Perceptions of Teaching Aims in Physics

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Main Objective

What do both students and staff perceive as the main aims of the teaching and learning process?
Teaching Aims

Aims Influence Learning Outcome

The perception of teaching aims and the learning process can influence a student's approach to learning, consequently affecting the quality of their learning outcome.

(Trigwell, 1999)
Learning Approaches

**Surface**
- Deal with "external impositions"
- Practical motivation
- Students try to complete task with minimal effort.
- Study without considering the wider context
- Prioritises memorisation over understanding

(Biggs, 1987)

**Deep**
- Understand ideas and find meaning in the material studied.
- Intrinsic interest in tasks
- Study in the context of the overall topic
- Satisfy curiosity, find the underlying principles

(Biggs, 1987)

*Researchers have shown that students adopting a deep approach to learning have a better quality learning outcome compared to students using a surface approach*  
(Chin and Brown, 2000)
Learning Approaches

What influences a student approaches

- Character and intrinsic motivation (Beattie, 1997)
- Learning environment, perceived workload and quality of teaching (Ramsden 1992)
- Enthusiastic, engaging lecturers that communicate clearly and put content into context (Martin 2019)
- Staff Perception of Teaching Aims (Dall’Alba, 1991; Trigwell, 1999)

Do the staff and student perceptions match?
Survey Design

- Multiple-choice questions require less effort to complete [9 mcq, 1 free text]
- Data analysis is more efficient (using \( R \))
- Easier to compare answers from different groups
- Students: age, gender, year of study, programme of study; staff: years teaching
Data

students: 960 → 289

staff: 143 → 32
Demographic

Student (n=289)

- 1st year: 35.6%
- 2nd year: 25.6%
- 3rd year: 21.8%
- 4th year: 17.0%

Staff (n=32)

- 0-5 years: 18.8%
- 5-10 years: 15.6%
- 10-30 years: 59.4%
- 30+ years: 6.2%
Overall Aims

What do you aim to learn or get out of the university teaching during your degree?

Students

<table>
<thead>
<tr>
<th>Percentage of Student Responses</th>
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</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>Boost potential job prospects and become more employable</td>
<td>18.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10%</td>
<td>Develop transferable skills that can be used in the future</td>
<td>20.3%</td>
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<tr>
<td>20%</td>
<td>Experience the 'university life'</td>
<td>8.1%</td>
<td></td>
<td></td>
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<tr>
<td>30%</td>
<td>Find out about research methods and experiments and their applications in the real world</td>
<td>9.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40%</td>
<td>Learn and understand theories and phenomena in physics</td>
<td>26.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50%</td>
<td>Satisfy my curiosity in physics</td>
<td>17.3%</td>
<td></td>
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Staff

<table>
<thead>
<tr>
<th>Percentage of Staff Responses</th>
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</thead>
<tbody>
<tr>
<td>0%</td>
<td>Boost potential job prospects and become more employable</td>
<td>26.7%</td>
<td></td>
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</tr>
<tr>
<td>10%</td>
<td>Develop transferable skills that can be used in the future</td>
<td>13.3%</td>
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Overall Aims

What do you want to do after finish your physics degree?

**Student**

- Academic research or further studies in another field: 14.2%
- Academic research or further studies in physics (Masters/PhD): 49.5%
- Non-academic career: 26.3%
- Scientific R&D and analysis: 8.0%
- Teaching and other educational activities: 2.1%

**Staff**

- Academic research or further studies in another field: 2%
- Academic research or further studies in physics (Masters/PhD): 38%
- Non-academic career: 38%
- Scientific R&D and analysis: 23%
Teaching Aims

What would you tell a friend who has never done physics if they asked you what your lecturers are teaching you or helping you to develop?
Learning Approaches

How do you currently go about studying physics?

**Student**

- Mixed learning approach: 56%
- Pure deep learning approach: 36%
- Pure surface learning approach: 8%

**Staff**

- Mixed learning approach: 70%
- Pure deep learning approach: 7%
- Pure surface learning approach: 23%
Student and Staff Preferences

What part of teaching is most useful to you?

**Student**
- Example questions with solutions: 20.60%
- Complete course notes: 20.20%
- Exercises and Problem Sheets: 18.20%
- Pre-recorded lectures: 17.10%
- In-person tutorials: 9.50%
- In-person lectures: 8.20%
- Personal feedback: 2.20%
- Books or other suggested further reading: 1.60%
- Non-course resources: 1.30%
- Live Zoom lectures: 1.30%

**Staff**
- In-person lectures: 28.0%
- Exercises and Problem Sheets: 20.0%
- Pre-recorded lectures: 13.0%
- Complete course notes: 11.0%
- In-person tutorials: 10.0%
- Example questions with solutions: 10.0%
- Personal feedback: 4.0%
- Live Zoom lectures: 3.0%
- Books or other suggested further reading: 1.0%
Student and Staff Preferences

What do you think are attributes of a good university lecturer?

![Bar chart showing preferences between students and staff for various attributes of a good university lecturer.](chart.png)
COVID-19

Considering COVID-19 what are you finding difficult with online teaching in general? Where do you think the teaching is lacking?

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>Percentage of Weighted Student Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staying interested and motivated</td>
<td>23.0%</td>
</tr>
<tr>
<td>Engagement and participation during lectures or other online sessions</td>
<td>15.0%</td>
</tr>
<tr>
<td>Too much content to learn</td>
<td>13.0%</td>
</tr>
<tr>
<td>Personal interaction with lecturers</td>
<td>12.0%</td>
</tr>
<tr>
<td>Quality of online and pre-recorded lectures</td>
<td>11.0%</td>
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<tr>
<td>Limited access to facilities (libraries, study spaces etc.)</td>
<td>9.0%</td>
</tr>
<tr>
<td>Adapting to new environment</td>
<td>6.0%</td>
</tr>
<tr>
<td>Unclear module structure</td>
<td>4.0%</td>
</tr>
<tr>
<td>Not enough learning materials</td>
<td>4.0%</td>
</tr>
<tr>
<td>Technical problems</td>
<td>3.0%</td>
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</tbody>
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Considering COVID-19 what are finding difficult with online teaching in general? Where do you think the teaching is lacking?

Staff

- Engagement and participation during lectures or other online sessions: 37.0%
- Personal interaction with students: 24.0%
- Keeping students interested and motivated: 19.0%
- Adapting to new environment: 6.0%
- Technical problems: 5.0%
- Too much content to teach: 3.0%
- Limited access to facilities (libraries, offices etc.): 3.0%
- Quality of online and pre-recorded lectures: 2.0%
- Unclear module structure: 1.0%
- Not enough learning materials for students: 1.0%
COVID-19

Only considering teaching, do you prefer online or in-person teaching?

**Student**

- In-person teaching: 76.7%
- Online teaching: 23.3%

**Staff**

- In-person teaching: 100.0%
- Online teaching: 33.3%
Conclusion

• Perceptions of teaching aims during the degree is roughly similar for staff and student
• Teaching aims promote a deep approach
• Students use a deep approach to learning
• Students mostly prefer offline resources over face-to-face interactions whereas staff prefer in-person lectures
• A large proportion of students prefer online teaching
• ‘I think the best realistic model in the future is pre-recorded lectures followed by live in-person sessions’
Thank you!

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