Restructuring IT Pathways to the Workforce: Ivy Tech’s Computing and Informatics Programs

Michelle Van Noy, PhD: Education and Employment Research Center, Rutgers University, Piscataway, NJ
Matthew Cloud, MS: Ivy Tech Community College, South Bend, IN
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Ivy Tech Locations – Data Centers and Labs

- 32 Campuses
- 20 Campus Upgrades
- 14 Data Centers
Overview

• Restructuring of Ivy Tech’s computing and informatics programs. Attendees will learn about the college’s
  • assessment of student information needs,
  • strategies for developing an information tool for these pathways,
  • how to reach out to employers

• In reference to DOLETA’s Six Key Elements of Career Pathways
Building Bridges

• Creating partnerships across regions and campuses
• Inter agency relationships
• Letters of intent
• Memorandums of Understanding
• Contracts
Who?

- Legislators
- Coordinated Higher Education Board
- Department of Workforce Development
- Workforce Boards
- Department of Labor
- Department of Education
- Employers
- 24 campuses within 14 regions of the State
- Four year colleges/universities
- High schools
- Third-party evaluator at arms-length (Rutgers)
How?

• Advisory Board meeting
• Get Letters of Intent
• Apply for funding to support
• TSAP?
  • Special legislative committee to support transfer
  • First two years transfer in block to four year colleges
• Industry Certifications
• Meetings every 6 months Statewide, Regionally and Locally
• Statewide agreement with local flexibility for industry demands
Initial Design of programs

• Faculty
• Businesses
• Four years – TSAP committees
• Finding a balance between the workforce and academia
• Almost all but Businesses are now different people...
Funding Sources and Policy

• TAACCCT as springboard
• Regional funds from legislation
• Additional grants
• Businesses
• Faculty
• Legislators
Policy and Alignment

• TSAP

• Transfer Single Articulation Pathway
  • Agreement between four year colleges and colleges with two year degrees in Indiana
  • Objectives based, not course based
  • Last two years at any four year public college in Indiana without doing a course by course translation

• Indiana Senate Bill 301
  • DWD produce data on workforce by 6/30/2016
  • Ivy Tech Align to workforce needs
Measure Performance

- Third Party Evaluator – Rutgers
- Department of Workforce Development
- Ivy Tech
- Students
- Employers
- Department of Labor
- Department of Education
- Commission for Higher Education (Indiana)
- Indiana State Legislators
- Surrounding States?
Including industry from the start

• Adjunct faculty
  • Many of our faculty and administration come from industry and start as adjunct faculty.
• Internships for students
• Externships for faculty
• Curriculum development
• Industry Certifications
• Working models of industry in the classroom
What roles in IT are needed?

- Design of 4 programs into 8 programs
- Computer Science
  - Computer Science (Researchers and transfer)
  - Software Development (Software Developers and transfer?)
- Computing Information Systems
  - Informatics (IT Generalist positions applied to 5 different industries and transfer)
  - Database Management and Administration (DBA and transfer?)
- Information Security
  - CyberSecurity/Information Assurance (Cyber Security professionals and transfer?)
- Computing Information Technology
  - Information Technology Support (IT Help Desk)
  - Network Infrastructure (Network analysts and installation)
  - Server Administration (Server Administrators)
What is the role of Four Year Transfer?

• TSAP
• Computer Science to CS BS or BA
• Informatics potential to CS BA and
• Crosswalk of courses with four year colleges
  • Interest the four year colleges in what helps them... (Research)
Welcome to the land of confusion!

• 8 Programs Have
  • 3 AS Degrees
  • 2 AS TSAP Degrees
  • 7 AAS Degrees
  • 7 Technical Certificates (less than a year)
  • 15 Certificate Programs (last count)
  • 22 Industry Certifications embedded (maybe 25 by the end of the month)

• Methods of instruction
  • Traditional
  • Online
  • Hybrids

• Number of courses
  • ~50 Courses
  • 24 campuses
  • >400 implementation styles
TAACCT

• Deployment to 14,000 students throughout Indiana
• Direct Control of IT Labs for Confident Students in Industry
  • Building
    • 14 Data Centers
    • 20-24 Labs
• Faculty Certification Development
• Online Advising Tool
  • Multiple Phases
• Employer Engagement
  • Local/Regional
  • State
  • IT Competition
• DWD Engagement
Raised Floors
Business involvement

• Annual Statewide IT Advisory Board meetings
• Quarterly/Semi-annual Regional IT Advisory Board
Faculty Development

• Training
  • Industry Certification and Partnership
    • Cisco
    • Microsoft
    • Linux
    • Java
    • CompTIA+
    • Contracts to retain employment
      • Expectation of partnership and breeding loyalty

• Other Development
  • Master Teacher
  • Faculty Paid Externships – Summer
    • Download of class of 8-10 hrs/wk in industry such as Wintek
  • Sabbatical
  • Research
Phases of Advising

• Advising successful partnerships with faculty and students
• Turn into a tool for state-wide use
• Build upon
  • Students
  • Faculty
  • Advisors
  • Businesses
Simplification

• Core courses
• Separate Certifications
• Reduce Courses/Credentials not used
• Add Flexibility for regions/campuses
Difficulties to overcome

• Advising on Programs for each campus
  • Difficulties faced on web site
  • [https://www.ivytech.edu/computers/index.html](https://www.ivytech.edu/computers/index.html)
  • Overcome with student internships
  • [https://bobbi.ivytech.edu/~pkeating/CPIN%20Online%20Tool/campuses.php](https://bobbi.ivytech.edu/~pkeating/CPIN%20Online%20Tool/campuses.php)

• Active Advisory Board on a regional/local basis

• Collecting data
  • Internally
  • Employment
  • Industry Certifications
Measuring System Change and Performance

• Traditional
  • Degrees
  • Completing in less than 2 years
  • Transfer after completion

• New Models
  • Degrees, Certificates and Industry Certifications
    • ?% Already have an AS degree or higher
  • Meeting students expected timelines
    • 50% are part time students
    • 51% are incumbent workers
  • Increase in pay after enrollment
  • Employment after credential completion
  • Employment after one course?

• Baseline evaluation data to inform on-going implementation
What is important to students in selecting a program?

Percent of CPIN Students Rating Factor as Important or Extremely Important

- Ability to obtain an industry certification: 37% Important, 52% Extremely Important
- Ability to get a well-paying, stable job: 23% Important, 76% Extremely Important
- Opportunity to have a hands-on learning experience: 33% Important, 58% Extremely Important
- Availability of online/distance learning options: 32% Important, 46% Extremely Important
- Ability to complete the program in less than one year: 20% Important, 11% Extremely Important
- Ability to obtain an associate degree: 22% Important, 71% Extremely Important
- Ability to transfer to a four-year degree: 21% Important, 54% Extremely Important
- Math requirement does not include Algebra: 22% Important, 9% Extremely Important
- Math requirement does not include Calculus: 30% Important, 21% Extremely Important

Source: Rutgers’ CPIN Student Survey
Information needs - academics

Percent CPIN Students Reporting More Information Was Needed

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difference between programs</td>
<td>64%</td>
</tr>
<tr>
<td>Math requirements</td>
<td>31%</td>
</tr>
<tr>
<td>Best classes to take together</td>
<td>63%</td>
</tr>
<tr>
<td>Best order to take program courses</td>
<td>63%</td>
</tr>
<tr>
<td>How to transfer to a four-year degree program</td>
<td>54%</td>
</tr>
</tbody>
</table>

Source: Rutgers’ CPIN Student Survey
Information needs - career

Percent of CPIN Students Reporting More Information Was Needed

- 58% for Specific jobs/careers associated with programs
- 62% for Skills required in different jobs/careers
- 59% for Earnings associated with different jobs/careers

Source: Rutgers’ CPIN Student Survey
Students’ current information sources - academics

Source: Rutgers’ CPIN Student Survey
Students’ current information sources - careers

Percent of Students Reporting Use

Source: Rutgers’ CPIN Student Survey
<table>
<thead>
<tr>
<th>Faculty views on advising tool information</th>
<th>Percent reporting item as “most useful”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information on programs, course requirements, and course descriptions</td>
<td>49</td>
</tr>
<tr>
<td>Maps of recommended sequences of course-taking</td>
<td>26</td>
</tr>
<tr>
<td>Short videos on jobs/careers associated with particular programs</td>
<td>8</td>
</tr>
<tr>
<td>Descriptions of a day in the life of a particular job/career</td>
<td>8</td>
</tr>
<tr>
<td>None—I’m not sure an online advising tool would be useful</td>
<td>3</td>
</tr>
<tr>
<td>Earnings associated with jobs/careers</td>
<td>0</td>
</tr>
<tr>
<td>Links to websites with information on jobs/careers</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Rutgers’ CPIN Faculty Survey
Faculty involvement with industry

Percent of Faculty Reporting Involvement

- Any employer involvement: 68%
- Pass on job opportunities to students: 58%
- Receive feedback from employers about skills they seek: 42%
- Refer students for internships: 37%
- Help employers identify strong candidates for job openings: 31%
- Invite employers into my classes to speak to students: 30%
- Coordinate with employers for students to visit job sites: 25%
- Attend regular meetings with employers in the industry: 24%

Source: Rutgers’ CPIN Faculty Survey
## Faculty reasons for industry engagement

<table>
<thead>
<tr>
<th>Type of Engagement</th>
<th>Percent Rating as Most Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employer input about skills sought in potential employees</td>
<td>39</td>
</tr>
<tr>
<td>Internships for students</td>
<td>27</td>
</tr>
<tr>
<td>Employers as guest speakers in classes</td>
<td>18</td>
</tr>
<tr>
<td>Job shadowing/visits to job sites for students</td>
<td>11</td>
</tr>
<tr>
<td>Share information on job opportunities with students</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Rutgers’ CPIN Faculty Survey
Advising Tool Phases

1. What programs? Where? How?
2. Videos on programs
3. Describing programs to jobs and interrelationship (in-progress)
Phase 1 - (2015)

School of Computing and Informatics

Programs by Campus  Programs Index

Math
Math 123  Quantitative Reasoning  AS
Math 136  College Algebra  AS
Math 211 & 212  Calculus I & II  AS

SDEV  Software Development  AAS/TC
DBMS  Database Management  AAS/TC
INFM  Informatics  AAS/TC
ITSP  Information Technology Support  AAS/TC
SVAD  Server Administration  AAS/TC
NETI  Network Infrastructure  AAS/TC

This is the legend for the colors that are used above:

- Face to Face & Distance Education
- Face to Face
- Distance Education Only
- Not Offered

IVY Tech Community College  South Bend, IN
Phase 1 (Campus Choice)
Phase 2 Advising Tool

• Online Videos
• School completed 5/2016
• Programs completions Spring 2017
• https://www.ivytech.edu/computers/
• https://www.youtube.com/watch?list=PLc2GkMkIlwR-avz_79rP4K7i__Ge3Ky8O&v=Lak5IlyQzL0
Phase 3 (in development)

• Choose a course
• Get the pre/co requisite courses
• Show a new pathway to your credential
• Show the jobs related to the credential
• Show the credentials related to the credential chosen

• Database driven so as the data changes the interface changes
# Academic Roadmap

## Associate of Science in Computer Science

### Computer Science Transfer Single Articulation Pathway Concentration

**Fall Term**

**2016 - 2017**

**Program Code:** CSTP

*The following suggested sequence includes all core requirements for this degree.*

**Transfer General Education Core**

**Fort Hayes**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ENGL 111</td>
<td>English Composition</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>ENGL 111</td>
<td>English Composition</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>ENGL 111</td>
<td>English Composition</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>MATH 211</td>
<td>Calculus I</td>
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<td>A</td>
<td>ENGL 111</td>
<td>English Composition</td>
<td>3</td>
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<tr>
<td>A</td>
<td>ENGL 111</td>
<td>English Composition</td>
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<tr>
<td>A</td>
<td>MATH 211</td>
<td>Calculus I</td>
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<td>A</td>
<td>MATH 211</td>
<td>Calculus I</td>
<td>4</td>
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</table>

### Summer Term

<table>
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<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>2</td>
<td>COMM 101</td>
<td>Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>CBSC 100</td>
<td>Computer Science I</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>ITSP 105</td>
<td>Hardware / Software Support</td>
<td>4</td>
</tr>
<tr>
<td>A</td>
<td>MATH 212</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>A</td>
<td>NSUR 100</td>
<td>Network Communications</td>
<td>3</td>
</tr>
</tbody>
</table>

### Fall Term

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>CBSC 105</td>
<td>Discrete Logic for Computers</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>CBSC 200</td>
<td>Computer Science III</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>SDUV 200</td>
<td>Software Development using Java</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>SDUV 210</td>
<td>Software Development using Visual Basic</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>SDUV 220</td>
<td>Software Development using Python</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>SDUV 240</td>
<td>Software Development using C+</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>BIOL 105</td>
<td>Biology I: Molecular and Cellular Processes</td>
<td>5</td>
</tr>
<tr>
<td>A</td>
<td>PHYS 220</td>
<td>Mechanics</td>
<td>3</td>
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</table>

### Summer Term

<table>
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<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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<tbody>
<tr>
<td>4</td>
<td>ENGR 270</td>
<td>Computing and Information Implementation and Evaluation</td>
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<tr>
<td>A</td>
<td>CBSC 110</td>
<td>Database Systems</td>
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</tr>
<tr>
<td>A</td>
<td>SDUV 153</td>
<td>Web Site Development</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>ENGL 111</td>
<td>English Composition</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>ENGL 111</td>
<td>English Composition</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>BIOL 207</td>
<td>Biology II: Diversity of Life</td>
<td>5</td>
</tr>
<tr>
<td>A</td>
<td>PHYS 221</td>
<td>Heat, Electric and Optics</td>
<td>3</td>
</tr>
</tbody>
</table>
Phase 3 Education to Career Paths

Core IT Curriculum

• Start on one of the Certificate Programs

• Start with a Core Class
  • ITSP 135-Hardware/Software Support (CompTIA A+)
  • INFM 109-Informatics Fundamentals or CSCI 101-Computer Science I*
  • NETI 100 or 105 Network Communications** (Cisco CCENT/CCNA)
  • SDEV 120-Computing Logic (SDEV 153-Web Site Development*)
  • CSIA 105 (CompTIA Security+)
  • SVAD 121 (Windows and Linux Certifications removed)
  • IVYT 111/115 for AAS specific to CPIN programs (Adding IT Pathways materials for 2017)

  • DBMS 110 Removed to make room for certifications

• Course outline of record - https://wwwapps.ivytech.edu/cgi-bin/cor3/gpcourse_list.cgi
Prior Learning Credit from Industry/Professional Certifications by Program - Software

- **CSCI – Computer Science**
  - Java SE7 Programmer I (SDEV 200)/Java Fundamentals (2017) (as of 2016)

- **SDEV – Software Development**
  - Java SE7 Programmer I (SDEV 200)/Java Fundamentals (2017)
  - Android Developer (2017)

- **INFM – Informatics**
  - CompTIA Project+ CPIN 279 and 280

- **DBMS – Database Management**
  - *MTA Database Fundamentals (DBMS 110) (2016)*
  - Oracle SQL Fundamentals (DBMS 130)
  - Oracle Administration I or II (DBMS 150/250)
  - Designing Database Solutions for Microsoft SQL Server 2012 (DBMS 230)
  - Administering Microsoft SQL Server 2012 Databases (DBMS 240)
Prior Learning Credit from Industry/Professional Certifications by Program - Hardware

• ITSP – Information Technology Support
  • CompTIA A+ Exam 1 and 2 (ITSP 135 and 136)
  • CompTIA Mobility+ (ITSP 215 and 216) (through 12/2017)

• CSIA – CyberSecurity/Information Assurance
  • CompTIA Security+ (CSIA 105 and 106)
  • Certified Ethical Hacker (CSIA 225)

• NETI – Network Infrastructure
  • CISCO CCENT (NETI 105, 115, and 116)
  • CISCO CCNA (NETI 105, 115, 205, 215 and ((116 and 216) or (217)))
  • CompTIA Network+ (NETI 105, 115, and 114) (2016)

• SVAD – Server Administration
  • Microsoft Track
    • *Microsoft Configuring Windows 8 and Microsoft Windows Server Administration Fundamentals (SVAD 121) (2016)
    • Installing and Configuring Windows Server 2012 (SVAD 231)
    • Administering Windows Server 2012 (SVAD 236)
    • Configuring Advanced Windows Server 2012 Services (SVAD 241)
    • Designing and Implementing a Server Infrastructure (SVAD 246)
    • Microsoft Exchange Server 2013 (SVAD 251)
    • Administering and Deploying Systems Center 2012 Configuration (SVAD 253)
    • Microsoft SharePoint Server 2013 (SVAD 256)
  • Linux Track
    • CompTIA Linux+ Exam 1 and 2 (SVAD 116)
    • Advanced Level Linux Certification (SVAD 216)
    • RedHat System Administrator I, II, III (2017?)
Results

- Students getting hired
- Student credentials and timelines?
- Happy employers
- Happy students
- Happy professors
- Happy legislators?
Case Study 1

• Enters CSCI Program 2013 unemployed as teen
• Develops Resume and Cover letter for ideal job in CSCI 202 1/2015
• Develops computing project in class towards job 5/2005
• Project results in job offer as a software developer at a startup firm in 11/2015
• CSCI AS Degree conferred 12/2015
Case Study 2

- Elder student enters homeless and so long ago he took Defense Against the Dark Arts
- Implements Data Center design at South Bend campus 7-9/2015
- Develops Advising Tool Phase 1: 8-12/2015 with team of three students in Indiana and Florida
- Graduates 12/2015
- Reenrolls in new program 1/2016
- Internship at AM General 6/2016
Case Study: 3

• Entered on Fall 2014 unemployed in 30’s
• 8-12/2015 In charge of building data center in Bloomington results in
  • Part time internship at Smithville Fiber
• Pass Cisco CCENT Exam (3/2016) results in
  • Full-time employment at Smithville Fiber (4/2016)
• Selected for Cisco Dream Team (6/2016) results in
  • Multiple offers from Smithville Fiber for advanced position
• Passes Cisco CCNA (9/2016) results in
  • Multiple offers from Smithville Fiber and Cisco
• Completes AAS Degree Fall 2016 results in
  • Offers from Ivy Tech?
Early Outcomes

• Increased wages for 50% of the employed students with the first two quarters (over 2,000 students)

• New program hires officially are low
  • However, official data is delayed 6 months

• Qualitatively students are reporting
  • Increased Confidence in Skills
  • Increased Employment
  • Increased Internships
  • Increased Employer involvement at all levels throughout the state
  • Increased
Early Outcomes

• Higher than expected number of participants
  • 7,000 estimated for the first year
  • 8,542 in the first year

• Consortium of 60 employers in NW wanting us to build a new data center
More data to come...

• Evaluation includes:
  • Quasi-experimental analysis of student outcomes
  • Additional surveys of students and faculty
  • Surveys of advisors
  • Surveys and interviews with employers
  • Site visits to additional campuses
Thank you!

• Staff, Faculty and Students of Ivy Tech Community College
• Staff and Faculty of Rutgers University
• Department of Labor TAACCCT Grant Round 4

For more information, contact:
Matthew Cloud, mcloud3@ivytech.edu
Michelle Van Noy, mvannoy@rutgers.edu