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Evaluating the learning outcomes of an international field trip in postgraduate lighting design courses

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Abstract

Lighting industry professionals work in an international marketplace and encounter a range of social, geographical and cultural challenges associated with this. Education in lighting should introduce students to aspects of these challenges. To achieve this, an international field trip was recently undertaken that sought to provide an authentic learning experience for students. Twelve Masters of Lighting students from two Australian universities took part in a field trip to Shanghai, China and surrounding areas. The goal was to offer students insight into practical issues in the lighting industry at an international level and to do so in a unique and authentic context. To evaluate the outcomes of the trip, each participant was surveyed afterwards. Benefits were identified in terms of: increased knowledge and insight into manufacturing issues in lighting, experiential learning in lighting design practice not available locally (e.g, master planning), increased understanding of cultural influences in design and enhancing professional contacts within the lighting industry. Field trips may also act as an inverted curriculum experience for new students to engage them and promote learning within a professional context.

Keywords

authentic learning, experiential learning, field trip, first year experience, inverted curriculum, lighting industry

Introduction

It is generally acknowledged that field trips have the ability to promote deep learning (Hill & Woodland, 2002). The value of field trips and their contribution to student engagement and learning can be viewed from an experiential learning framework. Experiential Learning Theory (ELT) encourages deep understanding by progression through four steps in the learning cycle: concrete experience, reflective observation, abstract conceptualisation and active experimentation (Kolb, 1984). Easterly and Myers (2009) positioned field trips in the experiential learning cycle, noting the ability of the direct (i.e., concrete) experience fieldwork offers to initiate the experiential learning cycle. In a discussion of learning spaces for enhancing experiential learning, Kolb and Kolb (2005) acknowledged the significance of learning spaces that extend beyond the classroom in order to engage people with different learning styles. They continued on, concurring with Lave and Wenger (1999) and describing learning from an ELT perspective as "a process of becoming a member of a community of practice through legitimate peripheral participation" (p. 13). From this perspective, a field trip can be viewed as an opportunity to achieve several benefits: student engagement, facilitating deep learning, and connecting students with a professional

community.

The Masters of Lighting courses at QUT and University of Sydney each has a strong vocational focus, and therefore it is deemed important to provide opportunities for the development of graduate capabilities. Most significantly, it was expected that the joint international field trip that the students would undertake in 2010 would specifically develop capabilities related to:

i. advanced knowledge and understanding in lighting design practice and manufacturing for lighting design;
ii. professional knowledge and skills in lighting and/or engagement within the lighting industry;
iii. an understanding of international perspectives encompassing:
   - active contribution to intellectual, social and cultural activities,
   - recognition and appreciation of gender, culture and customs in personal and community relations; and,
iv. effective communication with discipline specialists in cross-cultural contexts.

While there is little evidence in education literature relating to the use of field trips in lighting education, there are many disciplines in tertiary education that have a strong tradition of fieldwork, viz., geography, agriculture and sociology (Easterly & Myers 2009; Fuller, Edmonson, France, Higgitt, & Ratinen, 2006; Jakubowski, 2003). Further, the use of immersive field trips in sociology education has been shown to enhance students' ability through 'learning through involvement' including learning about cultural diversity (Jakubowski, 2003). These experience reinforce the educational potential of the field trip to China as an opportunity to promote engagement of lighting course students with an international design community. From an experiential learning theory perspective, the trip was designed to offer students concrete experience, and the opportunity for reflective observation: two of the four dimensions in the experiential learning cycle.

Scope of the field trip

The international field trip described in this paper comprised of visits to factories, universities, lighting installations and culturally significant sites in Shanghai, Hangzhou and surrounding areas in China. As noted, the field trip was primarily designed to offer the students opportunities for experiential learning that were unique to the location and that were not available to them in Australia. These related to:

- observing the lighting-related manufacturing sector in China;
- listening to lectures from a lighting designer on master planning for the Hangzhou Lake area – followed by a guided tour of the site; and,
- observing cultural influences on lighting design in Chinese cities and towns.

Technical visits

The lighting industry in Australia is largely retail, so students working in the local lighting industry would have little or no exposure to the manufacture of lamps and luminaires. The field trip included visits to lamp and luminaire factories to gain insight into product development and the manufacturing processes involved in lighting products. Students saw lighting products evolve from the basic components (glass, metal plastics), through methods of assembly, addressing issues and difficulties in the process and follow the product right up to quality assurance and packaging.

Lighting master planning

It is rare that a student of lighting can get 'hands-on' with lighting master planning (defining lighting concepts for a large region). Addressing this, the field trip included a visit with an expert in lighting master planning to describe and discuss the development of a plan for a local tourist area (Hangzhou Lake) from brief to concept and plan. They then had the opportunity to visit the Hangzhou lake area – guided by the designers who implemented the plan – to observe the design as it was constructed.

Cultural experiences in lighting design

Exterior lighting design in China can contrast dramatically with typical lighting design observed in Australian cities. Factors such as differences in technologies commonly employed (particularly the prevalence of LEDs), different national lighting standards and energy efficiency codes, cultural associations with colour, and diverse approaches to the use of public spaces; manifest to yield unique cultural associations with lighting design. Experiencing and appreciating these unique cultural aspects of design is one of the major goals of the field trip.

Research method

The trip, as an experiential learning activity, sought to provide students with concrete experiences in several areas of lighting that will enable deep learning in a professional context and develop their capabilities. In order to evaluate the outcomes of the field trip, a survey of all of the staff and students who attended was conducted on its completion.

The survey questions were distributed prior to the trip. The goal of this was to reveal the questions prior to the experience and prompt attendees to consider and reflect on their experience with the survey questions in mind. In this respect, the survey itself was intended to become part of the learning process by encouraging reflective observation, an element of the experiential learning cycle.

Of the 10 surveys distributed, 8 were completed. This total was made up of 6 student responses and 2 staff responses. All surveys were correctly completed and most included detailed comments responding to stimulus questions. Simple quantitative analysis and qualitative coding was applied to the survey responses. The findings are presented in the following subsection and the survey instrument is included in Appendix 1.

Findings

The survey, as can be noted in Appendix 1, required simple yes (✓) or no (X) responses. Overall, the responses were highly positive. The following themes emerged from the student and staff responses.

Technical visits
All of the respondents (n=8) agreed that the trip allowed them to observe and understand issues related to manufacturing in the lighting industry. Technical visits to lamp and luminaire factories were rated as highlights of the trip by many and 75% agreed that they had gained new insight in manufacturing issues. In all, 88% of respondents believed they had increased their knowledge of China as a centre of manufacturing in the industry. Favourable response to the technical visits was highlighted in detailed comments:

- *I would like to see more technical and manufacturing issues and how it works.*
- *The field trip to RoLED and Everfine (factories) is something highly cherished.*
- *I found the process of making fluorescent and metal halide lamps fascinating.*

The survey findings suggested that students with varying levels of industry experience all engaged in this aspect of the field trip. A student with experience in lighting consultancy commented: *'Having sold some of these products before I was looking forward to seeing the operation – in particular the aging processes and thermal testing facilities.'*

Lighting master planning
The survey asked students if they felt that the field trip allowed them to experience examples of master planning, particularly observing the culmination of planning in the Hangzhou Lake area. The majority, that is 88% of respondents, identified this as an important outcome of the trip. This outcome was highlighted in detailed comments:

- *Tongji University gave a great presentation of their master plan for the lighting of EXPO and then we were able to view the EXPO site at night … it was great to see their preliminary design and then to experience what was and wasn't put into practice.*
- *The Hangzhou Canal cruise provided an interesting look into the development of a master plan and the final product and how things in design may be perceived differently than how they will turn out in practice.*

Cultural experiences in lighting design

The survey sought responses from students on how the trip impacted on their concept of international lighting design and the influence of cultural factors on lighting design (both specific to China and Australia – and more generally in a global context). Several survey questions related to measurement of this outcome, and the majority responded positively. The majority, that is 88% of respondents, agreed that the trip helped them to appreciate the cultural impact on design and aesthetic outcomes and allowed them to observe the cultural significance (and cultural differences) in interior and public space lighting. Fewer respondents, 63%, agreed that they experienced and understood the impact of cultural influences on lighting design. When directly questioned about whether they felt the field trip broadened the scope of their understanding of lighting design to include international design issues, 63% agreed that it had done so.

Other detailed comments relating to graduate capabilities

Other comments were sought from students relating to positive outcomes from the field trip that related to graduate capabilities. In all, 88% of respondents felt that the experience not only highlighted the importance of making industry contacts, but that it actually expanded their contacts and afforded them networking opportunities both nationally and internationally. This is an excellent outcome for a course with a strong vocational focus.

Only 50% of students felt, however, that the trip helped them to understand the relationships within sectors of the lighting industry, appreciating the practice of various professional groups and the contact they have with each other. One student felt that their experience gave them insight regarding the lighting industry and professional practice, specifically: *'insight into the importance of specifications and design team interaction through the design process.'*

Six of the eight respondents felt that they were inspired by the events of the trip. A standout comment that encapsulates the intrinsic value of the field trip to the student experience was: *'What inspired me the most is that after going and seeing all of this in China, I know more than ever and that I am on the right track at being the best lighting designer I can possibly be.'*

Discussion

When prompted for any additional comments or feedback, several issues were raised that might have impeded optimal outcomes from the field trip. These comments might also impact on future field trips or, at least, inform their planning.

When is the best time for the field trip?

Field attendance was voluntary and offered to all students (first year to final year); however, most of the participants on the field trip happened to be in the final stages of their course. One of the students formally noted (through the survey) that they would have gained much from the trip earlier in the course. This was confirmed informally in conversation with other participants after the trip. This is an interesting response from an educator's point of view: Would a less experienced student gain as much benefit given their more limited exposure to important concepts, theories and terminology in lighting?

Combining reports of feeling inspired by the field trip (75% agreed) with student responses indicating that it would have greater value earlier in their studies, points to the possibility of field

trips as inverted curriculum experiences in a Masters of Lighting course. 'Inverted curriculum' refers to the provision of high-level, complex learning experiences, normally reserved for advanced students, to those who are just beginning in a program of study. The goal of this practice is to allow new students to appreciate the type of tasks and activities that they will be undertaking as they progress through their studies and into the workplace. These tasks are normally reserved for capstone units, that is, until a student has accumulated the knowledge and skills considered requisite; however by exposing students prior to this it can motivate and provide context for the learning to come (Gilling, 2010; Lister et al., 2006; Pedroni & Meyer, 2006). One of the benefits of engaging first year lighting students with such an inspirational experience and learning in a professional context may be observed in increased student retention. If the field trip were applied as an inverted curriculum experience in the future, outcomes may be measured by student retention rates and the number of students articulating between the award levels of the course (i.e., Graduate Certificate in Lighting, Graduate Diploma in Lighting to Masters in Lighting).

Barriers to optimal outcomes

Several students identified time restrictions (e.g.. on factory visits and tours) and language barriers as issues that hampered the learning experience. This is expected in a field trip of this nature, but could be improved by limiting the itinerary to a restricted geographical area and reducing travel time.

Future fieldwork

Given the positive outcomes reported by participants in this field trip, it is a future goal to implement international field trips as an (elective) inverted curriculum experience in the Masters in Lighting courses. The impact of this may be measured in terms of student retention and progression through the course. The opportunity to incorporate assessment into the field trip may also be explored with the goal of enhancing the reflective observation component of the work and potentially incorporating active experimentation, thus allowing greater student progress through the experiential learning cycle.

Conclusion

The international field trip to China described in this paper was an overwhelmingly positive experience for students and staff of the Australian Masters in Lighting courses. Students' reports reflected that the goals relating to enhancing graduate capabilities were achieved and that the field trip provided students with authentic experiences of international issues in lighting in a professional context. Additional benefits of the trip were reported in terms of its motivating and inspiring students and in the development of industry contacts nationally and internationally. Future directions for this research include incorporating assessment into the field trip to further promote experiential learning, and structuring the trip as an inverted curriculum experience for first year students.

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Appendix 1: Survey Tool

Postgraduate lighting students – China field trip 2010
Participant survey

Background: The learning experience is invaluable for local QUT students. The lighting industry in Australia is largely retail, so that even students working in the local lighting industry would have little or no exposure to the manufacture of lamps and luminaires. The ability to visit the factories and gain insight into product development and the manufacturing processes involved is not available by any other means. Here students can see a lighting product evolve from the basic ingredients, through methods of assembly, addressing issues and difficulties in the process and follow the product right up to quality assurance and packaging.

It is rare that an Australian student of lighting can get very 'hands-on' with lighting master planning. In this tour, students can see an expert in lighting master planning (Prof Hao Louxi) describe and discuss the development of a plan for a local tourist area (Hangzhou Lake) from brief to concept and plan. They then get the opportunity to visit the Hangzhou lake area – guided by the designers who implemented the plan – to observe the design as it is realized. This experience is undoubtedly unique for students. Shanghai in 2010 will host the World expo, this is significant as it will be designed according to another lighting master plan led by Tongji University, providing another opportunity to observe a master plan realized.

Some potential learning outcomes of field trips of this type are listed below. Not all of them will be relevant for each individual (or each tour):

Please indicate with a tick [√] the learning outcomes you feel have been achieved as a result of participating in this tour. You can indicate with a cross [x] any you feel have not been addressed.

- ☐ Visit lamp and luminaire manufacturers and see the industry development from R&D and product testing, to production on the factory floors (observing an industry no longer existent in Australia)
- ☐ Understand the issues of quality control during manufacture, and how it can affect final product performance
- ☐ Gain new insight into lighting manufacturing issues (please specify)
- ☐ Increased knowledge of China, as a centre of manufacture, with a broad spectrum of products ranging in quality from very high to low
- ☐ Visit Tongji University and Fudan University in Shanghai to view research facilities and hear presentations from students and local Professors – specifically this relates to emerging research in photometry, human factors in lighting and mesopic vision (Fudan University) and also lighting design, lighting master planning and lighting design visualization (Tongji University)
- ☐ Experience examples of Master Planning, explained to the group, then viewed in situ
- ☐ Observe the culmination of lighting master planning in the Hangzhou lake area
- ☐ Observe the cultural significance (and differences) in interior and public space lighting through tours of noteworthy buildings and nightscapes.
- ☐ Broaden the scope of your understanding to include international design issues, and their relevance to you as international graduates
- ☐ Experience and understand the impact of cultural influences on lighting design

- ☐ Appreciate cultural impact on design, bias, aesthetic outcomes
- ☐ Understand the importance of making industry contacts, and an opportunity to do so. Also includes your postgraduate student cohort, which is comprised of industry practitioners
- ☐ Expand contacts and improve networking, nationally and internationally, including Sydney/Brisbane contacts
- ☐ Appreciate the organisational structure of the lighting industry and your role in it
- ☐ Understand the relationships within sectors of the lighting industry, in particular how each affects the market structure
- ☐ Was the balance of the technical and cultural elements of the tour about right?
- ☐ Did you feel that the cultural and tourism elements of the tour gave any extra depth to its technical elements?
- ☐ Were you inspired?
  - Challenged?
  - Have you revised any previous thoughts or preconceptions?
- ☐ Did you feel there were learning outcomes achieved that are not listed here?
  If so, please describe:

Additional comments:
Please provide any additional comments, feedback or suggestions for future field trips:

Thank you for your participation. If you would like to make any other comments, please email Dr Gillian Isoardi at QUT g.isoardi@qut.edu.au