What do multidisciplinary, interdisciplinary and trans-disciplinary education mean for an educator in practical terms? What methods and strategies can educators use, what obstacles need to be overcome?
Definitions: multidisciplinary / interdisciplinary / transdisciplinary

Rosenfield [1992], Nicolescu [1999], Klein [2006], Stokols [2006], ...

MD: “… work in parallel or sequentially from disciplinary-specific base to address common problem.”

ID: “… work jointly but still from disciplinary-specific basis to address common problem”.

TD: “… work jointly using shared conceptual framework drawing together disciplinary-specific theories, concepts, and approaches to address common problem.”

[ROS92]
## Map this into practical terms

<table>
<thead>
<tr>
<th>Disciplinarity</th>
<th>Educators</th>
<th>Students</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uni</td>
<td>Typically one.</td>
<td>Same disc.</td>
<td>Educator expands into knowledge of other disciplines as needed for core topics</td>
</tr>
<tr>
<td>Multi</td>
<td>Typically one, other speakers may have guest appearances.</td>
<td>Typically multiple disciplines.</td>
<td>No attempt to synthesize different views for students.</td>
</tr>
<tr>
<td>Inter</td>
<td>Typically one, other speakers will have guest appearances.</td>
<td>Form interdisciplinary groups</td>
<td>Collaboration between students of different disciplines.</td>
</tr>
<tr>
<td>Trans</td>
<td>Several educators share responsibilities, analyze/synthesize with students. Additional speakers possible.</td>
<td>As in inter-. Active part in analyzing/synthesizing views.</td>
<td>Grad level recommended for sufficient depth in own discipline.</td>
</tr>
</tbody>
</table>
Examples of Visualization Courses along the „Continuum“

Creativity and Technology (Domik, University of Paderborn): Computer science, Media studies), EG2006 [Dom05]

Animation Art and Technology (Duesing/Hodgins, Carnegie Mellon University): Computer Science and Art; Siggraph 2004 [DH05]

3D and Immersive Visualization Tools for Learning (Wollensak, Connecticut College): Science, Computer science, Design; Siggraph 2001 [Wol05]
Obstacles

- time required to establish common conceptual ground
- unrealistic expectations from members of other disciplines
- conflicts among alternative disciplinary views of science
- bureaucratic impediments to cross-departmental collaboration
- .....
Methods, Strategies

- Overcome obstacles
  - Improve collaboration between team members
    - Breadth-First: establish common language during lectures
    - Long-Tail education: use passion on topic to connect members of different disciplines
  - Practice in team work: team leaders exhibit interpersonal skills
    - ...

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Prof. Dr. Gitta Domik
Department of Computer Science, University of Paderborn
## Do we gain anything?

<table>
<thead>
<tr>
<th>Disciplinarity</th>
<th>Collaboration</th>
<th>Creativity</th>
<th>Definition/framing of complex problems</th>
<th>Gaining knowledge distributed across disciplines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uni</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Multi</td>
<td>-----</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Inter</td>
<td>✓</td>
<td>✓</td>
<td>(✓)</td>
<td>✓</td>
</tr>
<tr>
<td>Trans</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Where can I get more information?

References

Definitions for Multidisciplinarity, Interdisciplinarity, Transdisciplinarity:


Collaboration:


[DSH08] DiGiano, C., Shao, M.P., House, A: Anticipating Challenges in Interdisciplinary Computing Experiences, (forthcoming), contact authors through digi@computer.org
Visualization Courses listed:


Breadth-First:


Long Tail:


Transdisciplinary Graduate Education:


Thank you for your attention!