1 Grant + 2 Institutions + 3 Course Variations = Data Science 4 All

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Darina Dicheva, Christo Dichev - Winston Salem State University

### 2 Institutions, 3 Course Variations

**Student Demographics**

<table>
<thead>
<tr>
<th>Institution</th>
<th>Freshmen</th>
<th>Sophomores</th>
<th>Juniors</th>
<th>Seniors</th>
</tr>
</thead>
<tbody>
<tr>
<td>WSSU</td>
<td>39%</td>
<td>11%</td>
<td>17%</td>
<td>39%</td>
</tr>
<tr>
<td>Villanova</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Curriculum**

- **WSSU**
  - Courses: Data Science, Statistics, Computer Science
  - Focus: Data Management, Machine Learning, Statistics
  - Prerequisites: Calculus, Programming

- **Villanova**
  - Courses: Data Science, Business Analytics, Statistics
  - Focus: Data Analysis, Predictive Analytics, Data Visualization
  - Prerequisites: Calculus, Programming

**Effects of the Course**

- **WSSU**
  - Increased interest in Data Science
  - Improved statistical skills

- **Villanova**
  - Improved problem-solving skills
  - Increased confidence in data analysis

### Attitudinal Surveys (Comparing Courses and Student Growth)

**WSSU**

<table>
<thead>
<tr>
<th>Attitudinal Questions</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS will boost my professional standing</td>
<td>4.2</td>
<td>4.5</td>
</tr>
<tr>
<td>DS will help me make more employable</td>
<td>4.0</td>
<td>4.3</td>
</tr>
<tr>
<td>DS is not suitable to the typical professional</td>
<td>2.6</td>
<td>2.0</td>
</tr>
<tr>
<td>DS is not applicable to my life outside my job</td>
<td>3.6</td>
<td>3.2</td>
</tr>
<tr>
<td>I can use DS every single day</td>
<td>3.0</td>
<td>3.4</td>
</tr>
<tr>
<td>I will have no application for DS in my profession</td>
<td>2.0</td>
<td>1.8</td>
</tr>
<tr>
<td>DS is not important to my life</td>
<td>3.5</td>
<td>3.0</td>
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**Villanova**

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<td>4.7</td>
</tr>
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<td>4.5</td>
</tr>
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<td>3.0</td>
</tr>
</tbody>
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**Achievement of Course Objectives (VU: F16 only)**

<table>
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<tr>
<th>Objective</th>
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### References and Recommendations

- **Curriculum**
  - Balance of programming, statistics, and data science
  - Background skills (programming/stat)
  - Choosing prerequisites
  - Dealing with heterogeneity
  - Important topics / considerations
  - Ethics of data science
  - Use of real-world data

- **Consider where students are going**
  - What went well?
  - Excite students about DS
  - Faculty learned new skills / pedagogy
  - It was fun!

- **Inter-disciplinary collaboration (Stats/CS)**
  - Important conversations
  - Creates stronger programs

- **Challenges**
  - Heterogeneity of backgrounds
  - Prep time
  - Marketing to other disciplines

- **Attitudes differences (DBER)**
  - WSSU - Increase in value of DS & useful of DS to typical professional
  - Diff in DS is professionally useful
  - Low power due to small sample size

- **What next?**
  - Teach more iterations of course (new CS course at VU)
  - More DBER (collaboration? funding?)
  - Design attitudinal survey for DS (NSF proposal submitted)

### Attitudes / Opinions / Recommendations

- **WSSU**
  - Staff and faculty feedback
  - Student feedback

- **Villanova**
  - Staff and faculty feedback
  - Student feedback

### Reflections and Recommendations

- **WSSU**
  - Staff and faculty feedback
  - Student feedback

- **Villanova**
  - Staff and faculty feedback
  - Student feedback

### Staying in Touch...

**Contact Information**

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http://www.wssu.edu/

**Villanova University**

http://www.villanova.edu/