

# Using Heritage to Promote Student Learning

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***Abstract:** In higher education today, much attention is being given to the introduction of technology as a way to enhance the student learning experience. From the use of PowerPoint and the Virtual Learning Environment (VLE) to e-Portfolios and Second Life, the range of technology options is ever increasing.*

*This paper argues that the important characteristic of an engaging curriculum is variety. Despite the current generation of students' ability with technology, too much of the same thing can lead to disengagement. In addition, if teachers allow students to remain in their 'comfort zone', the opportunities to challenge students as they learn are reduced.*

*This paper explores the use of heritage in the engineering curriculum as a way to promote learning and engage students in a less familiar approach to study. The pros and cons of such a strategy are discussed and evidence of the student perceptions of the experience is presented.*

## Introduction

There is much interest today in the use of information technology in teaching and learning (Laurillard, 2002). Students come to university technology literate and it is seen as appropriate to make effective use of these skills both in and beyond the classroom. The JISC report, 'In Their Own Words' suggested that the use of e-learning is welcomed by the student body and should be encouraged (JISC, 2007).

This would seem to make sense, but it is valuable to take an opposing viewpoint and to suggest that using technology to support learning because students have a degree of comfort with it, is not an approach that should be accepted too readily. The findings of the 'Educating the Net Generation' project funded by the Australian Learning and Teaching Council suggest that the widespread student desire to use technology in learning is less prevalent than perceived (Kennedy et al, 2009). Beyond this, if universities are to equip students for the world of work, they should be challenged to operate outside their comfort zone as well as being given the opportunity to use and develop their technological talents.

This is even more important when we consider the reflective nature of teaching practice (Biggs and Tang, 2007). As practitioners we are encouraged to reflect on what we do. Critical reflection is also a skill that teachers work hard to develop in students as it is considered an important feature of effective learning. To reflect is to look back at past events and then to identify ways in which future actions can be modified in the light of the evidence gained. Against this background, it would seem appropriate to consider the use of heritage as a resource to promote student learning.

Engineering students, by way of their educational choices, are most often identified as the ones to welcome technology in the classroom. This is perhaps even more of a motivation for occasionally stepping away from technology and exploring different learning strategies.

## Learning and Teaching Proposition

There is a wealth of literature on the practice of learning and teaching and the underlying theoretical foundation. Whether based on psychology, sociology or a more discipline focused dialogue, it is important that the teacher has a basic philosophy supporting what they do when engaging with students. This will be unique for each teacher, yet given the common underlying themes, there will inevitably be similarities, perhaps with different levels of emphasis.

Within the engineering discipline it is perhaps not surprising to see this proposition presented in the form of an equation. The author has developed their own statement that drives the development of appropriate teaching strategies. Put simply, the proposition is

$$R + V + A = \text{Environment for Success}$$

The required outcome of any learning and teaching encounter is success – success for both student and teacher. Consequently the challenge faced by the teacher is how to create a learning environment in which that success can be achieved. The author's suggestion is that there are three key components to the creation of an appropriate environment.

Firstly, the relationships (R) that are crucial to the learning environment need to be valued and nurtured. These will not just be between student and teacher, but between students and their peers, teachers and colleagues and between both students, teachers and other interested parties e.g. families, industry, university managers and administrators.

Secondly, the variety (V) of approaches used in the classroom need to be significant yet remain appropriate to the task in hand both for teaching and assessment. In engineering we are blessed with opportunities for laboratories, manufacturing, simulation and much more, consequently the teacher already has much to choose from.

Finally, the alignment (A) of learning and teaching strategies with desired learning outcomes and assessment, Biggs' constructive alignment, is vital. The author suggests that the alignment should go beyond Biggs' definition to include consideration of the entry and earlier educational experiences as well as the future employability opportunities for the students.

Professional body requirements make the engineering curriculum a demanding choice for students and one that can appear to teachers quite inflexible to the introduction of creative learning and teaching. Problem Based Learning and its allied approaches have presented a way to coalesce areas of knowledge to produce opportunities for students to learn in a more efficient and effective way (De Graff and Kolmos, 2007). This is the same driver that has resulted in the consideration of the use of heritage to promote student learning.

## Context of the Study

The study group for this work is a cohort of students studying on an MSc course in Engineering Management. Students entering this course will typically have a first degree in an engineering or technology subject and up to 3 years experience working in industry.

This paper explores two examples whereby students were introduced to heritage as part of their studies. In both cases the objective was to take the students away from the classroom to explore a subject in a manner that promoted deeper learning. This can appear an abstract approach to engineering students, so the strategy was not without risk.

The two examples are:

- a visit to the ss Great Britain in Bristol as part of a Project Management module
- a visit to the Back to Backs in Birmingham as part of a Change module.

In both cases, the visits were undertaken towards the end of the identified modules and the activities formed part of the summative assessment. On completing the assessed piece of work in each case, the students were invited to complete a short questionnaire that explored their experience and the value they perceived it had to their learning.

The use of historical case studies in the engineering teaching environment is not common. Quite often the main focus of engineering teaching is the future – innovation and new technology rather than looking back at the past. Mottram (2007) describes the use of failure-related case studies based on historical events as an approach in civil engineering. Using history to teach engineering ethics has been described by Kline (2001). In both examples the learning and teaching is classroom based.

## Case Study 1 – ss Great Britain

In a 2002 poll carried out for the BBC, Isambard Kingdom Brunel was voted the second greatest Briton of all time behind Sir Winston Churchill (BBC, 2002). This recognition goes some way to show that engineering need not be as remote a subject to the general public as it sometimes appears, especially when considering the need to encourage more young people to enter the profession (Hasna and Clark, 2009).

A testament to Brunel is that large parts of his Victorian engineering innovation are still in use today whether they are railways, bridges or tunnels. One piece of Brunel's ingenuity that had suffered a rather chequered history was the ship the ss Great Britain.

The ss Great Britain was Brunel's great steamship and she was launched in 1843. At her launch she was the biggest ship in the world and was a technological marvel. She was the first ship that combined the screw propeller and an iron hull and is considered the forerunner of modern shipping (Watkinson et al, 2005).

After a chequered history, the ship finally came back to Bristol and in 2005 she opened to the public following an £11.3m conservation project that employed considerable creativity. The ship has a 'glass sea' around it that visitors are able to stand below. The iron hull is enclosed in a large dehumidification chamber that maintains a relative humidity of 20%. Studies had shown that this would stop the corrosion of the iron (Einstein Network, 2005).

The students were taken to visit the ss Great Britain and explored not only the technological innovation of the 1840's and today, but also the approaches to project management in each of these periods. On arrival, the students were introduced to Brunel and the ship by the curator of the attraction. This set the historical context for the visit. The students were then allowed the opportunity to visit the ship and the accompanying exhibition as they considered the questions posed in their assignment (Figure 1).



**Figure 1: Students enjoying the ss Great Britain**

The questions were developed in order to encourage the students to contrast the past with the present, to identify the importance of people in the innovation and management processes and to reflect on how their studies could impact projects of the complexity and magnitude of the ss Great Britain initial build and the more recent conservation.

The day concluded with a presentation by the project manager responsible for guiding the restoration project (Baister, 2006). The contrast between Brunel's lack of project management process and the maturity of the modern day approach became apparent, yet the students were encouraged to also consider the time periods in which the two events occurred and the innovation involved.

## Case Study 2 – Back to Backs

Management of Change can be perceived by many engineering students as an abstract subject to study, yet it is important in our ever changing world to have an appreciation of the subject. There are often no right or wrong answers to the challenges posed, consequently students are taken outside of their comfort zone (Clark, 2008).

The exercise employed as a capstone to the course of study is a presentation. The feature of the presentation that is not typical is that it takes place within the courtyard of some restored 19<sup>th</sup> century Back to Back housing owned and operated by the National Trust in Birmingham, UK (Upton, 2007). This means no PowerPoint. The presentations are restricted to 5 minutes per group and the groups are encouraged to be as creative as possible in addressing the business scenario described below (Figure 2).

*For this task you are being asked to work as a group. The scenario is as follows.*

*You are a team of change consultants and you offer training and consultancy to businesses all over the Midlands. Today you have been invited by the Birmingham Chamber of Commerce to a special morning presentation session, where you, along with other suitably qualified companies, are being asked to present a pitch for change management training to be provided to the companies whose managing director's are present today. You have been asked to present under the title – **Reflections on Change: Hope for the Future**.*



**Figure 2: Student presentation**

Locating the presentation in a heritage site encourages the students to look back as well as to the future. The Back to Backs themselves represent many of the changes experienced by the city of Birmingham since the early 1800's and act as inspiration to the groups as they work on their task.

The exercise generates excitement, promotes creativity and ensures the students focus on their message, space and audience to gain maximum impact. The presentations quite often involve different forms of role play, although the approaches taken vary from quite traditional ones with the groups bringing boards with writing and pictures on them to comedy, dance, singing and puppet shows. The thing to remember is that the students are all engineers!

The presentations are assessed by the student cohort as a whole against criteria they have defined as being important. Within groups peer assessment is also encouraged to allow moderation of the marks based on student contribution.

## Discussion

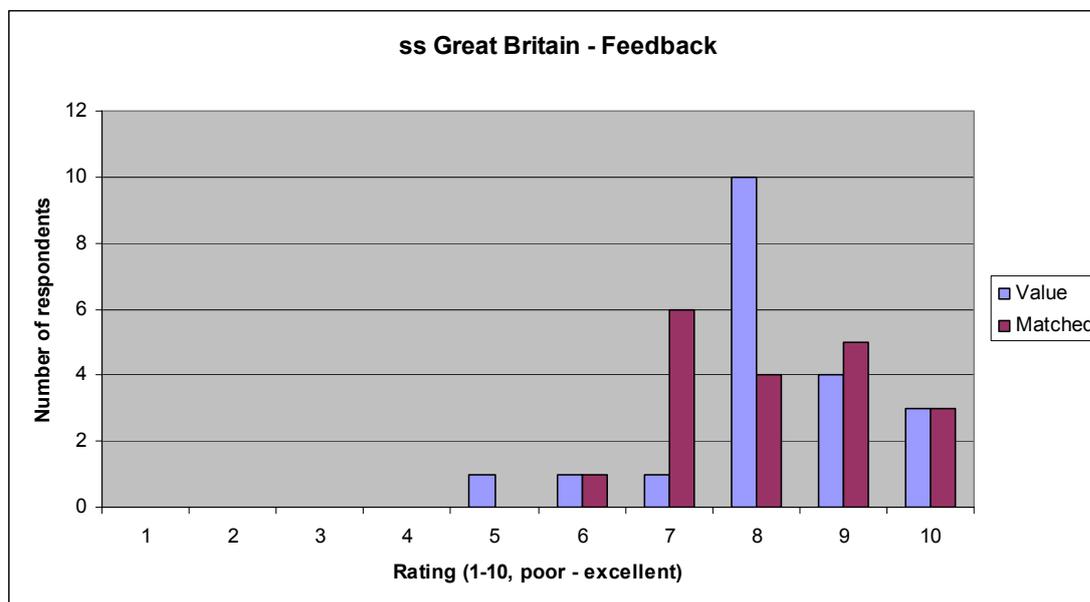
Initially it is worth stating that taking the students away from the classroom was seen by the students as an enjoyable experience. Because it occurs infrequently, the change was appreciated, it provided

new stimulation and allowed the students to develop new and sometimes different relationships with each other. Students enjoying the experience was one factor, but not the most important when considering learning.

Along with enjoyment, 3 other questions were posed – Was the experience valuable to your learning? Did you find looking back in time meaningful? Did the assessment activity align with the objectives of your learning? The responses were collected using a Likert scale from 1 to 10, where 1 is the low end of the scale, 10 the high end.

The responses rates were 29% for the ss Great Britain and 45% for the Back to Backs. In both cases all respondents considered the experience worthwhile. Looking back was seen as meaningful by all respondents, the mean score being 8.3.

Figure 3 illustrates the responses to the remaining 2 questions concerning the value to learning and the alignment of assessment. In both cases the student perceptions are positive, suggesting that the activity not only engaged them, but also contributed to their learning in a meaningful way. A similar characteristic was observed for the Back to backs case.



**Figure 3: ss Great Britain Student Responses**

The students were asked 2 open questions – What was the most valuable feature of the experience? What were the key learning points you took away? For the ss Great Britain, the opportunity to see a project first hand (13 references) and interact with a ‘real’ project manager (7) were seen as most valuable along with the historical context (8). The historical context (12) was seen as most valuable in the Back to Backs case. Learning by doing (9) followed, along with the students seeing the experience as an opportunity for them to change (7). The learning points were quite content related in the ss Great Britain case – risk (9), teamwork (7) and planning (6) being the top three areas referred to. For the Back to Backs one point dominated, that being the need to be proactive and adapt to change. In both cases the learning points are those that the teaching seeks to emphasise, so the student responses are encouraging.

In the cases discussed the learning experiences were considered effective. In order to achieve this, preparation was essential, both with respect to the visits and the assignments developed, and also when preparing students for the work to be undertaken and the historic settings used.

It is acknowledged that the response rates were quite low. This is not uncommon at the end of a term when student thoughts are on assessment and when the surveys require a voluntary response. Discussions with the wider student cohort confirmed the message the survey data was suggesting –

positive engagement and a perceived value to learning. The ultimate measure of effectiveness was the number of students that were successful when studying the two modules described. In both cases all students passed the module with grades between 60% and 70%. An additional indicator of the way in which both exercises were helping student learning was the way in which students referred to the experiences in exam questions in order to illustrate more generic concepts and applications. The memorable nature of the learning experience was often mentioned by students as key to the value they perceived in the exercise.

## Conclusions

In developing a response to the author's learning and teaching proposition, the work has demonstrated that using heritage to facilitate learning can be of value. In a technology driven age it adds variety to learning and teaching that can be both enjoyable and effective. The off site experience allows relationships within the learning and teaching environment to develop in different ways. An added bonus is that with an increasingly diverse student cohort, the opportunity exists to introduce international students to British culture. The challenge is ensuring that the experience is adequately aligned with the learning objectives and future employability. The perception of the students in this small scale study was that this had been achieved. Obtaining compelling evidence for the effectiveness of the interventions is an ongoing challenge.

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