

Feedback on Summer School

Wednesday Exercise

July 14th 2004

In this session, the four Summer School groups reported back on their long group exercise on embedding SD into the curriculum.

Group Led by Jim Poole

Offshore Tidal Impoundment (OTI)

Jim presented general scheme of SD as a “four-legged table”, the legs being economic, social, natural resources and environmental, coinciding roughly with the UK Government definition of SD. The theory is that the table must be kept flat and at the desired height by attacking all legs at once, not one by one.

The OTI scheme was presented. The scheme is basically for a large enclosed area in Liverpool bay near to Rhyl, North Wales. The enclosure wall houses turbines that generate electricity as the tide comes in and out. Members of the group then identified general sustainability issues corresponding to the scheme and identified role of engineer in each of the four “table leg” areas, coming up with Technical Expert, Communicator, Project Manager and Visionary – the latter encompassing conceptual design.

The group then tried to identify how to educate tomorrow's engineers for these roles using this case study. Some ideas were:

Visionary: multidisciplinary resources, and case studies within and outwith engineering, and open ended projects.

Communicator: role playing, dialogue within and outwith engineering disciplines.

Technical Expert: specialized input within disciplines.

Project Manager: application of management principles and management skills including leadership, etc.

Underlying all these was the idea of *dialogue* – that engineering involves two-way communication and this must be incorporated into courses. Case studies are one basis for doing this, but not the only one.

Group Led by Stefan Boron

Sustainable Beer Production

This group concluded that to embed SD, a “mindset remake” of the discipline of engineering is needed, rather than an addition to the discipline. Students must take on a mindset that is practical in a design context. In this application area, this centres on process design (in chemical engineering).

In terms of core skills the mindset remake involves an interrelationship of core skills within and between disciplines across the whole experience of the curriculum.

The group thought that the way to do this is to embellish engineering teaching with the skills of other disciplines, using a problem based approach from an earlier stage in courses than is usually the case.

Group Led by Peter Norman and Jose Lopez

Ghost Ships (i.e. disused US Naval vessels towed to UK for scrapping)

Each leader noted complimentary conclusions in this group, as stated below.

Peter Norman

The idea was to develop this concept into a role playing case study, to determine if this would be of benefit to students, and to determine what the alternatives were.

The group concluded that the students needed directed reading (to peer reviewed material) given the range of material of differing sources and qualities available.

It was found that the exercise is generic, involving open-ended thinking. It could be done as a debate for / against, or as a multi-user debate with different stakeholders including a range of engineering disciplines – e.g. Chemical Engineering is involved in the detoxification process, etc.

In terms of the Teaching and Learning outcomes, the final answer does not depend on technical issues, but may depend on probity of information. There are also lots of resource implications on rooms, AV etc. The group felt that this subject should be part of a programme of case studies addressing related issues, e.g. global warming. There were comments on life span of case study and whether it is now past (like Brent Spar) or on-going. Could it be re-used? It could be run once for social issues and once for technical, and it may be useful for other non-engineering disciplines.

Jose Lopez

This side of this group's activity differed from the former in that it envisaged that students were asked to find information rather than being given it. There is an issue that students in earlier years need help here, and boundaries of case study need to be clearly stated, and value of information needs to be assessed between pressure group material and academically attested peer reviewed material, and so on.

There is also an issue in finding satisfactory assessment methods for group case studies.

There are group work skills (etc) to be learned as well, and these as well as the technical outcomes need to be stated and assessment done against these.

In terms of objectives, the group noted that it was necessary to decide if the aim was to address detailed material, or whether it was just to get the students to understand what SD is.

The group also noted the risk aspects in this case study and wondered how do we teach uncertainty. Most engineering curricula concern certainties as a general rule.

This group also noted the resource issues in teaching this or other case studies in terms of required SSRs, and expressed its appreciation of the RAEng VP scheme. The group also noted that in terms of the life span of the case study, its currency was less relevant than the relevance of the material covered.

Group Led by Gordon Baker

Transport Infrastructure

This group considered an active exercise on reaching a decision on where different types of developments should be located according to transport impacts.

Two things emerged strongly. The first was that case studies and histories are valuable, but we need lots of them to be useful.

The second thing was that often the engineer inherits problem and solution with tightly constrained boundary. It was explored how this boundary might be moved, and concluded that it was important that the engineer understood the context, even if the boundary cannot be moved. The group also thought the engineer should be involved earlier in schemes, and this could be led by a RAEng scheme. This ties in with practice elsewhere in engineering, and applies to all stakeholders not just engineers.

Engineering Design for Sustainable Development

Annual Visiting Professors Workshop

July 14th-15th 2004

Wednesday

Keynote Address – Paul Jowitt

This was given in the form of a presentation available separately.

Summer School Feedback Session

Chaired by Richard Dodds (RD)

Panel members Paul Jowitt (PJ), Peter Norman (PN), Greig Mill (GM) and Mark Hadfield (MH)

Richard Dodds explained that this session was to encourage interaction between summer school delegates, with opinions we want to hear, and the panel. He explained that of the panel members, Greig has done CD-ROM based case study material whilst Mark has done an interactive web site.

Mark Dyer – Strathclyde. Congratulated the scheme on generating case studies which are invaluable, and asked how the RAEng or others would be able to make case study information available. MH explained that the web site portal (www7.caret.cam.ac.uk) is available to anyone. PJ – commented that there are some issues with Third Party IPR e.g. OS Maps and so on, and GM added that these have been solved in many cases. PN commented that people need to know case study material is there, and some coordination overall would be useful. PJ went on to discuss that there is difficulty in using someone else's case study. Gordon Baker commented that the material is not "off the shelf", but consists of resources for people to work with. Harry Eccles noted that there is a need to have IPR and an audit trail of how information is obtained. In contaminated land, there are serious issues in getting material in UK due to data owner sensitivity, and in Edinburgh University case studies these have only been resolved by use of EPA material from the USA.

George Howarth commented that there must be a duty to have some filter to provide all case studies more easily – there are 60-80 case studies at least so far. PN commented that discussions about publishing case studies have come to nothing.

Emma Dewberry, Cranfield asked does the RAEng have plans to produce protocol for Case Studies etc? It was pointed out that this was an action on Jim McQuaid following the VP workshop earlier in the year, but was yet to be done. The University of Ulster Mossley Mill project was to be a basis for the template.

RD put the point that there should be more aggressive promotion of access to case studies.

It was also commented that the teaching of case studies depends on "teacher instructions" as well. It is also necessary to ensure that students do not take case studies as good practice – they may in fact be illustrations bad practice to be used for learning. We also need to ensure students enter into debate, including value issues, rather than just cutting and pasting information from the web.

Sue Armstrong, Sheffield commented that the summer school has included many useful "short sharp" exercises that can be re-used for students, and can be embedded into existing modules. It would be nice to have a portfolio of short sharp exercises.

Roger Venables stated that Society for the Environment (SftE) may be useful in disseminating information. Barbara Carroll responded that there is a danger in using the SftE to promote SD in that it may give the false idea that SD is (only) about the environment.

Simon Steiner from LTSN Engineering drew attention the LTSN Engineering database (www.ltsneng.ac.uk) – this would provide a resource to disseminate case study material.

It was commented that a good plan might be to hone down case study database to maybe 20 that are well written up. The OU have good practice here. If this were done then most users would be prepared to pay for

access to the material, which would support the maintenance of the material.

RD Then intervened to divert the discussion to the interaction of SD and how Universities might adapt – for example problems with top-level buy-in and with getting the content into the courses. How do delegates see these problems in their own contexts?

It was commented that there is good practice already. Many people are “doing” SD and awareness of case study resource would help.

One question was “where would a lecturer go for help”? Maybe LTSN web-site, said Simon Steiner.

Emma Dewberry noted the difficulty integrating material into existing teaching, and that in many cases what is (not) happening is that top-down management are not embracing things and so there is no coordination across the campus. PN commented that there are other issues as well, e.g. Newcastle, where the embedding of SD is “enthusiast” driven by teaching staff, but there are still problems where the curriculum is crowded. Peter Bullman noted that the Joint Board of Moderators of the Institutions of Civil and Structural Engineers (JBM) guidelines for accreditation of courses require SD content, so that is now a powerful driver.

Shahin Rahimifard commented that there may be potential for use of awards to promote best practice.

It was commented that whatever is in JBM documentation, it still depends on individual commitment to include material, and anything that makes an academics' life easier is bound to help.

Martin Crapper noted the annual design competition run by the Steel Construction Institute (SCI), and an idea might be to run something similar with a national design brief on SD; the RAEng could do this as a development of this year's poster competition. PJ noted that the IStructE professional exam could be varied to include SD component. SCI design brief could be similarly varied, though it is noted that it does already include sustainability aspects.

Roger Venables re-iterated that the JBM is a powerful motivator to introduce SD and that this can be done with existing teaching materials. One example for instance is that of a timber bridge design, which is easy to vary slightly to include an SD component, in this case by introducing sourcing of materials into the project.

Tracy Bhamra commented on the need for top-down leadership, because of teaching resource issues, for example class sizes. To teach case studies you need extra staff to break up large classes. Roger Venables suggested that you need to have leadership from one level above most senior Doubting Thomas!

PJ said that you also need to involve other departments, typically via service teaching, which is an internal market exercise. Modern trends in budgeting make this unlikely to happen. In summary, organizational structures need to provide incentives and at present in many cases they do not.

Regina Santos wondered whether there was a need for clearer guidance from JBM in terms of number of credits to be allocated in various areas; PJ responded that as far as the JBM goes, SD is not meant to be an add-on but a pervasive thing in all course areas.

Martin Waller commented that SD is three “pronged” - Environmental, Economic and Social, and asked how are economists and social scientists taking this on-board? MH said these seem to come from the more global perspective. It was asked if there was any pressure to introduce courses in these areas, and PJ suggested that funding councils are applying “dilute” pressure to do this. David Foxley commented that there are some places where economic/social courses in SD are done, e.g. Surrey, where many other disciplines have been brought together. One other university found many isolated pockets of SD commitment, but no facilities to interlink between the disciplines.

Ken Snowdon asked can the RAEng fund things that involve non-engineering input? David Foxley said probably, depending on the context; for example, there are VPs who are not engineers and there is a progression in this direction.

Derek Deighton asked how can the RAEng influence Research Assessment Exercise (RAE), since this is the main driver for academics these days? And, how have we been teaching our teachers and in particular our researchers in these issues relating to SD?

PJ commented that new academic recruits ask how much teaching they need to do, meaning how little would they have to do, since career progression is by research. There needs to be movement here to

support good teaching.

A comment was made on other (i.e. non-Civil Engineering) disciplines from a research perspective. The SuperGEN research agenda was highlighted as an interesting exercise in multidisciplinary work. Jim Poole then commented that it may be a shock to learn that much thinking on SD happens outside academia, e.g. on NGOs, agencies, and amongst non-engineering academics. Visiting Professors (VPs) have a good role in bringing wider thinking into universities, and it might be a good idea to publish the VPs introductory lectures as well as case studies. It also makes sense to ask VPs for more lectures and less case studies.

It was asked, is there any way that government could recommend HEIs to introduce policy on SD teaching? Secondly, it was noted that young people are susceptible to advertisement, so what about advertising influence on SD for society to encourage students. PJ replied that funding councils have exhorted universities to look at SD, but as yet with no “scoring” attached to motivate. Also, a forum in Scotland which included about 20 universities was successful at getting HEIs to adopt policy.

David Foxley reminded the meeting of Forum for the Future. In this context the Secretary of State Charles Clark seems to have bought into the notions, but lack of continuity in leading universities due to changes of key personnel results in difficulties progressing things.

Poster Competition

David Foxley announced the results of the Poster Competition.

There were 38 votes cast, and each poster was given an average number of votes to normalize the effect of people not voting for their own institution and the different numbers of people present from various institutions. The average votes and places were as follows

Liverpool/Heriot Watt 25.9 – equal 4th

Loughborough 26.6 - 3rd

Cambridge 26.9 - 2nd

Sheffield 29.1 - 1st.

The winner was therefore The University of Sheffield.

Introduction of VP Case Study Portal.

David Foxley then demonstrated the VP Case Study Portal at www7.caret.cam.ac.uk showing people how to access the links to the various case studies.

Feedback on Summer School

David Foxley indicated that a feedback questionnaire was to be emailed round to delegates. One objective of the Summer School could be summarized as to disseminate material and get material re-used in other institutions. The Feedback was principally to ask “what can we do to make interaction between RAEng and universities better.” This Summer School is the first attempt to widen the participation in this way, and other ideas would be welcome.

Plenary Session

There then followed a plenary session intended to clear up issues and to promote understanding of how the RAEng, VPs and academia can interact better to promote SD.

Adrian Long said he was pleased with progress, but there remained a question as to whom are we talking. Is there a need for a leaflet to explain what SD is all about to a much wider audience?

A comment was made from a delegate who now has a clearer idea of SD, but feels powerless. What is needed is for decision makers to take a lead. David Foxley pointed out the inclusion of SD competencies in Engineering Council (EC) criteria for professional registration, which is widespread and forward looking, and

provides a hammer to attack internal obstacles.

Shahin Rahimifard suggested communication to heads of teaching. David Foxley indicated that there is a plan to do this, based on these notes and including a proper publication and also details of the poster prize etc in news sections of relevant publications.

Martin Crapper questioned the real value of top level buy in vis-à-vis peer buy in. The experience at Edinburgh is that management above the immediate teaching group has no interest in curriculum content except in resource terms, but peer buy-in to any changes is essential. He also noted the unhelpful propensity of JBM to recommend inclusions into the curriculum and need for them to recommend how to make gaps by removing other material.

David Foxley commented on the availability of world good practice. A Forum from the University of Catalonia and TU Delft recently indicated that challenges are similar on a world-wide basis to those raised by delegates.

It was commented that there is a danger that SD as an issue can be “hijacked” by environmentalists. This needs combatting, since SD is much more than a continuation of the environmental agenda.

Thursday

Discussion on DEFRA Consultation on SD Strategy and the RAEng response to this

DEFRA is running a consultation on a proposed SD Strategy to supercede a first strategy set out in 1992. The closing date for responses is 30th July 2004. This consultation does not apply to Scotland or Wales where matters are devolved. The consultation consists of a 42 question questionnaire covering a wide range of issues.

The discussion in this VP workshop was led by Nick Wilson from RAEng strategy group, whose job is to put together RAEng response to the consultation on the proposal. Nick came to the RAEng from Forum for the Future, London Sustainability Exchange. Nick made a presentation (available separately) outlining the consultation and the issues. After this there was a discussion chaired by Jim McQuaid.

Brian Hanna said that he had been a Northern Ireland Member on SD Commission for six years, and was due to retire. He emphasized that Commission is public body and people can apply to be on it – the RAEng can therefore promote people to be on it. The Commission is an eclectic body with members ranging from the Economic Director of FT to director of Friends of the Earth. The Commission made a submission to first strategy along the lines of “shows promise, must do better.” Brian noted that the 42 questions can constrain answers.

The SD Commission has a role to increase awareness of SD and to promote awareness of consultation process. It was noted that constitutional situation is such that many issues are devolved issues. This is not included in RAEng response. It was further noted that in Wales and Scotland SD has been centralized in Executives. In England where this was not the case, it was noted that SD being in a specific department, i.e. DEFRA then SD tends to be labelled as an “Environmental” issue.

Jim McQuaid asked how will this consultation/response affect the education of engineers?

Jim Poole said we should look on this consultation as an opportunity to have input into UK policy. Things like “joined up government” happen in Wales due to constitutional arrangements. He said that the RAEng response he had seen in draft form has good things but no “edge”. Many drivers are European, and everyone is also risk averse, for example not wanting to risk composting anything that may contain meat because of animal by-product rules. Jim Poole argued that the RAEng response needs to highlight this kind of issue and the raft of “inappropriate” regulations that don't hang together.

There was then a brief discussion on the nature of this part of the workshop and whether this discussion can influence RAEng response. It was confirmed that because of the deadline there is only limited scope for further input to RAEng response now, but there will be a second stage response later in the consultation cycle.

John McDougall said that we need to start asking how we are to achieve targets, not just setting targets. For example, how can we reduce CO₂ if we can't involve nuclear power? To have a consultation that does not consider methodologies available before setting targets is not a good example to students. Jim McQuaid said that this particular target of 60% for CO₂ reduction was not “plucked out of the air”, but was on the basis of a Royal Commission finding.

Matthew Simon stated that this consultation gives better basis for working with students than the last one. An interesting point was: is there less emphasis on economic growth than before? Nick Wilson confirmed that this is the case; in fact “economic” is “almost a dirty word now”. Also, continued Matthew Simon, we need to look in the European context, as why should our strategy be different from that of the EU? Brian Hanna informed the meeting that there is a European SD strategy in the making, which will have UK input. There should also, he commented, be an international strategy.

Brian Hanna went on to say that economic growth and jobs that relate to social progress (as opposed to undesirable jobs) are not necessarily clearly related, and this is a core issue for the report to address – in other words, how does growth fits with SD in the widest context.

Rex Harris commented that some issues are not addressed in the DEFRA consultation, e.g. Hydrogen, Nuclear Power are not clearly included. David Foxley replied that the RAEng responded to an Energy Policy consultation recently, saying that at present the “sums don't add up” unless you include Nuclear Power. This has therefore been dealt with in that context rather than needing to be in the present consultation.

Jim McQuaid asked the meeting to consider how engineers can facilitate society to deliver all these SD objectives referred in the consultation?

Barbara Carroll commented that many sectors working with SD are in need of sound advice to inform their work, so there is opportunity here. On social side, people are working with need for greater participation. There is a difficulty of how you arrange and manage this. This reflects on the education we give engineers, and the range of non-technical skills they may need.

Alan Strong clarified that we are dealing with two issues now: i) what do we want RAEng to say to consultation, and ii) what role should we be educating engineers for? As educators, we have responsibility in Life-Long Learning process to ensure that broader social/behaviour issues are addressed. Accreditation processes may have resulted in these being neglected too much. There are many issues such as water (as per PJ's keynote address yesterday), and engineers have means to change these, but must do so for right reasons and from broader perspectives.

Roger Venables supported view that response should have more "edge" to it. Is it too late to add response? As far as the RAEng response goes, unfortunately yes it is too late for this part of the cycle. Roger then asked Nick Wilson if there was any point making a response? The answer to this was, yes definitely! There are only a couple of hundred responses in total, so any one counts. Third, in terms of affecting outcome, should built environment people focus individual responses on their areas of interest, in which DEFRA's thinking seems less clear than in other parts. Nick Wilson agreed that the thinking was less clear and focussed responses may therefore make more of an impression.

Harry Eccles commented that RAEng should present what it believes should happen and not necessarily respond to the questions, since these can be confusing. Interim responses as per the DEFRA web site suggest that DEFRA is disappointed with responses which are not likely to give a clear lead.

Adrian Long said that there is no clear indication in the RAEng response that the "problem" has anything to do with engineering (or any practical disciplines). He thought that the focus should be on three, four or five main issues and state how these should be taken forward in practical terms.

George Howarth commented that we have not used the word design at all. We should be pushing the theme of design more, since design is the solution to the issues.

Jim McQuaid closed the discussion, inviting Nick Wilson to say a few summarizing words. Nick thanked the meeting for inviting his presentation and said that the last point on design is well taken. He also noted particularly the point that the response should be focussed on an overall stance, rather than just on answering the 42 the questions. There is going to be a second phase consultation so there will be more opportunity to respond.

Discussion on Engineering and SD: Guiding Principles for Integrated Decisions

Richard Dodds took the chair for a discussion on the RAEng document "SD: Guiding Principles for Integrated Decisions", in preparation by David Fisk and Jim McQuaid with input from the VP network, and currently in its 7th draft. Richard started by taking a view on whether people in the room can live with the document roughly as it stands and we can talk about refinement or whether it is not something they can support.

There was a show of hands. The vast majority nodded in support and it became clear in the discussion that we were talking about refinement. Gary Acres said that the document lacks illustrations, e.g. case studies, which should be spread through the document rather than at the end as an appendix.

Alan Emery commented that there are seventeen principles, which is too many for most organizations, ten or five being more usual. Harry Eccles said that he read there to be four overarching principles, with further contributory principles. Matthew Simon commented that this document, with case studies added, would be useful as a working document but not directly for students.

The question was asked as to who was the intended audience. David Foxley said this was the teaching community and the profession, as stated in the foreword.

Jim McQuaid responded saying that some of these points have been made before. The number of principles has been reduced from 27! No target was set, and 27 to 17 seems quite a good achievement. The intention was always to have case studies, but these were not ready to be used to develop principles, so these will be introduced after principles have been agreed.

Vision is that case studies will illustrate a selection of principles, so case studies will not necessarily fit in a linear structure.

Since the last discussion (at the VP meeting earlier in the year), consideration has been given to the view that we were too much of an enclosed community to develop principles and non-engineers have to be consulted. Suggestions of other consultees for the document were solicited, though few were forthcoming. The idea is now that it should be handed to an independent body to comment, and Forum for the Future is suggested since they might owe the RAEng some favours.

With regard to illustrating the document with case studies, this requires knowledge of the case studies, so can the VPs suggest case studies that might illustrate the particular principles? The document may also use case studies of “negative SD”, where principles have not been followed – PJ’s examples from yesterday, Three Gorges or Skye Bridge being possible cases in point.

Gary Acres suggested that the target audience should be asked for feedback. Jim McQuaid reiterated that the target audience is university teachers and their students.

Matthew Simon suggested that input from software engineering etc, would be welcomed, to widen spread across engineering disciplines.

Jim McQuaid commented that there was an action from the last meeting to produce a template for case studies. His intention was to use Mossley Mill Case Study from University of Ulster as a basis for the template, but this has not been done as yet (see notes for yesterday).

Alan Emery commented that there must be a cross-match between principles of professional institutions and this document so that students aren’t confused. David Foxley responded that institutions tend to have codes of practice rather than principles, and the task here is to identify overarching principles from different branches of engineering, so this is not likely to conflict with anything the institutions do.

Roger Venables suggested that the number of principles can be further tidied up, and with regard to case studies, one on infrastructure and one on process would be fine, and these are better if they are identifiable, though anonymous ones can work.

It was commented by David Raffo that the Principles are a mix of “technical” and “emotional”, some are overt guiding principles and others practical steps to take. Can these be split apart? It may be too late for this said Jim McQuaid.

It was commented that as far as teaching use was concerned, there is a need to know what the learning outcomes are supposed to be. Are the students meant to recite the principles? Really it is about the skills and competencies that students need. Jim McQuaid said, for example they can be asked to identify which principles apply to a given case study. David Foxley said the question was on the lines of “how do you use a text book?” The response was that a good text book has learning outcomes at the beginning and questions at the end to measure whether these have been achieved.

David Foxley asked please can we have suggested case studies, in the form to be provided, back by the end of September.

Adrian Long asked if we could we change the title to “Design for SD”? He commented that design is the whole process not just a part of it.

Roger Venables said that this document will help students work out how to deliver the ICE charter on SD, and would not compete with it.

Richard Dodds commented that the major action on the RAEng and Jim McQuaid is to phrase questions to the entire VP network regarding case studies, in some kind of template form, so that it is relatively easy to respond. This must happen very soon to get the ideas back in September.

Jim Poole emphasized that we must ask the target audience if the document is what they want, rather than allowing the document a life of its own. There are after all other principles, e.g. the UK SD strategy. One point is that we must point out that EU is making regulations that are going counter to its own principles and to the UK strategy (see above discussion on DEFRA Consultation).

The Engineering Council's UK-SPEC: Implications for Teaching Strategies

George Howarth led a discussion on this document which outlined the “competencies” needed for registration at the various grades of professional engineer. George started the discussion with a presentation, available separately, posing the following questions on competencies in SD:

What are key competencies in relation to SD?

What teaching/training should we do?

How do we measure and assess these?

He went on to discuss these questions in the context of Smith and Nephew.

Following the presentation there was a brief discussion on the detail of how performance against various competencies is managed. The key point is that achievement targets are supported by training to support staff where there is apparently a problem.

George asked if there were any additions to the specific SD competencies discussed in his presentation (which were: Awareness and understanding of SD, Analysis and problem solving and decision making, Strategic vision, Creativity, Act responsibly, Dialogue with stakeholders.)

Richard Dodds answered, perhaps we should include “understanding consumers”. Alan Strong extended this, saying that it was key to have an understanding that people behave differently as citizen and as consumers and as customers etc. Other suggestions for additions to the list included ability to handle complexity, ability to work in partnership and to deal with other professional disciplines and the ability to deal with stakeholders who do not necessarily have a rational perspective all the time.

It was noted that society has expectations of professionals (e.g. the medical profession) and is likely to exact retribution when these are not met. In former times attitude was “I am a big company, trust me” but now it is necessary to build confidence by demonstrating achievement, and perhaps by independent analysis. Distinction was drawn between “confidence” based on evidence and “trust” in the sense of an essentially unquestioning faith.

David Foxley asked the meeting “how much effect will UK Spec have on formal stage of education of engineers?”

It was suggested that one competency that could be included is the handling of risk; this is a key driver in modern business. This can be related to SD or in its general sense. There needs to be an “understanding of the lack of understanding” of risk amongst the general public and indeed amongst ourselves and other professionals.

George Howarth asked, would it be helpful if we set out a clearer list of UK SPEC competencies? This question was aimed at academic staff as well as VPs. The competencies need to be met if accreditation requirements are to be met. Do we need to address the detailed question of what we need to teach?

It was commented in response that it may be useful to have training in this for teaching staff. Some aspects however can be better done in industry, and industrial placements may be a good way of doing this. It was asked generally how formal are the requirements for placements, and whether SD was included in the requirements of placements? Martin Crapper pointed out that different industries have different attitudes to placements, for example mechanical and production is good and helpful, civil much less so in terms of detailed involvement in the academic side. This makes it difficult to set detailed objectives.

Barbara Carroll asked, are we recognizing the different competencies for specialists and generalists/managers and technical specialists? Both sides apply to all professions, and both need to engage with SD.

There was then a closure from George Howarth, who asked, what are the actions arising from the discussion? He said we will look at the competencies required for SD and define them more clearly and give learning outcomes and indicative assessment methodologies, and maybe also look at placements specifically.

Another issue was maybe to try and build a new examination process that allows people to be observed in

interaction with others, etc, in all the aspects that are not examinable by traditional methods. This is however difficult in design because, you can't observe someone coming up with an idea. You could however ask students to comment on behaviours of others seen in videos etc. We could also provide more examples of risks, opportunities and processes. We would examine whether there was mileage in involving accreditors in a summer school. It was noted that we need to get the message across to lots of academics who are not "the enthusiasts" like those present at this meeting.

Assessing the Effectiveness of the VP Scheme

David Foxley stated that we have been asked by one of the committees of the RAEng to determine how we might assess the effectiveness of the VP scheme. There are some preset objectives including ones for the RAEng itself, so we have these as background.

Roger Venables asked, has the RAEng done any "retrospective baseline studies", assessing where each institution was to start with. The answer is that this was partly assessed by Bill Addis' report vis a vis the first five participants, but his needs to be done for other participants as well.

Barbara Carroll said that there is an impression is that much amazing stuff has been done on different levels and we need to get and harness credit for this, identify synergies and avoid duplication.

Jim Poole would welcome a restatement of the objectives of the scheme, as this is not clarified in his actual contract. David Foxley said that the ROMEF statement is helpful here and should be consulted. Jim Poole said that he knew he was supposed to do case studies and be involved in teaching, and then third to "influence academia" in the round to introduce SD. He said his most satisfying involvement was with the Offshore Tidal Impoundment case study, and in particular getting a student to research and write up the case study.

George Drahun noted that we must assess the customer response and find out how do the students relate to the case studies and do they find it useful. We can ask also other people in Universities to see if SD is more visible than it was.

The question was put, has the scheme brought together a community that would not otherwise have existed? The answer was a categorical "yes", and this was thought to be important.

David Foxley noted that qualitative analysis is often more useful than quantitative, as the latter can be bland. Quantitative feedback might however be useful, e.g. identifying numbers of references to SD in course documentation, and seeing if this grows in repeat analyses.

Roger Venables noted also that VPs who practice in industry have had their practice improved by the scheme. He commented there is also an opportunity to expand into the CPD area as well as student teaching.

It was asked, could the Fellows of RAEng be used as peer reviewers on VP reports?

It was also noted that the RAEng could start being aggressive on the PR side; there is a department in place to do this now, and it would help get the message across. Further comments suggested that the summer school was a spin off of the VP scheme and was a good idea, and this could be continued.

Any further ideas will be welcomed later. The end of August would be the deadline for this.

Closure

In closure, David Foxley asked the meeting if there were any views on the nature and value of the VP workshop specifically.

Adrian Long said that we should continue with the workshop as the VP scheme continues to grow, and it allows people to network. Peter Norman was struck by academic colleagues wanting to share experiences. A question was asked as to whether there are specific areas of engineering where we have a low impact and should these be targeted.

Roger Venables commented that getting together is valuable, and also having academic partners present is

valuable. The summer school also appeared to work, and participating VPs enhanced the enthusiasm. This should be repeated and organizational aspects could be delegated from the RAEng if necessary. The combination of the summer school and VP workshop has been good, giving opportunity to follow up learning for those who were here.

Jim McQuaid said general feeling is we ought to continue with two annual VP meetings as at present, thanked everyone, and closed the meeting.