memegenerator/88282844/K2SO
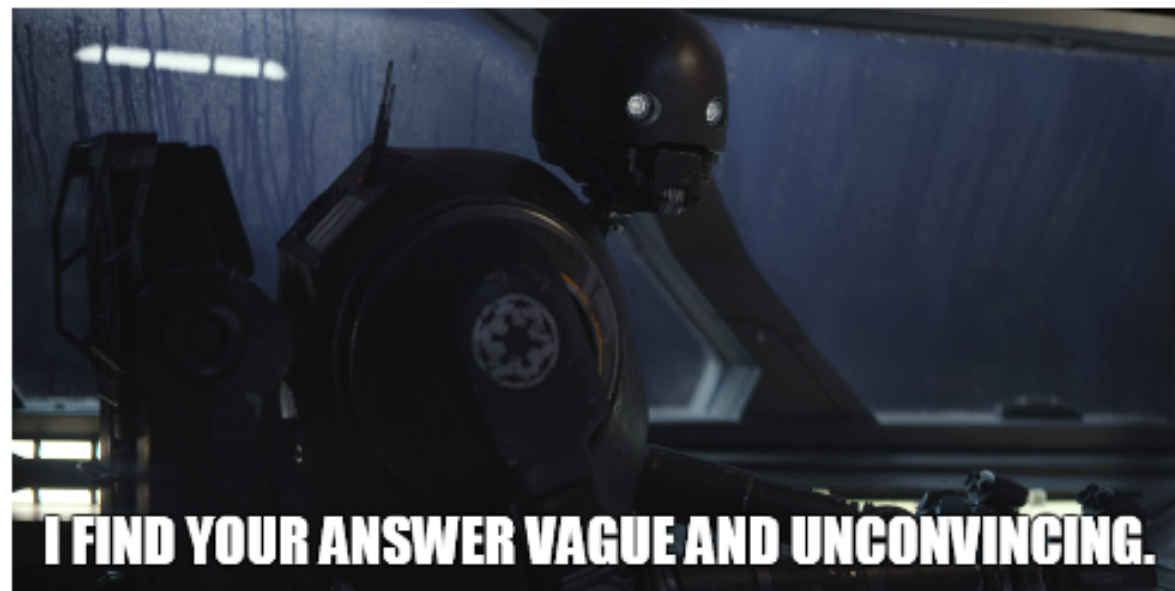
Limiting Factors – Agile Education

- Faculty Unions

- Accreditation Bodies

- Academic Administration

https://www.staples-3p.com/s7/is/image/Staples/sp36619013_sc7?wid=512&hei=512

Cybersecurity Landscape Demands

- Convergence – Complicates Digital Ecosystem

- Theoretical Knowledge != Enough

- Pillared Education != Enough

- Graduates – Degrees for Jobs (!=Exist)

EVERYBODY HAS A PLAN UNTIL THEY GET PUNCHED IN THE MOUTH.

MIKE TYSON

BetterFellow

https://s-media-cache-ak0.pinimg.com/736x/2c/71/7d/2c717d024a5f0b826085ceacb3f79bf1.jpg

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Cybersecurity Education Approaches

- Prepare Students – Total Package
  - Soft Skills - Interpersonal
  - Theoretical – Conceptually Based
  - Vocational – Technical Based
- Merge Disciplines
  - Cybersecurity
  - Engineering
- Core Approaches
  - Critical Thinking
  - Problem Solving/Troubleshooting
  - Adaptive Classes
  - Industry Involvement

I HUNT THE THINGS THAT GO BUMP IN THE NIGHT

THERE ARE WOLVES.
THERE ARE SHEEP.

I AM THE SHEEPDOG

https://lh3.googleusercontent.com/-tDPKLNGIkNg/VVk5It0OqWI/AAAAAAAAgig/bqi8UofN-8U/w800-h800/sheepdogp-35.gif

Questions?

- Email – dschippe@walshcollege.edu
- LinkedIn - https://www.linkedin.com/in/daschippers/

https://i.pinimg.com/236x/c2/68/e4/c268e418f4ff1b79d297125c430b0c88--star-wars -poster-star-wars-episodes.jpg