The 8th Educators' Symposium @ MODELS 2012: Software Modeling in Education

Dan Chiorean, Benoit Combemale

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Dan Chiorean
Babes-Bolyai University
Cluj-Napoca, Romania
chiorean@cs.ubbcluj.ro

Benoit Combemale
University of Rennes 1, IRISA
Rennes, France
benoit.combemale@irisa.fr

ABSTRACT

Modeling now plays an important role in software-intensive systems development and evolution. Modeling provides goal-oriented abstractions in all phases of the system lifecycle, which requires deep knowledge on modeling techniques and broad experiences in applying these techniques. The Educators' Symposium is organized annually in the framework of the international conference MODELS for discussing teaching these technologies to software engineers at universities and software industries.

In this paper, we summarize the 8th edition of the Educators' Symposium: EduSymp 2012. First, we remind the general objectives and goals of the Symposium, and we describe the general organization of the 2012 edition (committees, program, statistics, and publication process). Then we introduce the papers selected by the program committee to be presented during the Symposium, and to be published into the proceedings. Finally, we provide a summary of presentations and discussions that occurred during the keynote as well as panel of EduSymp 2012.

Categories and Subject Descriptors

A.0 [**GENERAL**]: Conference Proceedings, K.3.2 [**Computer and Information Science Education**] *Computer science education, Curriculum*

General Terms

Management, Documentation, Design, Human Factors

Keywords

Software Engineering Education, Introductory and Advanced Modeling Courses, successful teaching experiences

1. MOTIVATION AND GOALS

"Modeling of software is becoming a pervasive technique to help software engineers understand, engineer, and communicate aspects of the software to appropriate stakeholders" [2]. However, "...MDE is still in the early adoption phase and to be successfully adopted by industry, it must prove its superiority over other development paradigms and be supported by a rich ecosystem of stable, compatible and standardized tools. It should also not introduce more complexity than it removes" [3].

As Bezivin remarked: "In never-ending Research-Development-Teaching cycles, MDE is now in the position where the teaching question is probably the more acute" [1]. Many students have misconceptions or a superficial impression about modeling: "... they tend to view software modeling with great skepticism" and "... often feel that modeling adds accidental complexity to the software development process as they perceive it" [4].

The rate of success in case of companies that uses MDE techniques is very different from a company to another. Sensible differences in the results obtained in the teaching process were reported by academics in case of using different teaching methods and even when the order of topics introduced or associated was different. A first conclusion of the research presented in [5] is that "... the factors relating to whether new technologies succeed or fail are more often social or organizational rather than technical. This is true as well for MDE ... ".

In this context, offering teachers the opportunity to share both the more or less successful teaching experiences in the framework of MODELS conference became a tradition.

The paper is organized as follow. We give in Section 2 some insights on the organization of the edition 2012 of EduSymp. Then we present in Section 3 the accepted papers included in the post-proceedings as well as some notes in Section 4 on the invited talk and the final panel. Finally we conclude with personal thoughts on the symposium and current trends in the teaching of modeling.

2. ORGANIZATION

Dan Chiorean and Benoit Combemale organized the edition 2012. They were also co-chairs of the Program Committee. Publishing the proceedings by a well recognized international editor and announcing as earlier as possible this symposium edition were among the concerns of organizers. In previous editions the above-mentioned aspects were mentioned as potential factors diminishing the interest of submitting proposals at EduSymp. Organizers are very grateful to the conference general chairs for succeeding to enable the publication of all satellite events post-proceedings in the ACM DL. The symposium website[1] and the call for papers (CfP) was online, quite 10 months before the symposium date. Apart of the symposium site, the CfP was announced by different professional mailing lists (e.g., SEWORLD, pUML, planetmde). Despite the compliance with these "preconditions" the number of submissions received was in our opinion modest. We received 10 abstracts and 9 final papers. Finally 5 of these submissions were accepted (2 full papers and 3 short papers), resulting an acceptance rate of 55%. Each submission was

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[1] Cf. http://edusymp2012.irisa.fr

reviewed by at least three members of the Program Committee. Based on the reviews, the decisions regarding papers acceptance were taken unanimously. Three papers were co-authored by one of the workshop PC members. The review process ensured that the authors had no influence on the acceptance/rejection decision for papers written by them.

In addition to the workshop organizers, the PC consisted of: Colin Atkinson - University of Mannheim, Thomas Baar - University of Applied Sciences Berlin, Marion Brandsteidl - Vienna University of Technology, Bernd Brügge - Technische Universität München, Peter J. Clarke - Florida International University, Birgit Demuth - TU Dresden, Robert B. France - Colorado State University, Martin Gogolla - University of Bremen, Jeff Gray - University of Alabama, Thomas Kühne - Victoria University of Wellington, Ludwik Kuzniarz - Blekinge Institute of Technology, Richard Paige - University of York, Alfonso Pierantonio - Università degli Studi dell'Aquila, Pascal Roques - PRFC France, Bran Selic - University of Toronto, Andreas Winter - Carl von Ossietzky University. The organizers are very grateful to PC members for accepting to do this job in favor of the scientific community and for the quality of their work. In order to increase the interest in this EduSymp, and in conformance with the tradition, just after opening remarks presented by Benoit Combemale, Bernd Bruegge presented an invited keynote talk. Similarly, in the last afternoon session, a panel discussion moderated by Dan Chiorean and having: Colin Atkinson - University of Manheim, Bernd Brügge - Technische Universität München, Jean Michel Bruel -University of Toulouse, Robert B. France - Colorado State University, Jeff Gray - University of Alabama and Bran Selic - Malina Software and University of Toronto as panelists was organized.

3. ACCEPTED PAPERS

The first long paper "Model-Driven Paradigms - The Evolution of a University Course" - was written by László Lengyel and Gergely Mezei from Budapest University of Technology and Economics [7]. It is about a master course entitled Model-Driven Paradigms, grouping topics from the followings domains: Domain-Specific Modeling, Model Processing and Software Methodologies. The topics were organized in 11 themes each having allocated a percent of the whole course. The main objectives of authors were to attain a higher satisfaction of students taking this course and better results at exams. In order to comply with these objectives the percent of different themes was changed, and the obtained results measured. The study was realized in the period 2009-2012, and the changes triggered by students' feedback were made in 2009, 2010 and 2012. The conclusion resulted highlight the importance of a correct balance between different themes.

The second long paper, "Replacing Traditional Classroom Lectures with Lecture Videos – An Experience Report" was authored by Marion Brandsteidl, Tanja Mayerhofer, Martina Seidl and Christian Huemer from Institute of Software Technology and Interactive Systems Vienna and Vienna University of Technology [8]. As the title clearly suggest, the paper analyze the advantages obtained by replacing traditional classroom lectures with video lectures. The price to pay for obtaining the above mentioned advantages are also described. This time, it's about an introductory course in Object-Oriented Modeling offered by the Business Informatics Group (BIG) at the Vienna University of Technology. In our opinion, the large preference of students for video lectures compared with classical lectures is an explicit message to teachers that these modern techniques have to be considered in the future. Even if the price

of producing a video lecture can be expensive for the first time, the R. O. I. is excellent. Students can consume each lecture anytime and at any place as often as they want. On the other hand, teachers are not forced to give the same lecture many times, and have the opportunity to use their time more efficient.

The three short papers were: "Improving Software Engineering Education by Modeling Real-World Implementations" [9] by Thomas Baar - Hochschule für Technik und Wirtschaft (HTW) Berlin, "How Should Teaching Modeling and Programming Intertwine?" [10] by Birgit Demuth - Technische Universität Dresden and "On Explaining Modeling Principles with Modeling Examples: A Classification Catalog" [11] written by Martin Gogolla from University of Bremen and Antonio Vallecillo from University of Malaga. Similar to proposals described in the long papers, Thomas Baar proposal was also triggered by students' feedback. If the connection between the model and the system is not enough clear, students become demotivated. This suggested Thomas to propose the use of real world models that can provide different opportunities like: to see the advantages of using models for medium and large systems and to have samples of efficient implementations for real models. In the section "Related work" the author analyze the well known experience of Repository for Model Driven Development (ReMoDD) and remarks that real models contained in ReMoDD are not enough detailed in order to be efficiently used in code generation. In our opinion, this is due to the fact that real models are proprietary models and, by consequence the owners try to protect them. In Birgit Demuth's paper, the author presents the conclusion of 15th year of experience in teaching modeling with UML and OO programming at Technische Universität Dresden. The main educator's question is: how to teach students in order to prepare them as better as possible both in programming and modeling. The conclusion confirms Robert France opinion, that modeling and programming must be teach intertwined. In this manner, students understand easily the utility of modeling in software engineering. Regarding this paper, it worth to mention that the results obtained by students represents the feedback and, in Dresden experiment were included two related courses: introduction in OO programming, analysis and design using Java and UML and a practical course of applying the knowledge acquired in analyzing, designing and implementing a medium size application working in a team. Finally, the paper written by Gogolla and Vallecillo proposes a topic different from all others: a catalogue in which examples are classified by rapport to their syntax, semantics, pragmatics, complexity or evolution. These criteria enable teachers to check if examples included in a curricula cover the concepts and principles introduced and analyzed in the course. The proposal will be validated and updated in future projects.

4. THE INVITED TALK AND THE PANEL

This year, the keynote talk entitled "Model-based Development in Large Project Courses with Real Customers" was given by professor Bernd Brügge from Technische Universität München. Based on the results obtained in an impressive number of real projects, Professor Brügge argued that one can teach industry relevant software engineering practices to students with a special emphasis on informal models the key of a successful communication between developers and users/clients. The speaker explained how to combine modeling with delivery and presentation activities, ranging from scenario-based design, requirements elicitation to the presentation of executable prototypes. The software lifecycle model is based on a hybrid

process model using a combination of the Unified Process and Scrum. The presentation was very well received and has sparked a lot of questions and very interesting discussions. The keynote slides are posted on the symposium site http://edusymp2012.irisa.fr/. The paper entitled "Teaching the Tornado: From Communication Models to Releases" [6] describing the keynote was included in the EduSymp 2012 post-proceedings.

The panel entitled: "How do we inspire students to model?" was focused on measures meant to support teachers in convincing students about the usefulness of understanding, learning and using modeling in Software Engineering. After a short introduction of panelists and of potential topics given by the moderator, the panelists presented their position. Finally, the participants addressed their questions to panelists and/or made comments related to different topics. Both the introductory slides and panelists' slides are available on the symposium website. Compared to the previous EduSymp panel organized in 2009 and entitled: "Teaching Modeling: Why, When, What?" this panel was focused on a narrow theme. Panelists positions were very appreciated. Some of the most important statements:

Colin Atkinson: Modeling is an integral, indispensible, essential part of effective SE. What we call models today are just views/parts of a subject. Code is just a view as well, and therefore also a model. All development is or should be model-aware.

Bernd Brügge: A problem solving method that works - break down recursive the problem into two or more sub-problems of the same type, until these become simple enough to be solved directly. The solutions to the sub-problems are then combined to give a solution to the original problem. The ability to understand and apply divide and conquer is a skill that takes time to master: Practice, practice, practice...

Jean Michel Bruel: Considers that among the most appropriate manners for "inspiring" students to model is to ask them to do different activities like designing algorithms or coding patterns, (that are) natural based on modeling, without mentioning that this are modeling activities. Jean Michel explicitly stated about the difference of learning a modeling language, like UML and learning modeling.

Robert France: Modeling is an intrinsic human capability. We all model. Often we use only implicitly held models to help understand and explain concepts, or to drive our decision-making process. The challenge for educators is how do we further develop/nurture this capability in software engineering students.

Jeff Gray: Focuses on "Big Ideas" of modeling that motivate its usage in a way that is more appealing than learning about the specific semantics of a modeling language.

Bran Selic: Convince students to use modeling by embedding MBE in other courses with a clearer value proposition e.g.: courses on software architecture, advanced programming, systems design. Teach essentials - not the syntax. Invite experts as guest lecturers to teach topics as design principles, meta-modeling a. s. o. Use executable modeling tools and propose moderately complex team-based projects. Advice the use of tools easy to install and having effective tutorials.

5. CONCLUSION

This edition of EduSymp was a successful one both as concerning the topics debated, and the quality of presentations. The keynote focused on the original experience in teaching Software Engineering of Professor Brügge, at CMU and Technische Universität München. For sure, this experience deserves to be disseminated in other universities. The accepted papers were focused on: critic comparisons among the ponder that different topics have in the curriculum of introductory and advanced courses about modeling in software engineering, using new communication technologies in preparing and giving courses, the importance of using real world examples, classification criteria for examples - meant to support teachers in evaluating the degree in which the examples cover the concepts and principles discussed in the course. Finally, the panelists concluded that in software engineering, all development should be model-aware, that similar to teaching programming, teaching modeling have to be based on big ideas, not on secondary aspects and mentioned different tips and tricks meant to support teachers in succeeding to inspire students to model. Hoping that in the future the interest in presenting and sharing teaching experiences in modeling will grow offering so a better access to interesting examples and successful teaching experiences.

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