Development and validation of a new survey: Perceptions of Teaching as a Profession PTaP

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Introduction

- Purpose
- Instrument format
- Development and Validation
- Preliminary Results
Purpose

- Grade 7-12 science and math teaching
- Climate of the department as perceived by the students
  - See institutional differences
- Perceptions of the career
  - Intellectual fulfillment, Pay, benefits, high need
- Early identification of potential candidates
- Every student can learn (aka Growth vs. Fixed Mindset)
Research questions

• What differences in department culture and student perceptions about teaching exist among institutions that are more or less successful in preparing large numbers of physics teachers?
• What is the impact of PhysTEC support, measured by longitudinal changes in student attitudes?
Research questions

• What measurable characteristics differentiate students who become teachers from those who do not?

• Do specific interventions, including providing more accurate information about teaching as a profession or participating in an early teaching experience, increase students’ interest in becoming a teacher?
PTaP Format

- Likert scale, suitable for online delivery
- 58 statements plus demographic questions
- 11 empirical categories
- <9 minutes

“My department would be proud if I became a Grade 7-12 teacher.”

“Grade 7-12 teachers can retire comfortably before age 60.”
Development and Validation

• Expert feedback on valuable topics
• Student Interviews
• Large scale data collection Summer 16
• Statistical Analyses
  – Item analysis
  – Factor analysis
• Expert responses collected
• Expert feedback on data, statement revision/deletion and factor naming
Development and Validation

**REPEAT!**

- Student Interviews on new statements
- Large scale data collection Spring 17
- Statistical Analyses
  - Item analysis
  - Factor analysis
- Expert responses collected
- Expert feedback on data and factor naming
Development and Validation

Experts

- PhysTEC Advisory Board (11 faculty and 9 TIRs)

Student Interviews

- 13 UNC students
- 18 Mines students (1 DU, 1 Rice)
- Challenging to draw out negative thoughts about profession
Development and Validation

Large scale data collection

• Summer 2016
  – ~1,000 STEM students from ~15 institutions
• Spring 2017
  – ~800 STEM students from ~12 institutions
• Negative thoughts more freely shared

Item Analysis

– V1 Deleted statements: correlation > 0.5, 90% agreement, no category or differentiation between populations
Development and Validation

Factor Analysis

– Reduced-basis factor analysis
  • Principle Components – initially Direct Oblimin rotation
  • Analyze one category at a time
• V1 - 9 very strong empirical categories.
• V2 – 11 categories
• Categories nearly orthogonal
• More robust than CLASS categories
<table>
<thead>
<tr>
<th>I want to become a grade 7-12 teacher</th>
<th>Neutral</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 777</td>
<td>156</td>
<td>481</td>
<td>140</td>
</tr>
<tr>
<td>Overall (53)</td>
<td>39.4</td>
<td>66.8</td>
<td></td>
</tr>
<tr>
<td>Personal Enjoyment</td>
<td>12.2</td>
<td>87</td>
<td></td>
</tr>
<tr>
<td>As a Career Choice</td>
<td>37.1</td>
<td>75.8</td>
<td></td>
</tr>
<tr>
<td>Support by Others</td>
<td>48.1</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>Department Values &amp; Encourages Teaching</td>
<td>35.5</td>
<td>59.7</td>
<td></td>
</tr>
<tr>
<td>Department Supports Me Teaching</td>
<td>47.2</td>
<td>64.1</td>
<td></td>
</tr>
<tr>
<td>Employee Benefits and Security</td>
<td>29.4</td>
<td>48.4</td>
<td></td>
</tr>
<tr>
<td>Teaching Is Scientific</td>
<td>50.1</td>
<td>80.7</td>
<td></td>
</tr>
<tr>
<td>Nurturer</td>
<td>33</td>
<td>86.5</td>
<td></td>
</tr>
<tr>
<td>Back up Plan</td>
<td>42.1</td>
<td>49.2</td>
<td></td>
</tr>
</tbody>
</table>
## PTaP Results - Version 2

<table>
<thead>
<tr>
<th>Statement</th>
<th>Neutral</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>I want to become a grade 7-12 teacher.</td>
<td>156</td>
<td>481</td>
<td>140</td>
</tr>
<tr>
<td>N = 777</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Students Can Learn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>59%</td>
<td>80%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pursue Teaching Cert at my Institution</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pursue Teaching Cert other route</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would if...</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>179</td>
<td>45</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PTaP Results – Version 2

- Underestimate teacher salaries by ~$10K+
- Overestimate private sector salaries by $10K - $40K
- Don’t think teachers can retire comfortably
- Think teaching would be boring after a year or two

Need to get the facts out!
Category Names – Version 2

• Personal Enjoyment
• As a Career Choice
• Support By Others
• Employee Benefits and Stability
• Teaching Is Scientific
• Nurturer
• All Students Can Learn

• I would if...
  • Department Values and Encourages Teaching
  • My Department Supports Me Teaching
  • Back Up Plan
Conclusion

- PTaP is a new instrument that measures perceptions of teaching as a profession
  - 11 strong categories of student perceptions of the profession
- PTaP finds measurable differences between
  - students who want to become secondary teachers and those who do not
  - institutions
- Identified a major obstacle to recruiting teachers.
  - Inaccurate information about the profession.
Messaging Design

• As a Team we identified a range of misperceptions that we wanted to tackle
• Searched for existing research/surveys/data to support facts countering each misperception.
• Developed a correct statement to counter each misperception. “Did you know...”
Messaging Testing

• Conducted 5 student interviews
• Survey Monkey completed by STEM undergrads and grads and UNC and Mines

1. Did you know… most teaching jobs have better retirement benefits than private industry?
   o This adds to my opinion of teaching.
   o Neutral
   o This subtracts from my opinion of teaching.
Messaging Testing

- Conducted 5 student interviews
- Survey Monkey completed by STEM undergrads and grads and UNC and Mines
  - Adds or subtracts from opinion of teaching
  - Rank messages
Tagline Development

• Compiled taglines from previous projects and existing society resources
• During student interviews for messaging, solicited tagline ideas
• On the end of the messaging Survey Monkey “Suggest a tagline:”
Tagline Testing

• 5 student interviews
• Thumbs up for each tagline

1. Those who can, do. Those who can also inspire, teach!
   – 1, 2 or 3 thumbs up
   – plus a text box for comment.
Tagline Testing

• 5 student interviews
• Thumbs up for each tagline
• Choose your favorite tagline (drop down)
• Choose your second favorite
• Choose your third favorite
Did you know...

- that there are student loan forgiveness programs and scholarships for math and science teachers?
- most teaching jobs have better retirement benefits than private industry?
- You can get a job almost anywhere as a science or math teacher?
- science teachers report having higher overall job satisfaction than other STEM professionals?
- teaching is one of the best ways to work abroad, teaching science or math in an American school?
Messaging Results

• Did you know...
  – teachers are six times more likely to say that they make a difference in people’s lives than other STEM professionals?
  – science teachers report similar or greater levels of intellectual challenge in their jobs compared to other STEM professionals?
  – math and science teachers are in high demand?
  – most people underestimate teachers’ salaries by $10,000-$30,000? Did you know... over 78% of high school science teachers are still in the classroom after 5 years of teaching?
Messaging Results

• Did you know...
  – as a teacher you have opportunities to attend conferences and keep learning?
  – teachers have the option to make $6-$8K each year for coaching, clubs, after school tutoring etc...?
  – about half of all science and math majors report an interest in becoming a teacher?
Taglines

• 2.26 Blow minds. Teach Science
• 2.11 Teaching: Worth it in more ways than you may think.
• 2.03 Those who can inspire, teach!
• 1.9 Be happy. Teach science.
• 1.88 Those who can, do. Those who can also inspire, teach!
• 1.86 What's stopping you from teaching the next generation?
• 1.84 Want to be in demand? Teach math or science.

# is average number of thumbs up
Taglines

• 1.7 Teachers have better work stories
• 1.63 Thinking about teaching science?
• 1.48 It pays to teach!
• 1.4 Teaching is a solid job worth looking at.
• 1.36 Teach now!
• 1.31 Why wait? It pays to teach!

# is average number of thumbs up