



Questions:



Gitta Domik, University of Paderborn, DE

What do multidisciplinary, interdisciplinary and transdisciplinary 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. “

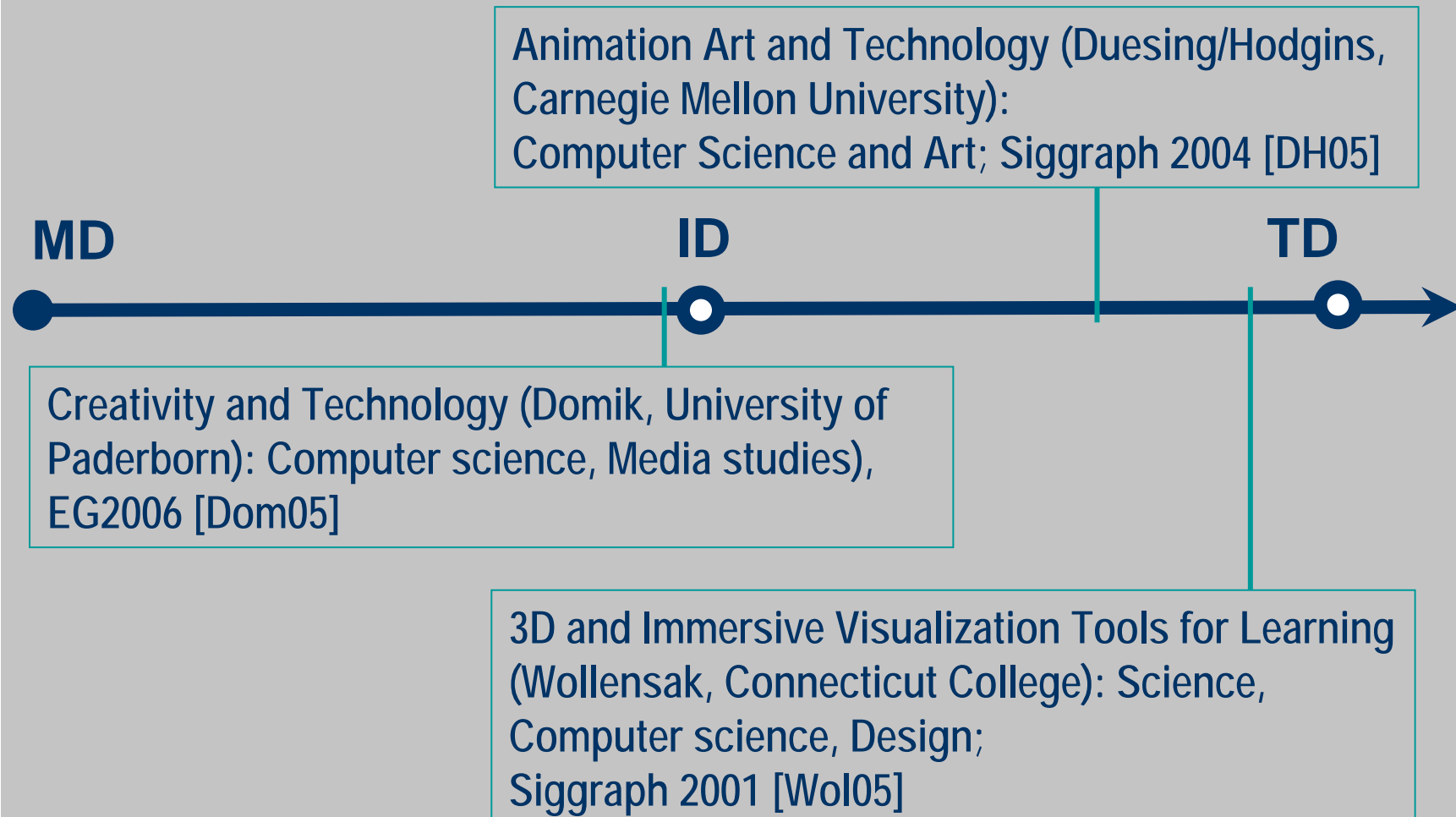
[ROS92]



Map this into practical terms

Discipli- narity	Educators	Students	Comments
Uni	Typically one.	Same disc.	Educator expands into knowledge of other disciplines as needed for core topics
Multi	Typically one, other speakers may have guest appearances.	Typically multiple disciplines.	No attempt to synthesize different views for students.
Inter	Typically one, other speakers will have guest appearances.	Form interdisciplinary groups	Collaboration between students of different disciplines.
Trans	Several educators share responsibilities, analyze/synthesize with students. Additional speakers possible.	As in inter-. Active part in analyzing/synthesizing views.	Grad level recommended for sufficient depth in own discipline.

Examples of Visualization Courses along the „Continuum“





Obstacles



Stokols [06] on collaboration, DiGiano et al. [DSH08] on ID education

- **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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Do we gain anything?

Discipli- narity	Colla- boration	Crea- tivity	Definition/ framing of complex problems	Gaining knowledge distributed across disciplines
Uni	-----		-----	-----
Multi	-----			✓
Inter	✓	✓	(✓)	✓
Trans	✓	✓	✓	✓



Where can I get more information?



References

Definitions for Multidisciplinarity, Interdisciplinarity, Transdisciplinarity:

[Kle06] Klein, J. T.: A Platform for a Shared Discourse of Interdisciplinary Education, *Journal of Social Science Education*, Volume 5, Number 2, September 2006, pp 10-18. ISSN 1618-5293, www.jsse.org.

[Nic99] Nicolescu, B.: The transdisciplinary evolution of learning, http://www.unesco.org/education/educprog/lwf/dl/nicolescu_f.pdf, 1999.

[Ros92] Rosenfield, P. L.: The potential of transdisciplinary research for sustaining and extending linkages between the health and social sciences. *Social Sciences and Medicine*, 35: 1343–57, 1992.

Collaboration:

[Sto06] Stokols, D.: Towards a Science of Transdisciplinary Action Research, *American Journal of Community Psychology*, 38: 63-77, 2006.

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



Where can I get more information? (cont.)

Visualization Courses listed:

[DH05] http://wwwcs.upb.de/cs/ag-domik-static/visualisierung/vis-report/curriculum/courses_wv_2005/vis-collab/hodgins/p_hodgins.html

[Dom05] http://wwwcs.upb.de/cs/ag-domik-static/visualisierung/vis-report/curriculum/courses_wv_2005/vis-collab/domik/p_domik.html

[Wol05] http://wwwcs.upb.de/cs/ag-domik-static/visualisierung/vis-report/curriculum/courses_wv_2005/vis-collab/wollensak/p_wollensak.html

Breadth-First:

[DG06] Domik, G., Goetz, F.: A Breadth-First Approach for Teaching Computer Graphics, Education Papers, pp. 1-5. (Eurographics 2006), Vienna, Austria, September 4-8, 2006.

Long Tail:

[And06] Anderson, C.: The Long Tail: Why the Future of Business is Selling Less of More, Publisher Hyperion 2006, ISBN 1401302378.

[Fis07] Fischer, G.: Building New Worlds Together: Meta Design and Social Creativity", Google, Boulder Engineering Open House, November 2007, <http://l3d.cs.colorado.edu/~gerhard/presentations/slides-google2007.pdf>



Where can I get more information? (cont.)

Transdisciplinary Graduate Education:

[DF05] Derry, S. and Fischer, G.: Toward a Model and Theory for Transdisciplinary Graduate Education,, Paper presented at *2005 AERA Annual Meeting, Symposium, "Sociotechnical Design for Lifelong Learning: A Crucial Role for Graduate Education"*, Montreal, April 2005
<http://l3d.cs.colorado.edu/~gerhard/papers/aera-montreal.pdf>.



Thank you for your attention!