

## The ministerial brief – a tool for coastal zone management education

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**ABSTRACT:** Engineers not only deal with the general community and other professionals within their own disciplines, but they may also be required to engage with politicians who have extremely limited time to either read documents or participate in lengthy discussions. Therefore, politicians must be communicated with in a precise and informative manner. This is often achieved through the use of short ministerial briefs (typically < 2 page document addressing key points) followed by a short discussion. Students in the Bachelor of Engineering in Coastal Engineering degree at Griffith University, Gold Coast, Australia, were introduced to the concept of, and taught how to design and present for assessment, a ministerial brief. Following this, they had a meeting with the *designated* Minister where their task performance and knowledge of coastal zone management was evaluated through direct questions. This educational process was found to be a valuable learning, teaching and examination process in an area that students had not experienced before. This project highlighted the necessity to adopt education techniques that expose students to scenarios that mimic those faced by practitioners.

### INTRODUCTION

A successful engineer requires effective and efficient communication skills [1]. Indeed, it has been well documented that the professional engineer will spend up to 80% of their time communicating with other engineers, clients and the general community (eg [2]).

With regard to engineering, communication covers written (such as project reports, tender applications and financial statements) and oral components (such as information presentations, meeting chairing and formal public discussions). Therefore, there is a requirement for the engineering educator to ensure that graduating students have the necessary skills to communicate effectively over a broad range of areas and with a variety of people. To help develop this necessary skills base, undergraduate engineers engage in various teaching/learning activities throughout their studies. Historically, these have been centred predominately on report writing, but there is now a growing emphasis on oral presentation skill development.

Advances in technologies mean that students can now access a plethora of material to support their learning processes over an Intranet or the Internet. However, the changing nature of the engineering profession requires constant changes to the educational process; accordingly, the reliance upon technology should not be the only driving mechanism for educational advancement (eg [3][4]).

Modern engineering education programmes should prepare students for scenarios that mimic those faced by engineering practitioners. Problem-Based Learning (PBL) helps students to cohesively conceptualise engineering fundamentals to develop holistically acceptable solutions to engineering problems (eg [5-7]). However, engineering students are rarely assessed on their knowledge of PBL exercises through interview-based techniques, where they must confidently and concisely address

directed questions. This is one educational area addressed by the project presented in this article.

It is important to realise that graduate engineers deal not only with the general community and other professionals within their own disciplines, but may also be required to engage in discussions with politicians. This is especially the case for those engineers involved in planning and management. The major difference with the politician in comparison with other professionals is that the politician's time for reading documents or engaging in lengthy discussions is extremely limited. Therefore, one must communicate with them in a concise, accurate and informative manner.

Typically, ministers are supplied with a short summary of a project they are asked to support in Government. This is followed by a very short discussion session with the proponent of the project. The proponent, who is usually an engineering professional or team of diverse professions, needs to answer any questions the Minister and his/her support staff may have. These questions go far beyond the technical contents of the report to include issues relating to community and environmental concerns, health and safety risks, alternative approaches, etc. Typically, the Minister has limited knowledge on the technical aspects of the project and rarely has questions related to its engineering soundness. However, the Minister has many valid (and sometimes irrelevant) questions that need to be competently addressed in order to instil a sense of confidence in the Minister that the project and its proponents can meet stated project-specific objectives, as well as the interests of a wide range of stakeholders involved with, and/or influenced by, the project.

The innovative educational approach described herein provides students with some insight on how to professionally deal with government officials, and fosters the development of confidence and communication skills. Such an exercise fills the

void of traditional engineering programmes, where the curriculum is focused largely on technical skills development.

## STRUCTURE OF A MINISTERIAL BRIEF

The concept of the ministerial brief was brought to students through course lectures. Students were made aware of the fact that politicians have extremely limited time to read and comprehend documents, and hence a ministerial brief would have to be limited to a maximum of two pages. It is, therefore, a challenging task for the engineering professional to address wide-ranging issues that may be of interest to the politician/minister in a convincing manner within a concise document.

Engineering professionals take pride in developing and designing projects of technical excellence and innovation. However, the ministerial brief must focus on issues of interest to the minister, such as the following:

1. Project brief;
2. Alternative options;
3. Benefits to the community;
4. Economics and value for money;
5. Environmental impact;
6. Sustainability;
7. Public opinion.

A brief description about the project and the need for the project must be clearly stated. It is also important to convey the message that alternative options have been considered in detail prior to arriving at the final proposal. The brief should also highlight the expected benefits to the community; this could be in the form of solutions to existing problems, the creation of new jobs, business opportunities, improvements to quality of life, etc.

The funding mechanisms and value for money issues should also be discussed. Will the project depend totally on Government funding? Is it going to be a Public Private Partnership? Will there be foreign collaboration? Will it generate income and be sustainable in the long term? The funding mechanism and sustainability issues will have a significant influence on a minister's final decision.

A summary of any Environmental Impact Assessment (EIA) study should also be included in order to satisfy the minister that environmental issues have been given due consideration and that the activities and way of life of the wider community will not be adversely affected. Politicians are sensitive to public opinion and, therefore, the ministerial brief should address issues that might bring public opinion into play.

In essence, the ministerial brief should place less emphasis on technical details/excellence and focus on social, environmental, financial and sustainability issues.

## MINISTERIAL BRIEF TEACHING METHODOLOGY

Students in the Bachelor of Engineering in Coastal Engineering degree offered at Griffith University, Queensland, Australia, were introduced to the concept of, and taught how to design and present, a ministerial brief [8][9]. This degree was targeted as the most appropriate programme to incorporate this innovative teaching, learning and assessment approach, as its graduates deal within the highly political area of coastal zone

management [10], and were the most likely to engage with ministers in their professional careers.

The Ministerial Brief Educational Activity (MBEA) was incorporated into a final year course entitled *Coastal Zone Management*. MBEA students worked in groups of two or three and were first required to develop a project (eg the development of a new boat harbour or an ecotourism resort) and then to conduct a hypothetical EIA on that project, which was submitted as a major report. This report helped develop students' knowledge of a particular development activity and the legislation details required for it to be successfully undertaken. Following this, students made a typical presentation to their student cohort, which was evaluated. The idea and concept of the ministerial brief was discussed with the students throughout the semester and then taught through a formal two-hour lecture.

The art of writing a ministerial brief was detailed in the lecture. The contents that must be included in the brief were highlighted with examples and case studies. The importance of presenting the project from a politicians' point of view, rather than that from a technical expert, was instilled in students. Students were also made to appreciate the importance of this brief document and the consequences it might have on implementation of the project.

Students were then required to develop a two-page brief based on their developed EIA report. The brief was assessed, with special emphasis being placed upon its clarity, conciseness and its ability to get its message across. The students then met with a *stand-in* Minister and presented their project for discussion. This face-to-face meeting lasted only 10 minutes. Their performance during the meeting was evaluated, with emphasis being placed upon quantifying their communication quality and their responses to direct questions, which were mostly non-technical based. Students were assessed by the Minister and a silent observer, who, to date, has always been the lecturer.

In all, 40% of the student's grade for this course was placed on the two-page brief and the meeting with the Minister. While this represents a very high proportion given the perceived amount of effort in terms of formal examination time (10 minutes), it is essential to realise that students were required to know and appreciate their work in order to achieve a high grade. Further, this weighting reflected the importance placed upon this MBEA and the fact that it should be taken seriously.

The MBEA was first introduced in 2003. Little real change was made over the subsequent two years, meaning that the results obtained from evaluations of this teaching/learning approach from all three years could be combined and compared. For consistency, the same lecturer presented the lecture on the ministerial brief each year.

## MBEA STUDENT EVALUATION

Formal student surveys, consisting of both numerical weighting and written answer to questions were undertaken to evaluate the perceived effectiveness of the developed MBEA as a teaching, learning and examination tool. The results from the numerical portion of the survey are presented in Figure 1, while the written comments are presented in Tables 1, 2 and 3. The specific questions asked in the questionnaire were as follows:

1. How would you rate the effectiveness of the ministerial brief interview technique as a teaching tool?
2. How would you rate the effectiveness of the ministerial brief interview technique as a learning tool?
3. How would you rate the effectiveness of the ministerial brief interview as an examination technique?

That is, the questionnaire examined students' perceptions and not a quantifiable learning value. This was achieved through the formal assessment process.

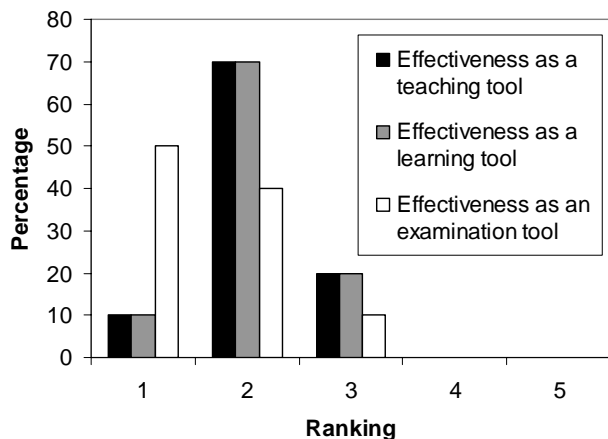


Figure 1: Graphical presentation of survey results from the MBEA when students were asked to evaluate the effectiveness of the ministerial brief education technique as a teaching, learning and examination tool. As the teaching methods did not alter and class sizes were small, data from the three years of teaching has been combined. A ranking of 1 means *very good* and 5 means *very poor*.

Table 1: Student perceptions of the MBEA for teaching.

How would you rate the effectiveness of the ministerial brief interview technique as a teaching tool?
<i>Very good preparation for the real world</i>
<i>From the ministerial brief, I think I was the one teaching</i>
<i>Get you ready for the real world</i>
<i>Made you think</i>
<i>Not much teaching required</i>
<i>Good experience, getting questions from a neutral person</i>
<i>Because it prepares us for the industry. Makes us think on the spot and understand what is required</i>
<i>I am not good at speaking – get very nervous. It is good to have practice before I'm in a job situation where the stakes and pressure are much higher</i>
<i>Effective tool that allows me to realise from another point of view what people make judgements on</i>

For the numerical question regarding the effectiveness of the MBEA as a teaching tool, the mean score was 1.86 with a standard deviation of 0.6 (n=17). To help develop an understanding of why students made their choices, the questionnaire also requested written feedback on their decisions. Table 1 lists some of their responses. The numerical

score indicates that students perceived the MBEA to be an effective teaching tool – at least in relation to its aims and other styles. The written comments support this and reveal the students agreed it was a relevant teaching tool, thus satisfying one of the MBEA objectives of preparing students for future communication activities.

For the question regarding the effectiveness of the MBEA as a learning tool the scores were the same as these for the teaching tool: mean 1.86 with a standard deviation of 0.6 (n=17). At first glance, this result indicates that respondents may not have been able to distinguish between the two questions. However, upon closer inspection, this was not the case. The comments made by students revealed their perceived importance of the MBEA for their future careers (Table 2). Significantly, this was not limited to traditional engineering type work (eg structural design), but also extended to communication at various levels, including rapid response communication.

Table 2: Student perceptions of the MBEA for learning.

How would you rate the effectiveness of the ministerial brief interview technique as a learning tool?
<i>EIS was helpful to learn procedures and legislation stuff</i>
<i>Good to help see how the integration of the project between team members helped us</i>
<i>I did learn how to prepare for such an incident</i>
<i>I learnt a lot about presenting myself and dealing with a client face-to-face. Engineering can't teach you communication skills, however this topic did</i>
<i>It made me think on my feet and forced us to talk to a non-engineer about our proposal</i>
<i>Because it is important for us to know what things are important when discussing a project</i>
<i>Because, it was the first time that I did this technique and I found it very interesting</i>
<i>Good to be put on the spot with regards to report</i>
<i>Enabled me to think about important issues</i>

For the question relating to the effectiveness of the MBEA as an examination tool, the mean score was 1.6 with a standard deviation of 0.6. As shown in Figure 1, the distribution pattern for this question was distinctly different from that of the other questions, even though the mean scores were similar. The students certainly preferred the MBEA evaluation approach; this is also reflected in the written questionnaire comments (see Table 3), which illustrate that students strongly favoured the MBEA approach as it required real-world assessment preparation, and was useful for developing communication skills. It also shows that students realised that, even though the examination was short (when compared with the traditional multi-hour written examination), they still needed to know the course material to perform at a high level. This acted to reinforce their life-long learning approaches, which is another key generic skill required by Engineers Australia.

These comments underscore that, through careful design, students can learn through a non-traditional assessment technique that encourages them to gain a comprehensive and cohesive understanding of their projects. The activity

highlighted the need to engage students in their learning process and to consider relevant teaching approaches. The student perceptions also revealed their desire to reduce written examination time, which is certainly warranted, and should not always be specified as a necessary requirement for some courses.

Table: 3 Student perceptions of the MBEA for examination.

How would you rate the effectiveness of the ministerial brief interview as an examination technique?
<i>Places more importance on real world preparation</i>
<i>Good technique for developing communication skills</i>
<i>If this is what it comes down to in the real world then that is how we should be evaluated</i>
<i>Great, relieved the pressure. The minister was very professional and understanding</i>
<i>I think you learn more than a written examination</i>
<i>Gets you ready for life after uni</i>
<i>No study was needed but a lot of general knowledge was required</i>
<i>It is short and sweet and you are thrown into a situation where you really need to know your stuff</i>
<i>Good break up of theoretical examination techniques</i>
<i>Places more importance on real world</i>

Overall, the MBEA has been found to be highly effective as an educational tool for engineering students. However, it does require significant effort on the part of the educator to assess students, as the interview-style oral examination cannot be undertaken with large student groups. For this project, the group size was limited to a maximum of three students (but preferably two), which was found to be more than adequate. Therefore, for large classes, say of 40 students, a minimum examination time (for a 10-minute interview and 10-minute changeover, where the student grades were determined) would be approximately six hours that, when compared to typical three-hour examinations followed by extensive marking, is very beneficial for the educator.

It was apparent from the educator's assessment of students' performance that students had indeed gained the degree of knowledge and generic skills expected of them. Furthermore, the oral examination gave the educator the chance to truly evaluate their direct interaction oral communication skills, which is not possible via other mechanisms.

## CONCLUSIONS

The Ministerial Brief Educational Activity was found to be highly valuable learning and teaching process in an area that

students had not experienced before. Students' perception of the activity was evaluated through formal questionnaires and from informal discussions. It was found that students' perceptions were that the activity was beneficial to their education process – a view also held by the educators.

This project highlighted the necessity and ability to educate students through different, what would probably be considered non-traditional, engineering education techniques. The outcomes are significant as a new learning and teaching tool was developed and implemented, that could be applied to other engineering fields. It has indeed transformed the education approach within the degree.

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