

## Appropriate Technology Research Projects

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### Abstract

Appropriate technology research projects were sourced from around the world through charities and by direct advertising. The resulting suggestions provided challenging projects for 3<sup>rd</sup> and 4<sup>th</sup> year Mechanical Engineering students. The projects have encouraged students to become more involved in tackling global design problems, and have raised the profile of engineering research in the community through presentations, interviews and local media reports.

### Background

As part of Mechanical Engineering MEng. and BEng. degree programmes at the University of Nottingham, students are required to undertake an individual project and (in the case of the MEng. programme) a group development project. These projects form a substantial portion of the marks for the third and fourth years of the degree programmes (25% individual project, 33% group project). In my experience, students have been motivated by “real world” projects and by feeling that their research will make a difference, rather than just producing a report to sit on a shelf. Coming up with exciting projects year after year is a challenging task for lecturing staff.

### Methodology

In order to source some exciting “real world” projects, I placed a “problems wanted” advert in “Footsteps” – a magazine produced by a UK relief and development charity, Tearfund. Requests for help in designing engineering solutions to all sorts of problems came in over 100 email messages and letters from Cambodia, India, Uganda, Mongolia, Bolivia, Kenya, Afghanistan, Nepal and many other developing countries. I also contacted Engineers Without Borders for additional suggestions. The problems were considered on a case by case basis, and resulted in a healthy number of individual and group projects. These included: designing a passive solar tracker, designing a candle-powered device to seal plastic bags, development of simple medical equipment and the design and construction of a wood-fired bread oven.

### Issues

Some of the difficulties in running appropriate technology projects are in matching the design requirements with the academic project requirements (level of scientific input and technological challenge). Communication with the individuals who suggest ideas for projects can be temperamental, but email access seems to have reached most of the people who responded to the requests. Resources to undertake the work are provided from the (limited) teaching budget, with some sponsorship from industry. Designing in a developing world context has required students to re-evaluate manufacturing methods and materials. For example, bolting is preferred to riveting or welding in some situations where workshop facilities are limited.

### Benefits

The benefits can be categorised into three areas. On the most fundamental level, some solutions have been found to problems experienced by people around the world. Secondly the students who have been involved in the projects have shown exceptional enthusiasm for their work. I believe that this is because they feel (quite rightly) that the skills they have developed as part of their degree programme are being put to good use and that their work can make a difference to the lives of people around the world. Thirdly the research has raised awareness of the importance of technology in alleviating poverty.

## **Evidence of Success**

There has been considerable media interest in the projects from newspapers, radio, and Professional Engineering (the IMechE journal). I have been asked to visit local schools, churches and have spoken to sixth form students on the Royal Academy of Engineering's Best Programme about the research. A presentation at the British Association attracted additional media interest. As a result, the profile of the University has been raised both in the local community and nationally.

Students who have worked on these projects have been inspired to investigate the relationship between technology and development, and some have taken up summer placements overseas with Engineers Without Borders to experience the challenges of working with developing communities at first-hand. These activities too have enhanced the profile of the University and the UK, and media interest has raised the awareness of the role engineering can play in changing communities for the better. Other members of staff have become involved in these projects, and in future the number of projects on offer will grow due to their popularity with staff and students alike.

## **How Can Other Academics Reproduce This?**

Suggestions for appropriate technology projects in all branches of Engineering are available from Engineers Without Borders. Other useful contacts include the Intermediate Technology and Development Group and charities such as Tearfund

## **Reflections**

Student motivation is the key to success in project work. By setting projects that enthuse the students from the outset, the outcomes are more likely to be positive. Personal involvement is also a big motivation. These projects have encouraged students to spend summer placements overseas to see the challenges facing people in the developing world. It would be beneficial if more permanent links could be established with universities, colleges and NGOs working overseas, with the possibility of partners visiting the UK to share problems and ideas.

## **References**

Engineers Without Borders: <http://www.ewb-uk.org/>

ITDG: <http://www.itdg.org/>

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