Through the eyes of instructors: a phenomenographic investigation of student success

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Outline

• Research question(s)
• Background
• Methodology
• Results
• Discussion
• Conclusions
Research question

What are instructors’ perceptions of student success?
Research question

What do instructors see as the factors affecting student success?
Background

- Success prediction
- Teaching/learning theory
- Phenomenography
Success prediction

- Tests of programming ability
- Correlation with background (particularly mathematics)
- Demographic factors
- …
Teaching/learning theory

Biggs: three kinds of instructors

- What the student is
- What the teacher does
- What the student does…

(Made into a major motion picture: “Teaching teaching and understanding understanding”.)
Teaching/learning theory

• Kansenen: instruction as total process (teaching, studying, and learning)
Methodology

Context: PhICER 2006

- Organizers supply interview script concerning “difficult” topics and strategies for dealing with them
- PhICER participants interview computing instructors, bring transcripts to Canterbury
- At workshop, subgroups form around interesting aspects shown in the transcripts
Methodology (this study)

- “Vertical” analysis: each researcher categorizes success quotes from subset of transcripts
- Group merges categories into one consistent set
- “Horizontal” analysis: each researcher identifies all quotes belonging to one category from all of the transcripts.
- Group negotiates category boundaries and membership.
- Group determines relationship between categories.
Results

- Categories
- Relationships among categories
- Instructor-centric filter
Categories

- Subject
- Intrinsic
- Previous experience
- Attitude/behavior
- Developmental
Subject

• Student success is understood as being influenced by the inherent nature or quality of the subject matter to be learned

• Focus: Nature of subject being taught and how that influences student success

• Dominating aspect: Subject
“Because you know, pointers are less concrete than values. So they don’t always grasp that whole concept of the address... I just think they’re hard to visualize.”

“And what comes to the errors and such, computers are cruel. They expect things to be exact and they just don’t work, will not co-operate with you unless you are pretty exact about telling them to what to do.”
Intrinsic

• Student success is understood as being caused by an intrinsic quality or “magical” ability of the student; something neither the instructor nor student can significantly change.

• Focus:
  Students’ intrinsic attributes and how they connect to success.

• Dominating aspect:
  Student.
Intrinsic

“No, no, there are definitely some students that it just clicks [snaps fingers] with them. They have no trouble at all…quite a few students just have a knack for that.”

“I’m thinking some of these top students, you know, I could hand them the book and disappear, and they would figure it out…they’d be learning pretty much in any environment...And then there are some weak students who are not making it, and frankly, I’m not sure it would matter who was teaching them...”
Previous Experience

• Student success is understood as being influenced by the amount, quality, or design of preparation before the current course.

• Focus:
  How background knowledge and experience affects success.

• Dominating aspect:
  Student.
“If I remember, it seemed that those that didn’t understand [flow of control] were those that didn’t have prior experience.”

“...what makes things even worse is that they have a priori understanding of what it is because they’ve heard about it through friends, through the media, through whatnot. ... they come with this aggravating factor that biases them very often in the wrong direction.”
Attitude/behavior

• Student success is understood as being influenced by the student’s attitude or behavior

• Focus:
  Student attitudes or behaviors and how they influence student success

• Dominating aspect:
  Student
Attitude/behavior

“I think that students just aren’t always willing to put in the time that it takes. They think that things should come easily…”

“…they might do a simple example and then they might extend it and play around with it… they are the people who do well, because they are interested, inquisitive, and willing to explore”
Developmental

• **Student success is understood** as being a process of developing an understanding, way of thinking, or skill with the instructor’s help

• **Focus:**
  Strategies that the instructor uses to help students succeed

• **Dominating aspect:**
  Instructor and Student
“I think what I should be doing is putting my students in environments where they have the maximum opportunity to learn ... putting them in a context where they can, with the right experiences, learn the things they need to learn.”

“It’s really throwing them in deep water ... Just give them...something giant and let them sink in it, and [to] the ones that are sinking say, ‘See? That’s why we have abstraction.’ ”
Relationships among categories

Developmental

Previous experience
Attitude / behavior

Intrinsic

Subject
Instructor-centric filter

Student success is explained in terms of instructor’s abilities and experience

• instructor’s current abilities and experience, or

• instructor’s abilities and experiences as a student
Instructor-centric filter

“…things that are so ingrained in us, we don’t realize that they can have trouble with just the idea that the sequential execution of an algorithm or a method, or an assignment statement.”

“I enjoyed it a lot more when it was engaged like that, and very often it’s fun to see the students after a while start to enjoy the game … But it’s based on my personal bias and subjectivity as to what I think is most effective for me”
Discussion

- Categories and success literature
- Categories and educational theories
- Trustworthiness
Categories and success literature

• **Subject**—some studies exist, tied to particular approaches

• **Intrinsic**—lots of studies, demographic (esp. gender), also cognitive testing, learning styles, spatial skills

• **Previous experience**—lots of studies, things like math courses and programming
Categories and success literature

• Attitude/behavior—some studies consider things like comfort level, self-efficacy, and metacognitive strategies

• Developmental—little focus on instructor attributes
### Categories and Biggs

<table>
<thead>
<tr>
<th>Subject</th>
<th>Biggs</th>
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<tbody>
<tr>
<td>Intrinsic</td>
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<tr>
<td>Previous Experience</td>
<td>Level 1</td>
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<tr>
<td>Attitude/ behavior</td>
<td>Level 2</td>
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<tr>
<td>Developmental</td>
<td>Level 3</td>
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This study
Categories and Kansenen

Our categories emphasize different parts of the triangle

Instructor

Subject

Students

Studying / learning
## Categories and Kansenen

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<thead>
<tr>
<th><strong>This study</strong></th>
<th><strong>Kansenen</strong></th>
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<tbody>
<tr>
<td>Subject</td>
<td>Subject</td>
</tr>
<tr>
<td>Intrinsic</td>
<td>Student</td>
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<tr>
<td>Previous Experience</td>
<td>Student, plus</td>
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<td>Student-Subject link</td>
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<tr>
<td>Developmental</td>
<td>Instructor-Student link</td>
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<td>plus “Didactic” link</td>
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<td>(Instructor-&gt;(St-Su))</td>
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Trustworthiness

- Subjects represent variety of countries, ages, genders, courses taught
- Coder reliability (Åkerlind, 2005)
- Dialogic reliability (ibid.)
However ...

Structure of study somewhat unusual

- Different interview styles, languages
- Interview focus broader than research question: phenomenon is teaching topics students find difficult, question is how they succeed or fail
Conclusions

- Studying instructors offers another perspective on students and student learning

- Phenomenography is a reasonable way to elicit the different instructor perceptions of students’ attributes and experiences

- These categories provide a way for instructors to reflect on their perceptions of student success.
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