



## Identifying e-learning principles for Maritime Education through the e-initiatives project: A design-based approach

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The Australian Maritime College (AMC) has a major objective to innovate and build better practice in e-learning by developing high quality learning for anyone, anytime, anywhere. One strategy that the AMC has undertaken to achieve this is to fund a number of e-initiatives (learning and teaching projects being undertaken using digital technologies) each year between 2012 and 2016. To gain maximum long-term benefit from this project it is essential to develop an evidence based approach, studying each initiative's effectiveness and derive learning and teaching (L&T) principles for using technology within the maritime context. This paper describes a project to explore, implement and document e-learning principles relevant to the maritime education context. The project uses an educational design-based approach. At conclusion of the project it is expected that a number of learning designs and guiding principles for maritime education will be developed.

Keywords: e-learning, Maritime Education, design-based research, learning designs

### Introduction

... the capacity for technology to enhance the student experience ... is enormous. This presents exciting opportunities to refresh curricula approaches and the challenges of ensuring staff are aware of these opportunities (UTAS, 2012).

The Australian Maritime College (<http://www.amc.edu.au/>) is committed to expanding the use of technology that enhances learning and teaching. Part of its strategic planning is to strengthen e-learning and assessment through a structured program which includes the provision of funding for a number of grass roots e-learning initiatives (AMC Strategic Plan, 2012-2014). These e-initiatives are seen as a way to build better practice in e-learning and potentially provide new and exciting opportunities for expansion of learning and teaching into flexible learning environments in the maritime context. According to the AMC executive management team (AMC, 2012) a number of environmental drivers have precipitated the need for greater awareness and practice in e-learning, including:

- Changes in teaching and learning theory and practice, with an increased focus on student-centred learning and a subsequent change in the role of the teacher from lecturer, or sage on the stage (King, 1993), to a facilitator of learning in partnership with students;
- Opportunities to participate in emerging markets in the broader maritime sector and non-maritime sectors;

- Rapid technological change and development with a growing need for seafarers with advanced technological skills.

The challenge for teachers within the AMC and indeed in maritime education is to deliver quality learning and teaching within an environment that may be unfamiliar to them and many of their clientele. The industry has typically used a hands-on training approach, which provides skills, context, experience, a physical environment, and tactile feedback. The predominant face-to-face approach to learning and teaching within maritime training is understandable, given the nature of traditional workplace practice. One of the greatest limitations of providing e-learning in the maritime industry where participants are from all parts of the globe is delivering it in a form that maybe very effective for those whose first language is English, but may be less than effective for those with other linguistic backgrounds. Another limitation is to provide access to resources that are easy to access ashore, but providing access to seafarers at sea with limited bandwidth, and speed possess a major hurdle.

## Guiding principles underpinning research

The e-initiative project is being guided by two major theoretical frameworks or guiding principles: learning designs and learning themes.

The first learning framework underpinning the research is learning design theory. Learning designs are visual diagrams or templates of student learning experiences. Oliver and Herrington (2001) suggest that a learning design is a framework that “provides structure to support the design process” (p. 17). A learning design should include the following elements: learning tasks, learning resources and learning supports (Oliver, 1999; Oliver & Herrington, 2001). According to the AUTC (2000) project website learning designs “describe the various frameworks that can be used to guide the design and choice of these elements in the development of a learning experience for students, particularly ICT-mediated learning experiences”. Within the educational development phase of the project, learning designs are developed for each e-initiative. These designs will provide examples of good practice in e-learning in a maritime context and support building better practice in e-learning for future initiatives.

The second learning framework is learning themes. Luckin et al., (2012) suggest that understanding and applying “learning themes” can support the development of learning using technology. They developed a framework that can help evaluate the success of innovations in learning and teaching. Learning themes are used in this project to guide the evaluation of each e-initiative and to determine which designs better facilitate each aspect of learning. The learning themes include (Luckin et al., 2012, p. 9):

- learning from experts - approaches that enable learners to access and use information from experts in the field (e.g. resources available on the web) and also approaches that allow outside experts to participate and support learning;
- learning with others - approaches that support collaboration, community building, networking with others and sharing items;
- learning through making - approaches that use digital tools to make, construct, share, discuss or craft something;
- learning through exploring - approaches that support learners to develop skills in finding and filtering information and regulating their own learning;
- learning through inquiry - innovations that support students asking questions, making discoveries and rigorously testing these discoveries;
- learning through practicing - innovations that allow students to practice skills and knowledge, providing challenging problems and immediate feedback mechanisms and often using multi-modal representations;
- learning from assessment - innovations that support assessment and help teachers and learners track their progress and present that information in rich and interactive ways (potentially using learning analytics and other feedback mechanisms);
- learning in and across settings - innovations that allow the learner to use technology outside the classroom and within settings that are relevant to the task.

## Aims and scope of the project

The AMC e-initiative project is designed to support lecturers in developing innovative strategies using e-learning to enhance practice. The project’s aim is to develop transferable learning designs and guiding principles for e-learning in the AMC maritime context and beyond, through dissemination of results. The overarching question framing this research is: What L&T principles are most relevant to the AMC context? Unpacking this question in each e-initiative (action research project) we ask two questions: Firstly, what educational principles

are facilitated by this e-initiative? And secondly, how effective is the e-initiative at facilitating these principles?

Design research will form the methodological framework for this study. This approach is also known as design-based research, educational design research, design experiments and development research, and while similar to action research, it goes beyond that methodology by involving an iterative process of analysis, design, development and implementation of a specially designed model (Herrington, Mantei, Herrington, Olney & Ferry, 2008; Phillips, McNaught, & Kennedy, 2012; Reeves, 2000). The planned e-initiatives will follow a four phase process similar to that defined by Reeves (2000, p. 25):

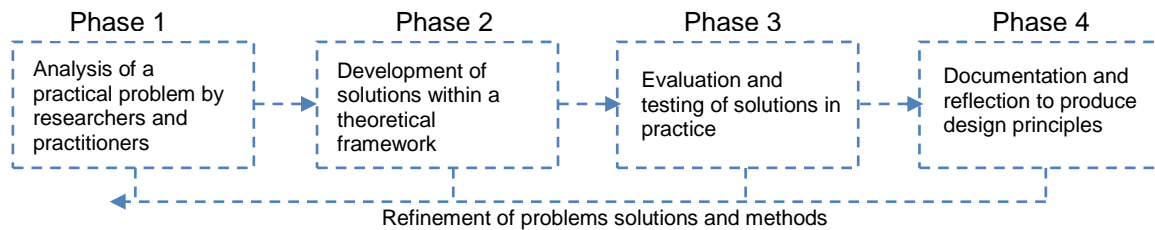


Figure 1. Design-Based Research Model (Reeves, 2000, p. 25)

## The e-learning principles for Maritime Education project

The e-initiatives project is anticipated to be conducted over a two year period, with approximately 12 teachers involved in a variety of projects. We have followed a modified version of the design based research process: including 4 phases to identify the e-initiatives, develop meaningful learning tasks through an educational development process, gathering evidence of the task and finally promoting, showcasing and sharing the examples, principles and learning designs to other teachers at the AMC and beyond (see diagram below).

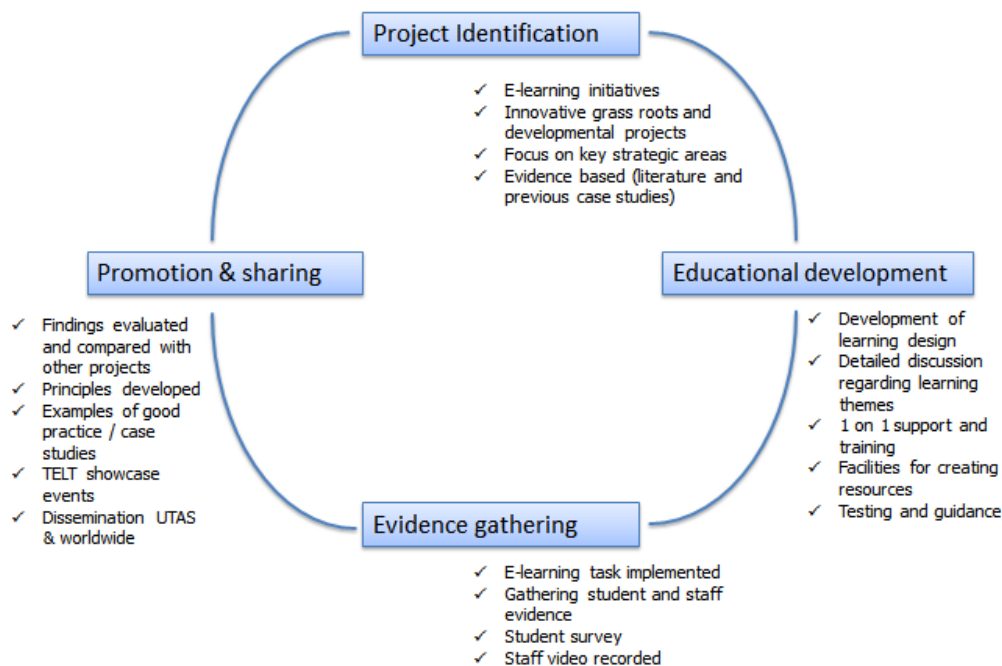


Figure 2. e-Initiative Project Design Model

### Phase 1: Project Identification – analysis of a practical problem by researchers and practitioners

At the beginning of each semester a request for expressions of interest for e-initiatives is sent via the AMC L&T Committee and e-Learning Working Party. Lecturers across the AMC can request funding, educational development and support for a project they would like to develop. After the expression of interest the lecturer and an educational developer discuss the project and the potential benefits for learning and teaching. The focus is on innovative or developmental grass roots projects exploring strategies for teaching in maritime education. The discussion is open ended (and often undertaken over a period of meetings) but usually involves discussion

and exploration of the following: the types of learning themes inherent in the initiative, technologies that may support the learning theme, the affordances of technologies that are being considered, and design considerations for how to make this idea operational. Together the educational developer and the lecturer develop an *Endnote* library (including documents) of relevant literature within the area of e-learning and start developing a literature scan for their topic. Phase 1 of the project often involves purchasing and allocation of required equipment, software and hardware.

In Semester two 2013 there are 6 projects underway, these include:

- using multimedia feedback to develop problem solving skills and to scaffold an appropriate problem solving methodology in marine engineering;
- developing video lessons of applied mathematics using a document camera and screencapture software;
- enhancing a student focused discussion forum assessment task;
- creating an online academic orientation module for mathematics;
- using video of a field trip and *Microsoft Excel* as an automated feedback mechanism to get distance students into the field in marine biology; and
- the development of mobile simulations for Global Maritime Distress and Safety Systems (GMDSS).

## **Phase 2: Educational Development – development of solutions within a theoretical framework**

At this stage a case study is developed by the lecturer and educational developer to provide more detail regarding the specifics of the e-initiative. Over a period of weeks the learning team will undertake the following: a more detailed discussion regarding learning themes and how they can be implemented within the project; development of a learning design; a video recording outlining the context, purpose, outcome/issue, and what is intended to be achieved; and professional development activities are undertaken to support the technological use.

Lecturers are provided a number of opportunities for developing the initiative and the technological knowledge to undertake it. Professional development opportunities are provided by AMC L&T, one on one at-elbow support is available, and an e-learning working party meets monthly to discuss and share ideas. The e-learning working party is designed to provide an outlet for lecturers to discuss the needs of their project and to develop professional development activities.

## **Phase 3: Evidence Gathering – evaluation and testing of solutions in practice**

Ten to twelve e-learning tasks are expected to be implemented and evaluated over the 2 years. Evidence will be gathered for each initiative over 3-4 weeks. Each case will be evaluated and reported on using the same methodology and survey instrument (with minor modifications to survey questions based on learning themes). Some additional data collection may occur depending on the specific needs of an e-initiative. At the end of this phase the teachers will have implemented their learning design including appropriate resources, supports and assessment items. They will have uploaded their case study to the e-learning website and gathered student perceptions of the learning.

## **Phase 4: Promote & share - documentation and reflection to produce design principles and disseminating of these principles**

The project team will explore the connections between the various projects. They will look at the successes and failings of each e-initiative, exploring the learning themes and how they are interpreted by the variety of strategies used, developing principles for e-learning in the maritime context, reflecting upon these understandings and then finally disseminating these findings freely to all teachers in higher education and in the maritime context. The final phase is the most important phase - using the findings of the implementation and evaluations to create design principles that can be used by other maritime educators (and potentially other lecturers in higher education).

A number of vehicles for dissemination have been decided. All case studies, learning designs and e-learning principles will be published via an AMC e-learning website, as part of an ebook, and at an annual AMC e-initiatives event. Each case will be added to a blog and a poster will be developed for dissemination around the university. A number of papers will be written for national and international conferences in learning technologies and also maritime education.

## Conclusion

Adoption of e-learning is not widespread in the maritime learning and teaching context. One potential reason is a lack of understanding and evidence regarding the types of strategies that are effective for maritime students. Another reason is the lack of simple and effective learning designs to guide the process for e-learning development. This proposed project intends to explore and implement a number of learning activities that explore learning themes in e-learning and learning designs appropriate for successful e-learning. The project is likely to yield a great deal of useful, transferable and customisable e-learning knowledge in a maritime context.

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