ELSEVIER

Computer-Aided Design 36 (2004) 1429–1430

COMPUTER-AIDED DESIGN

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Editorial

Editorial to special issue: CAD education

In June 2001 a discussion took place within the Editorial Board of Computer-Aided Design concerning the possibility of adding papers on CAD education to the journal's scope. The outcome was a proposal for a special issue, to include papers from academics, researchers and practitioners with a strong interest in educational issues. In response, a number of interesting and very varied manuscripts were submitted, from which this issue has been selected.

The first three papers in this issue are devoted to an industrial view of CAD education. Drawing on long experience in the automotive industry, Field identifies various groups of CAD users within General Motors, and describes the main tasks of each group and the knowledge and skill that each group needs, in terms of CAD fundamentals and technology. He goes on to correlate CAD education and training with implementation strategies for new technology, and describes some of the difficulties encountered. The paper by Dankwort et al. is based on data and information offered by German automakers and discusses CAx education focusing on modern design- and CAx-methodologies, the human factor, economic aspects of CAx-user training, and the continuous evolution of job profiles due to new CAx-technologies. Emphasis is placed on particular aspects of CAx work, such as job rotation, and the vital importance of personal relations. Ye et al. follow up this analysis by presenting the results of a detailed survey conducted among experienced practitioners across a number of CAD vendors. The survey looks at a range of topics, including the mathematical foundations of CAD, its relation to computer science, design methodologies, and system evaluation. Some very interesting messages emerge from the CAD community throughout this paper, especially the respondents' views on improving CAD education.

The next two papers consider the teaching of fundamental geometric concepts and tools as a component of CAD and graphics courses. Rossignac proposes a new topic at the boundary between education and research, which he calls education-driven research (EDR). EDR is concerned with determining the simplest, most intuitive ways of presenting CAD fundamentals, and Rossignac suggests that EDR often leads to new insights, as well as to improved teaching. He illustrates his concept by means of three specific examples from his own classes at Georgia Tech. The argument in the paper by Goldman et al. runs in a similar, but somewhat more specific, direction. This work promotes the use of LOGO and turtle geometry as an insightful way to introduce geometric concepts as varied as affine coordinates and transformations, fractals and iterated function systems, relaxation methods and subdivision schemes to undergraduate and graduate students.

The last two papers in this issue report on the teaching of more advanced and specific topics. Bischoff and Kobbelt focus on techniques applicable to polygonal meshes, and neatly outline a set of tools for classes in this area, while providing a compact summary of the related research results. In the final paper, Schaefer and Warren describe their experiences in running a 'capstone' course at Rice University, in which the class has to build a networked computer game during a single semester. This naturally involves advanced geometric and graphics programming and, moreover, gives students what is often their first taste of collaborative work on a large piece of software, which they do not understand in its entirety. The authors report some of the lessons they have learned in keeping such a remarkable student project on the rails.

The guest editors would like to thank all authors and reviewers who contributed to this special issue. We found it as rewarding to edit as a special issue in our own research specialities, and many of the reviewers made similar comments. We trust that readers will share that experience.

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0010-4485//$ - see front matter
doi:10.1016/j.cad.2004.03.004

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