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# Structural Analysis: Challenges and Opportunities

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## Abstract

A report by Johnson and May prepared for the Ove Arup Foundation in 2008 highlighted some of the problems faced by students studying engineering degrees. Mathematics was found as one of the obstacles. This research project is aimed at critically investigating the problems and challenges arising from teaching engineering students, and how they impact on them achieving their full potential. It proposes some practical solutions in dealing with the problems. What is proposed by this study is to investigate the actual root of the problems encountered, explore new approaches to teaching and learning, and implement these on a carefully selected module on structural analysis at a second year undergraduate level. Questionnaires were distributed to both academic teaching staff and students. Additionally, focus groups were carried out with students and interviews were conducted with academic staff. Three regional universities took part in the surveys. The results indicate that structural analysis is perceived by students as an important topic in their course but that a third of all students who took part in the survey struggled with mathematical concepts used in solving engineering problems despite having a strong mathematical background. Some students struggled with basic structural concepts such as shear and bending moments, load paths etc. Half of the students questioned disagreed that too much theory is involved in teaching structural analysis, whereas, just over a third of students found the labs stimulating and rewarding in supporting their learning because they "can see what's happening".

## Biography

**Messaoud Saidani** completed his first degree in Civil Engineering at the University of Science and Technology in Algeria, where he won the Best Student Award. He then completed a PhD in Civil Engineering at Nottingham University under the supervision of Dr Martin Coutie (author of the famous 'structural analysis' book co-authored with Coates and Kong). Messaoud then stayed on as a post-doctoral research fellow for four years working with Prof David Nethercot on a number of pan-European and UK projects (total value in excess of £4m). Messaoud then joined Coventry University in 1995 as a lecturer, then senior lecturer, and finally as a Reader in Civil Engineering, and for nine years also taught at the University of Warwick as a visiting lecturer teaching structural analysis and design. For the past five years he has been a visiting Professor at the University of Science and Technology in Algeria. He recently became a Chartered Engineer and a Member of the Institution of Structural Engineers. He is also a member of the International Society for Structural and Multi-disciplinary Optimisation. Messaoud is currently Associate Head of Department (Civil Engineering), in charge of managing its undergraduate and postgraduate programmes and its applied research portfolio including the preparations for the REF2014. Messaoud published over 70 journal and conference papers, and technical documents.