



Vienna University of Technology

Software Modeling Education

Challenges and Changes

Martina Seidl, Peter J. Clarke and **Jeff Gray**



Business Informatics Group

Institute of Software Technology and Interactive Systems
Vienna University of Technology

Favoritenstraße 9-11/188-3, 1040 Vienna, Austria

phone: +43 (1) 58801-18804 (secretary), fax: +43 (1) 58801-18896

office@big.tuwien.ac.at, www.big.tuwien.ac.at

MDE / Software Development

- ... promises to deal with the ever increasing complexity of software
- ... substitutes textual coding by graphical modeling
- ... provides powerful abstraction mechanisms
- ... allows the developers to focus on the “relevant problems”

... is ready to go



Modeling education ... ?

Who?
When?
How?
What?
(Why?)



Modeling
Knowledge

**People have to learn that models are more
than pretty pictures!**

What is special about modeling education?

- Modeling is manifold w.r.t.
 - ... requirements on models
 - ... modeling approaches
 - ... modeling languages
- Modeling is not a stable research area
 - ... knowledge on modeling evolves very fast
 - ... each year many exciting ideas emerge
 - ... techniques and ideas are realized in usable tools

What is special about modeling education?

- Modeling requires hands-on experience
 - ... can the academic world simulate practice?
 - ... are the needed tools stable enough?
 - ... just theory is not enough

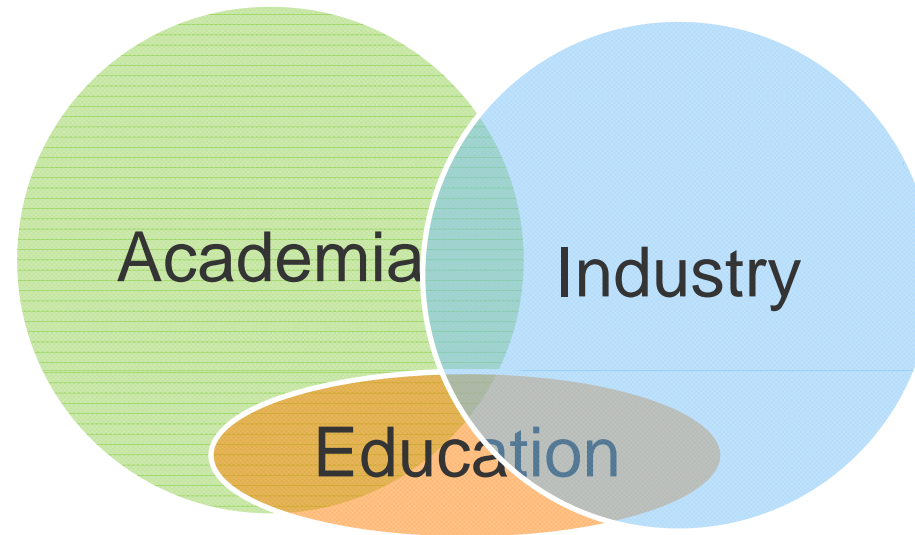
Some obstacles to students

- Modeling often requires a different way of thinking
 - Modeling is not coding
- Sometimes models have to be precise, but sometimes not
 - Models are used in different contexts (i.e., in various phases of the software life cycle)
- Even the modeling languages are ambiguous
 - Semantics is specified by tools or even by applications

Some obstacles to students cont

- Knowledge on model-driven engineering is quite new
 - No textbooks (sometimes only scientific papers are available)
 - No documentation (tool debugging might be necessary to understand a tool)
 - Unstable tool (only research tools are available)

Is there a gap?



Question: How big is the intersection???

→ *research on modeling education*

Some topics

- Introduction of Modeling Languages
- Dealing with Abstractions
- Gaining Practical Experience
- Model-Driven Engineering
- Model Engineering
- ...

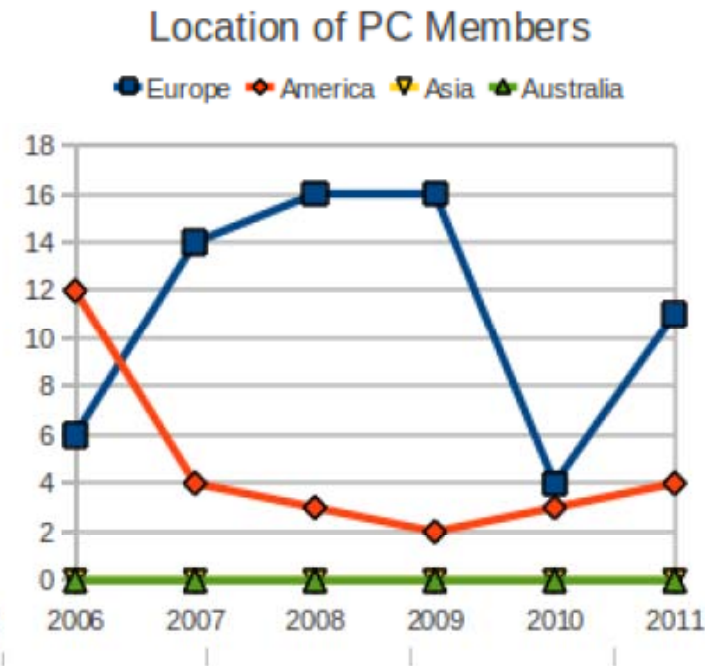
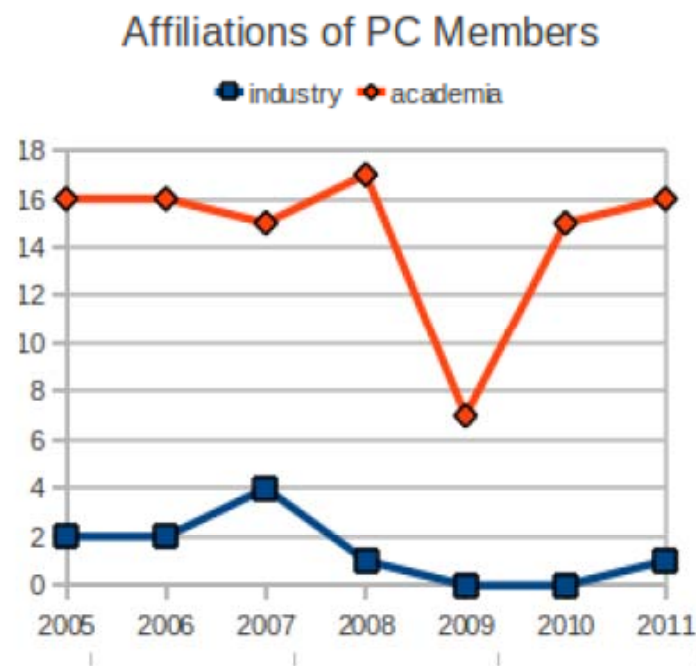
Educators' Symposium

- Goal – modeling educators meet, exchange experiences, and develop new approaches to promoting the MDE paradigm in education.
- Organizers – one or two researchers/educators
 - Organizers for the next symposium identified by the end of this year's symposium
 - Main tasks - preparing and advertising call for papers, selection of PC, coordinating the review process, and finalizing the programme.



Educators' Symposium cont

- Program Committee (PC) – assist with the review process and advertise the symposium.



Educators' Symposium cont

- Topics of papers:

	2005	2007	2008	2009	2010
A: Object-Oriented Modeling and UML	3	1	4	2	3
B: Modeling and Software Engineering	3	1	1	1	1
C: Model Engineering Techniques	0	0	1	1	2
D: Abstraction, Design Patterns, Formal Methods	2	1	0	1	0
E: Research on Modeling Education	1	1	2	0	0
F: Collaboration between Industry and Academia	0	0	1	0	1

- A, B, C – papers on descriptions and experiences on courses and curricula
 - D,E, F – papers on general methodologies and research on modeling education
-



Educators' Symposium cont

- Geographical distribution of authors:

	2005	2007	2008	2009	2010
Europe	3	4	8	4	5
America	5	0	0	1	0
Asia	0	0	1	0	2
Australia	1	0	0	0	0

- Majority of authors from Europe even if the symposium is in a non-European country



... and what is still missing?

- *Promotion* – teaching not considered to have the same impact as research
- *Repository of Teaching Artifacts* – need for good samples of models to be available (ReMODD project France, Cheng et al.)
- *Archival of Knowledge* – ideas and discussions need to be captured from the symposia. Papers need to be extended and published in archival journals e.g., Computer Science Education



... and what is still missing?

- *Dedicated Tool Support* – one of the greatest challenges (1) current tools have little or no documentation, (2) good tools are too expensive
- *Evaluation Criteria* – explicit quality metrics need to be identified in order to evaluate the teaching of models
- *Industrial Commitment* – needs close collaboration with industry to develop “real” student projects



... and what is still missing?

- *Student Involvement* – students should be encourage to attend EduSypm and travel support provided where possible.
- ...



Summary

- Knowledge of good modeling techniques is essential for high quality software
- There is a need for artifacts (tools, books, sample models, etc.) to support pedagogy
- Educators' Symposium continues to be the main venue for modeling educators and trainers
- Challenges identified for software modeling education. How do we address these problems?



Acknowledgements

- This work was supported by the Vienna Science and Technology Fund under grant ICT10-018

