AUSTRALIAN LEARNING & TEACHING COUNCIL

Promoting excellence in higher education

Developing and disseminating team skills capacities using interactive online tools for team formation, learning, assessment and mentoring

Final Report 2011

Partner institutions:
The University of Queensland
The University of Melbourne
The University of Western Australia
RMIT University
University of Southern Queensland
University of Technology Sydney

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http://ceit.uq.edu.au/content/pets

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Executive Summary

Teamwork is intrinsic in higher education. It allows for: larger real-world projects to be set, teamwork skills to be improved, collaborative learning, and the establishment of student social networks. However, in order to ensure that learning objectives are achieved, it is imperative that higher education teachers implement student team projects effectively and professionally.

This project was concerned with a multifaceted approach to creating effective, productive and happy student teams and minimising team dysfunction and poor project outcomes. The PETS (Proactively Ensuring Team Success) process, which addresses team dysfunction and social loafing, has been tested, evaluated and continuously improved across a range of disciplines since 2002. This project has produced a printed manual available online, an interactive and customisable website for students called *Working in Teams*, and an online peer-evaluation tool called *WebPAf*. Together these three components contain all the essential resources for the PETS process, including interactive teamwork exercises, downloadable models and examples of team structures, and video and audio packages to complement text and images.

It is important to note that the PETS process is not a quick fix nor is it a substitute for content. Instead, it is an effective teamwork overlay requiring good project management and a reasonable investment of time.

Additional details about the project include:

- Partner Institutions:
  - The University of Queensland
  - The University of Melbourne
  - The University of Western Australia
  - RMIT University
  - University of Southern Queensland
  - University of Technology Sydney

- Resources produced (located on http://ceit.uq.edu.au/content/pets):
  - Community of practice website
  - PETS Process instructor's manual
  - WebPAf: online peer evaluation tool
  - Working in teams online module

- Impact on and value to the sector:
  - National collaboration on student teamwork between partner institutions and Monash University, The University of Adelaide and The University of Tasmania;
  - International collaboration with The University of Loughborough, UK, Imperial College, UK, Purdue University, USA, The University of Canterbury, NZ, and The University of Cape Town, SA; and
  - Inter-project collaboration: IS-IT Learning (ALTC, UQ), and Innovation Adoption (CEIT, UQ).

1.0 Introduction

Aims

The key aims of this project were to develop a resource package to support the process for Proactively Ensuring Team Success (PETS) for students in higher education, incorporating:

1. software for instructors to automate much of the process of the peer assessment of teamwork, thus reducing administrative time requirements;
2. a website covering all aspects of working in teams for students to facilitate learning about and understanding of effective team work, improve personal team-working skills and the quality of team project outcomes, and increase students' satisfaction levels. The website was to be designed such that it could be embedded in a course, or run as a resource for a course that involved students working in teams. In addition, it needed to be flexible so that instructors could include additional material as relevant; and
3. a user manual to support dissemination of the PETS process and the above resources to the sector as a whole.

All parts of the resource package were to be freely available to national institutions with software being 'bundled' for installation on local servers, and the manual available as a download from the internet. A series of workshops were proposed to disseminate the project outcomes.

Background

Teamwork has been acknowledged as a key component of graduate attribute statements of most Australian and many international universities (ABET, 2007). This project sought to further *develop* and *disseminate* a successful and innovative teaching resource with applicability across the higher-education sector (the PETS process) particularly in its contribution to (i) assisting students to achieve graduate outcomes associated with teamwork, (ii) enhancing the student experience, and (iii) improving student retention. The PETS process was designed to achieve these three outcomes by improving the functionality and performance of student teams engaged in group projects, and by supporting a range of team management stages including:

- diagnostic assessment of team skills
- deliberate and purposeful team allocation
- explicit development of student skills in group role functions, group dynamics and effective teamwork
- diagnosis and remediation of poor teamwork
- formative and summative peer- and self-assessment and reflection
- team performance mentoring and
- embedding the development of team skills in the higher-education curriculum across a range of fields of study, and a range of institutional settings.

Underpinning PETS is the scholarly literature on: student team work (Holmer 2001, Benjamin 2000, Yuan and Benson 2000); student experience of teamwork (Barfield 2003, Burke, Jones, and Doherty 2005, Bourner, Hughes and Bourner 2001); the construction of student teams including the use of diagnostic assessment (Clinebell and Stecher 2003, Connerley and Mael 2001, Henry 2002); the use of peer assessment in marking team projects (Falchikov and Goldfinch 2000, Goldfinch and Raeside 1990, Cheng and Warren 2000, Kruck and Reif 2001, Johnston and Miles 2004); the use of online resources to develop team-working skills (Freeman and McKenzie 2002); training students in

group dynamics (McGraw and Tidwell 2001, McKendall 2000, Vik 2001, Page and Donelan 2003); and ways of addressing social loafing in teams (Brooks and Ammons 2003). The PETS process provides a structured, proven, quality-assured process for the development of the graduate attribute of teamwork without the need for extensive and expensive infrastructure. It includes a number of inter-related actions including:

- purposeful allocation of students to teams based on a team skills inventory and/or prior knowledge of student attributes
- student self-assessment of teamwork attributes
- explicit student skill development in team dynamics using classroom learning, mentoring and assessment
- tailored project features and assessment
- individual and team structured reflection
- anonymous peer evaluation and assessment of team members and
- team mentoring and monitoring.

These actions are shown in Figure 1 with respect to their application throughout semester and whether they are undertaken by the instructor (blue highlight) or students (purple highlight). The figure also shows the aims of the ALTC project (green highlight) as detailed below.

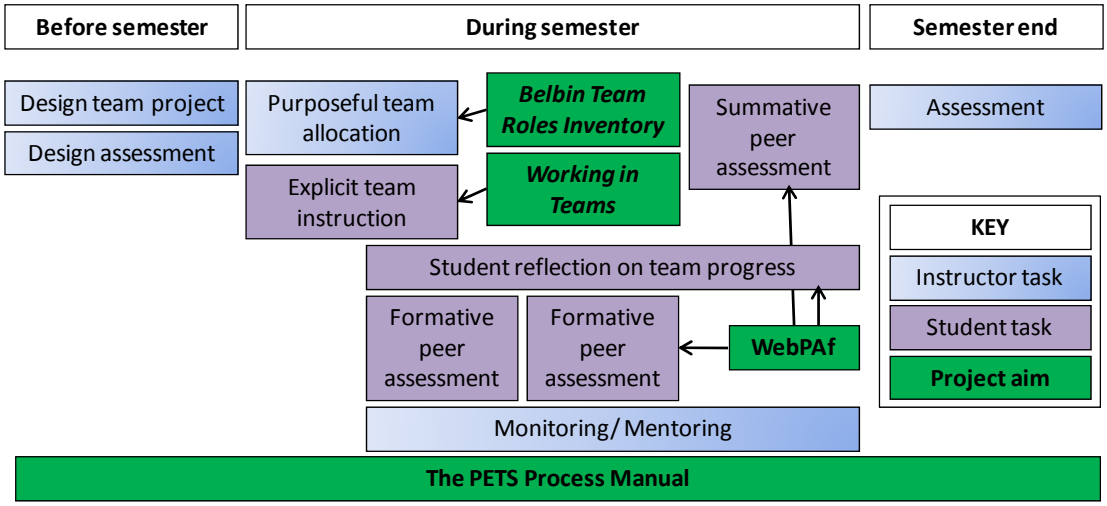


Figure 1: Components of The PETS process and ALTC project aims

This combination of actions has been found to diminish social loafing and team dysfunction with the result that a measurable improvement can be achieved in both student satisfaction and performance. It is however not a 'quick fix' and requires a significant time commitment from instructors and mentors. For example, with a cohort of 850 students, the input required for purposeful team selection alone will take at least a day. Therefore this project allowed for some of the more labour-intensive sections of the process, as identified in Figure 1, to be automated using a software package that incorporates:

- a modifiable team roles inventory index that can be customised for a variety of disciplines and learning environments (Belbin Team Roles Inventory)
- an online team training module (*Working in Teams*)
- a peer assessment factor calculation allowing both formative and summative feedback to the students (WebPAf) and
- a system for electronic submission of student reflections for mentoring and assessment (WebPAf).

In order to be of universal use it was specified that, where possible and as

relevant, the software should:

- be flexible such that the instructor can edit/change/add to the material;
- allow for student interaction
- allow instructors to see how students were interacting with the module
- cater for different learning styles by using links, videos, photos, text, and templates and
- be “IP free” so that it can be used by all.

Extensive trials to date (pilot and beta testing at a range of universities both domestic and international) show that the process has applicability across fields of study and across institutions.

2.0 Project Outcomes and Impacts

Approach and methodology

The project was carried out by a multi-disciplinary Project Management Team (PMT) based at The University of Queensland, and overseen by a multi-disciplinary Steering Group (SG). The SG was set up to provide additional experience, knowledge, and direction to the project from different cohorts and different institutions. During the project there were two day-long SG workshops and a final review and trial of the project deliverables.

The University of Queensland PMT consisted of Associate Professor Lydia Kavanagh (School of Engineering), Associate Professor David Neil (School of Geography, Planning and Environmental Management) and Dr John Cokley (School of Journalism & Communication).

The SG comprised leading academic educators from Australian institutions including:

- RMIT University (Associate Professor Margaret Jollands, Chemical Engineering)
- The University of Melbourne (Associate Professor Roger Hadgraft, Director Engineering Learning)
- The University of Queensland (Professor Ian Cameron, Head Chemical Engineering; Professor Caroline Crosthwaite, Director of Studies, EAIT faculty; Dr Gloria D’all Alba, Senior Lecturer, School of Education; Dr Lesley Jolly, School of Social Work and Applied Human Sciences; and Dr Clair Hughes, Teaching and Educational Development Institute)
- University of Southern Queensland (Professor Frank Bullen, Dean of Engineering and Surveying; and Mrs Lyn Brodie, Senior Lecturer)
- University of Technology Sydney (Dr Keith Willey, Senior Lecturer, Engineering)
- The University of Western Australia (Professor James Trevelyan, Mechanical Engineering)

In addition to the expertise of the SG, at different stages of the project, input and advice was received from:

- Information Technology Services (ITS), The University of Queensland (UQ) – assistance with programming for WebPAf
- The Centre for Excellence in Teaching and Learning (Engineering), The University of Loughborough (UK) – discussions around WebPA and its use
- The Centre for Educational Innovation in Teaching (CEIT), UQ – assistance with programming, web-based systems, software ‘bundling’, online system management, community site establishment for both WebPAf and Working in

Teams

- Education Research Unit of the Tertiary Education Development Institute, UQ – early assistance with educational design for Working in Teams and
- Third Cache – assistance with online design for Working in Teams.

Research was undertaken in stages as shown in Table 1 and Figure 2. All stages were completed with the exception of Stage 1.1 which could not be completed due to unresolvable issues with the IP associated with the Belbin Team Roles Inventory.

Figure 2 also identifies which parts of The PETS process development were underpinned by the ALTC project funding, and indicates the ongoing nature of the dissemination and use of the project outcomes. No further funding is required for this as the resources are in place.

Table 1: Research Stages

STAGE 1 PROCESS AUTOMATION (WebPAf)	
1	**Intentional Team Selection** Identification of requirements, software development/testing/amendment
2	**Anonymous Reflection Prior to Mentor Meetings** Identification of requirements, software development/ testing/ amendment, software bundling
3	**Peer Assessment and Calculation of PAFs** Identification of requirements, software development/ testing/ amendment
4	**Interface Design** Identification of requirements, design of Stage 1 interface, design of Stage 2/3 interface, testing and verification
STAGE 2 ONLINE STUDENT TRAINING MODULE	
1	**Development of Material** Identification of requirements, literature review, material selection, material preparation
2	**Development of Module** Identification of requirements, software development, software testing, software amendment, evaluation and research
3	**Dissemination of Module** Identification of requirements, workshop preparation, workshop delivery
STAGE 3 PETS PROCESS DEVELOPMENT AND DISSEMINATION	
1	**Steering Group Meetings** Initial briefing, mid-term review, final review
2	**Publishing PETS Manual** Editing hard copy manual, final approval of PETS Manual, negotiations with publisher
3	**Publishing PETS Manual (Online)** Additional material preparation, conversion to online format, trial of online manual, online manual amendments
4	**Development of Workshops for staff to trial manual/ online content**

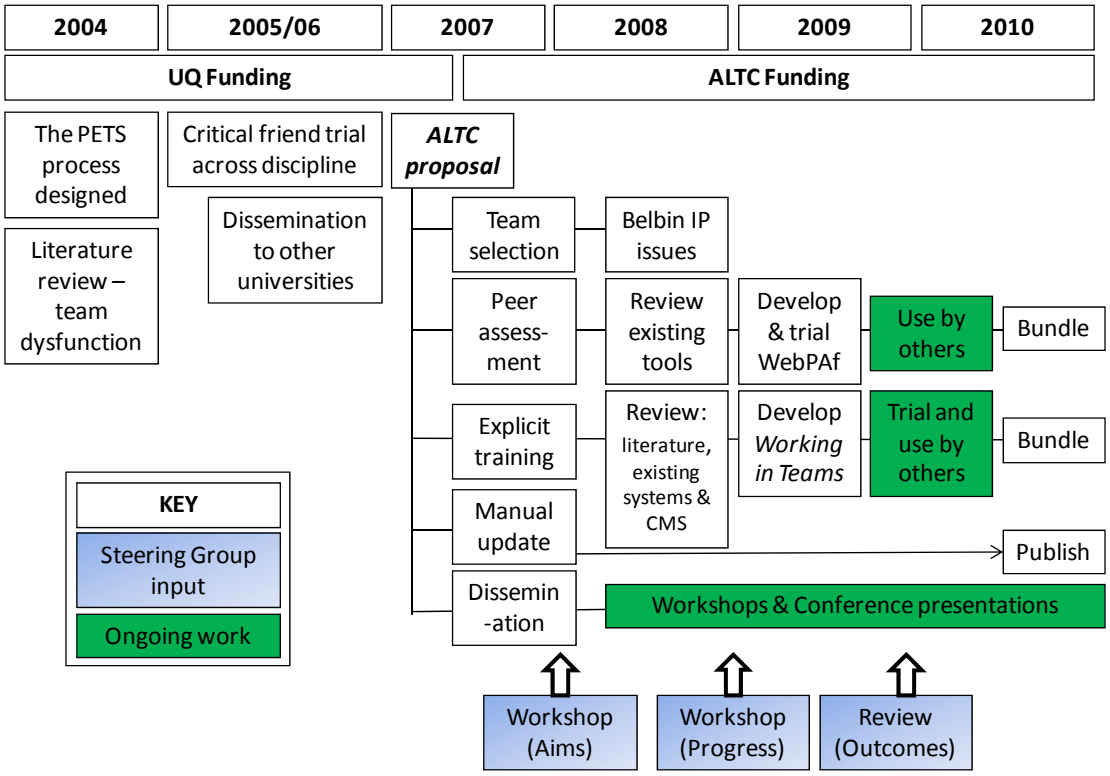


Figure 2: Project development timeline

Critical success factors

Project management was a critical success factor. Regular weekly meetings of the PMT underpinned directions and ensured that steady progress was maintained.

The expertise of the SG and the various research and development centres brought in to offer advice and to undertake some of the specialist work was also instrumental in the quality of the final deliverables. Their expertise also underpinned the value of the final deliverables across institutions and disciplines.

However, the project did take almost a year longer to complete than was originally anticipated as we significantly underestimated the time it would take to put the *Working in Teams* online module together with the functionality that we required. In addition, we were hampered by the loss of the Educational Resources Unit within The University of Queensland's Teaching and Educational Development Institute when it was disbanded and it took us more than six months to find a suitable replacement for this expertise.

Minor negative factors include the inability, despite repeated attempts to contact the Belbin Institute, to remove the IP barrier to automating the Belbin Team Roles Inventory, and the loss of an initial PMT member through ill health and competing commitments.

Outcomes

Table 2 summarises the outcomes of the project and details of how these outcomes can be accessed. There were also a number of internal outcomes which can be accessed on request: a review of group work resources online (April 2007), and SG workshop materials (Sept 2007 and Oct 2008).

Table 2: Summary of Project Outcomes

Title	Date	Access
Community website: Proactively ensuring success in higher education student teams	June 2010	http://pets.ceit.uq.edu.au/community
The PETS process workshop materials (including *Working in Teams* and WebPAf)	Jan 2010	Contact Associate Professor Lydia Kavanagh (l.kavanagh@uq.edu.au)
Working in Teams (Online Module)	Jan 2010	Download available from http://pets.ceit.uq.edu.au/community
WebPAf User manual	Jan 2009	Download available from http://pets.ceit.uq.edu.au/community
WebPAf (online peer assessment)	Jan 2009	Download available from http://pets.ceit.uq.edu.au/community
Kavanagh, L., Harrison, J., Cokley, J., and Neil, D. (2010) *Proactively Ensuring Team Success: A guide to effective student project teams in higher education, Instructors Manual* (In Press)	May 2010	Download available from http://pets.ceit.uq.edu.au/community
Report of Carrick Institute Team Skills (CaTS) Workshop, UQ	Feb 2008	Contact Associate Professor Lydia Kavanagh (l.kavanagh@uq.edu.au)
Kavanagh, L. and Steer, J. (2007) A process for proactively ensuring student team success: perceptions of students and lecturers, *Australasian Association of Engineering Education (AAEE) Conference*, Melbourne	Dec 2007	AAEE conference proceedings

Outcome 1: WebPAf

WebPAf is an online peer-assessment system that manages the collection of student evaluations of their peer's contribution to team work, and the subsequent calculation of peer assessment factors (PAf). WebPAf is based on WebPA, the open source program generated by The University of Loughborough.

The use of WebPAf to manage the peer-assessment process significantly reduces the amount of time required to implement the PETS process. Rather than receiving individual forms or spreadsheet files from students, students log into the WebPAf system and fill out an online peer-assessment form set by the instructor. WebPAf collects and manages the information electronically and presents the results in a spreadsheet. The program allows for flexibility in setting peer assessments and includes automated features such as emailing students when online peer-assessment forms are available for completion. WebPAf has numerous useful and easy-to-use features such as determining at a glance which students have, or haven't, completed the peer assessment, and being able to email those who haven't.

The software can be used to:

- automatically generate team names
- automatically populate teams with students
- allow assessment on a Likert or points scale across categories set by the instructor
- email students who have, or haven't, completed the assessment and
- collect student reflections.

A screenshot of WebPAf is shown in Figure 3.

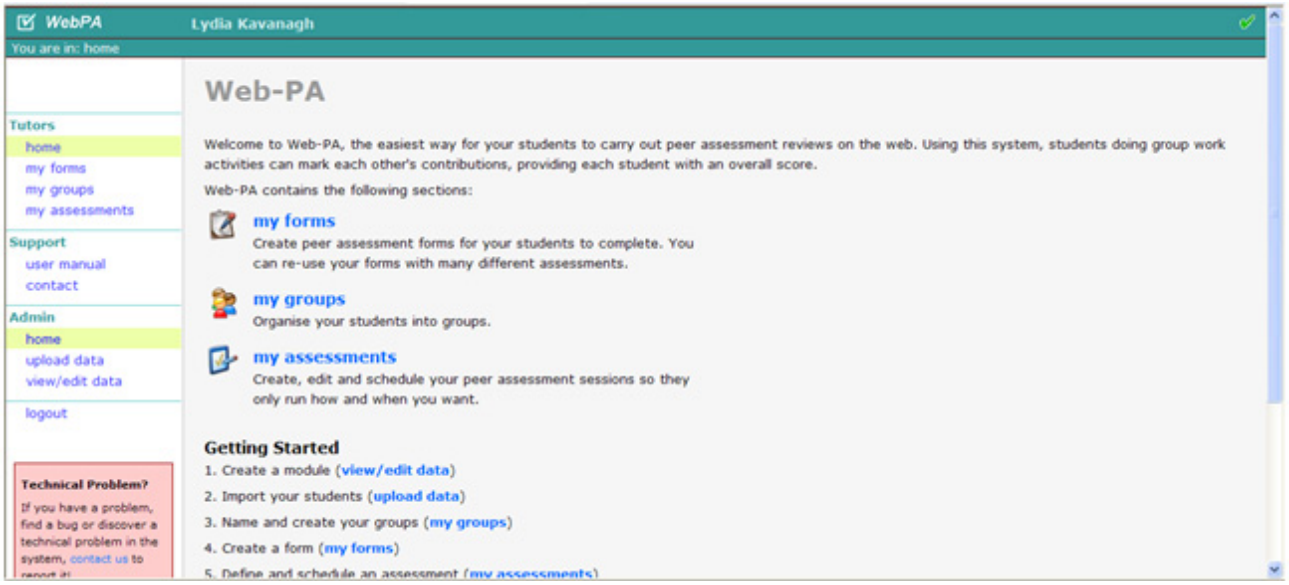


Figure 3: WebPAf Screenshot

A test WebPAf website has been set up to allow instructors to explore its capabilities. Guest access is via:

http://pets.ceit.uq.edu.au/webpaf

Login: webpastaff01, webpastaff02 ... up to webpastaff10

Password: demo2010!

Test data modules (mode101, mod102, ... mod110) have been compiled but may have already been uploaded by a previous user. Instructors should therefore edit the downloaded file and change course and year details in the final two columns. The data modules can be found at: http://pets.ceit.uq.edu.au/webpaf-files/

The installation package and instructor's manual can be downloaded from: http://pets.ceit.uq.edu.au/community .

Outcome 2: *Working in Teams* website

The *Working in Teams* website provides a resource to build students' effectiveness in teamwork and for students to consult when issues arise in teams in which they are working (Figure 4). Students are too often 'thrown in at the deep-end' when it comes to teamwork. The *Working in Teams* website provides training for students, which they undertake in their own time and at their own pace, either individually or with a teammate/s, such that no student need enter teamwork-based projects and assessment without first having achieved a prescribed level of knowledge, understanding and competency by completing the package.

Figure 4: *Working in Teams* Screenshot

The approach is that:

- the training package consists of sequential stages, each including a number of learning modules relevant to team-learning situations, with those modules incorporating both training and testing
- all students in a given course may be required to complete a section of the package successfully prior to first participating in teamwork for assessment or they may be given access to the module for reference purposes and
- the students' completion of the training package is recorded in a database, both to ensure compliance and to provide valuable feedback to mentors on student competencies.

The modules within the package include a variety of aspects of teamwork: its overall importance in student and professional life, characteristics of effective teams, individual roles and responsibilities within teams, assessment of teamwork, getting started, strategies for effective teamwork, what helps and what hinders effective teamwork, conflict resolution and resolving team dysfunction, and special cases in team dynamics (e.g. diversity of age, gender, culture, learning styles, approaches to study, disciplinary background).

Working in Teams can be used as shown in Figure 5; the course instructor can use it as a stand-alone resource (Mode 1), with some interactivity with student teamwork (Mode 2), or as part of the PETS process with student reflections available as part of assessment if required. This makes the resource very flexible because of its application in a diverse range of teaching and learning contexts.

The website was developed with the help of both online educational designers and CEIT expertise to ensure both readability (Neilsen 1997) and appeal (Bauerlein 2008).

Guest access to the Working in Teams online module is via:

http://pets.ceit.uq.edu.au/teamwork

Login: student01, student02, ... or student10

Password: demo2010!

The quizzes and the reflective writings may not be visible as they need to be cleared for each user but guest access provides a good overview of the module.

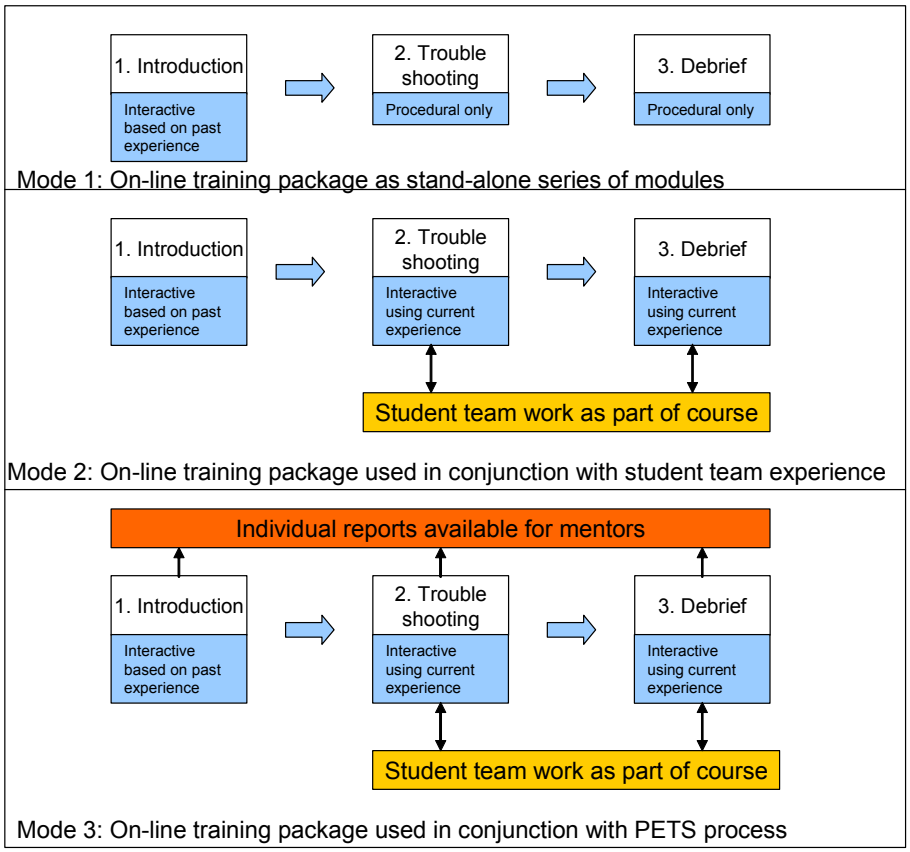


Figure 5: *Working in Teams* website modes of operation

Outcome 3: PETS Manual

The PETS process manual has been updated to include both WebPAf and *Working in Teams*, and edited ready for release. The electronic resource, a password-protected website, is complete and launched. Both of these could be included on a CD-ROM for distribution where download is not an option. Initial consultations suggested that providing the manual online offered the greatest accessibility to all campuses, and may also have a dual benefit in terms of information sharing (i.e. feedback can easily be requested and received electronically from academics). The manual can be downloaded from: http://pets.ceit.uq.edu.au/community .

Implementation of outcomes

Enhancing teamwork

The value of PETS with respect to enhancing the student experience is based on several propositions, all of which are supported by the extensive research that exists on the value of purposefully set teamwork in higher education:

- formally established team projects, which are part of the assessment of the course, provide opportunities for students to meet and get to know other students. This social aspect makes a contribution to reducing the social isolation often experienced by undergraduates and lays the foundations for the *fostering of learning communities*
- team projects provide a structure for effective delivery of academic advice and, if appropriate, pastoral care of students, through meetings with

academic mentors at designated intervals throughout the course. This can also be extended to professional mentoring

- the process provides a structure for *formative assessment*, and early identification of students at risk and
- the process has a built-in fostering of *peer-assisted learning*, as well as *independent learning* – that is, learning which is independent of the instructors. It also fosters, through the formal assessment tasks, *critical and independent judgement* of the work and capacities of others, as well as *critical self reflection*.

All of these are key graduate outcomes in higher education. In summary, teamwork facilitates peer-assisted learning and socialisation, both of which reduce attrition and enhance retention. PETS ensures that students can make the most of this experience without the catastrophic team dysfunction which causes learning objectives not to be met and/or a loss of student satisfaction.

Extending online learning

A second contribution of this project has been to enhance the capability within the sector to offer a diverse range of online learning experiences for both on-campus and distance students in a variety of disciplines. It is clear from current trends in higher education that online learning is becoming increasingly popular and is being offered in a variety of formats by many institutions. This project makes a contribution to extending both theoretical and practical knowledge of online learning and teamwork.

Scalability and sustainability assessment

The nature of this innovation is such that it can be adopted across disciplines and across institutions, so that it can be scaled up to run right across the sector. The sustainability of PETS is dependent on the will of academic boards and program committees to mandate processes of this nature as part of the curriculum in higher education. Initial findings are that academics who have trialled the system continue to utilise it and the associated software.

3.0 Dissemination

Workshops and presentations

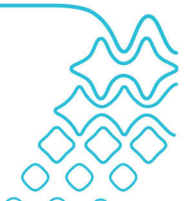
In addition to the manual and online resources, a workshop for academics delivered through academic staff development units in all participating institutions has been developed. Workshops have been successfully given to tutors and academics at The University of Western Australia, Monash University and others at The University of Queensland. Further workshops will be given as requested and workshop material can be easily disseminated by contacting Associate Professor Lydia Kavanagh (l.kavanagh@uq.edu.au).

The workshop material has been disseminated to the members of the SG for dissemination in a strategic fashion to teaching and learning committees, professional development bodies and discipline leaders.

Table 3 details workshops and presentations given on PETS and the assistive software during the course of the project. Further workshops are planned at national universities during teaching breaks. No further funding is required for these and they will continue as requested.

Table 3: Dissemination (2007-2010)

Date	Event	Purpose of the event	Number attended
Sept 2007	SG workshop, UQ	To ensure that the project scoping, needs and directions fits with stakeholder requirements	13
Dec 2007	AAEE conference, Melbourne	Presentation of results to date of applying PETS to a cohort of 1000. Interest in project outcomes sought.	~45
July 2008	Assessment workshop, UQ	To disseminate PETS and project outcomes to UQ TLC heads.	~50
Oct 2008	Mid-term SG review, UQ	To ensure that project directions fit with stakeholder requirements, to agree developments to date and obtain feedback	11
Nov 2008	ALTC w/shop, Adelaide	Poster presentation of project outcomes	~50
Dec 2008	EPSA TLC Showcase, UQ	Project outcomes and progress disseminated to Engineering, Physical Science and Architecture faculty.	~40
Dec 2008	AAEE conference, Yeppoon	Presentation of project results as part of teaching excellence presentation and invitation to collaborate/ disseminate	~200
June 2009	Blended Learning Conf., UQ	Poster presentation of WebPAf and *Working in Teams* online module	~200
Jul 2009	PETS workshop, UQ	Dissemination of PETS and online tools (School of Journalism & Communication)	6
Oct 2009	Online tool Demon-stration	*Working in Teams* and WebPAf demonstration (Science Faculty, UQ)	8
Nov 2009	PETS workshop, UQ	Dissemination of PETS and online tools (School of Occupational Therapy)	6
Nov 2009	ALTC w/shop, Melbourne	Poster presentation of project outcomes	~50
Jan 2010	PETS workshop, UQ	Dissemination of PETS and online tools (School of Chemical Engineering)	12



Jan 2010	PETS w/shop, UWA	Dissemination of PETS and online tools (Faculty of Engineering)	12
Feb 2010	PETS w/shop, Monash	Dissemination of PETS and online tools (Faculty of Engineering)	12
Sep 2010	PETS w/shop, Limerick Ireland	Dissemination of PETS and online tools (School of Journalism, The University of Limerick)	10
sep 2010	PETS w/shop, Troyes France	Dissemination of PETS and online tools (CELSA, School of Journalism and Management, Sorbonne)	10
Nov 2010	ALTC w/shop, Sydney	Poster presentation of project outcomes	~50
Dec 2010	ADEL meeting, Sydney	Workshop including overview of PETS process and the online tools developed (AAEE conference).	30
Dec 2010	PETS w/shop, Sydney	Overview of ALTC project including the online tools developed (Australasian Association of Engineering Education conference)	15

Community site

A community site (Proactively ensuring success in higher education student teams) has been set up by CEIT, UQ. All resources including the WebPAf software, WebPAf manual, PETS Guide and access to the *Working in Teams* module are available from the community site which can be accessed via http://pets.ceit.uq.edu.au/community . The community site also includes forums and allows site users to share files, links and blogs about team work and using the various resources made available by the project.

4.0 Linkages

Institutions

National collaboration

In addition to the initial collaborators from six national universities, Monash University and The University of Tasmania have joined the 'research community'. There has also been interest from The University of Notre Dame.

International collaboration

The project has allowed the team to establish collaborative links with six overseas institutions where similar work on teamwork is being progressed.

- Imperial College in the UK, linked through Professor Caroline Crosthwaite
- Purdue University (Division of Engineering Education) in the US, linked through Professor Ian Cameron
- The University of Loughborough, UK, The University of Canterbury, NZ, and The University of Cape Town, SA linked through Associate Professor Lydia Kavanagh and
- Catholic University of Valparaiso, Chile linked through Professor Ian Cameron.

Projects

The outcomes of this project are also to be used in another ALTC project based at UQ: IS-IT Learning? Online Interdisciplinary Scenario-Inquiry Tasks for active learning in large, first year STEM courses. Associate Professor Lydia Kavanagh is on the project team for this work and both *Working in Teams* and WebPAf will form tools in this online project-based system.

In addition, a project entitled 'Proactively Ensuring Team Success (PETS) – Innovation Adoption' has been initiated in 2010 by CEIT at UQ. This project seeks to identify technical barriers to the deployment/ installation of software that exists outside the standard university-wide Learning Management System, and to explore and propose solutions to these technical barriers. The uptake of PETS and the associated software will serve as a case study for this project.

5.0 Evaluation

Steering group

The SG met twice during the project (September 2007 and October 2009). In addition, a final review of project deliverables (WebPAf, *Working in Teams*, and the PETS manual) was requested in December 2009.

In all three cases, the SG evaluated project directions and their advice and recommendations were incorporated into the project. Each of the workshops was also concluded by a feedback session to gain meta-level feedback on the process.

An independent consultant was employed to bring the valuable information gained from the initial workshop together in a report, *Report of Carrick Institute Team Skills (CaTS) Workshop*, UQ, February 2008.

Pilot studies and trials of assistive software

WebPAf (the online assessment tool) has been evaluated by and is being used by:

- The University of Queensland (EAIT faculty: ENGG1000, CHEE2001, CHEE2002, CHEE3012, MECH3600, and the School of Journalism and Communication)
- Monash University (Faculty of Engineering)
- The University of Western Australia (Faculty of Engineering)
- The University of Tasmania (Faculty of Engineering) and
- The University of Canterbury (Faculty of Engineering).

Working in Teams (the website team training tool) is currently being evaluated by:

- The University of Queensland (EAIT Faculty, Science Faculty, School of Dentistry, Health Faculty, and School of Journalism and Communication)
- Monash University and
- has been used effectively in several courses in The University of Queensland School of Geography, Planning and Environmental Management (ENVM3202, ENVM3204, ENVM4100, GEOS2103)

The universities who are using WebPAf have expressed an interest in receiving the bundled version of the software. We will continue to disseminate both online tools.

Audit

Associate Professor Carl Reidsema audited the project. This appointment occurred at the end of the project due to three previous auditors pulling out of the project because of conflicting time commitments and thus his comments are summative. His report forms Attachment 1 of the Grant Scheme Final Report (Part 2). Section 6 of this report (Summary of Findings) is produced below in its entirety.

SUMMARY OF EXTERNAL STEERING GROUP (ESG) INTERVIEWS

The steering group consisted of a large number of reputable scholars in engineering education and included an ALTC Discipline Scholar, Head of School, ALTC Fellow and Associate Dean of Engineering.

There was strong agreement by the ESG of the importance of the problem that this project addressed with the majority agreeing that the project had achieved the stated outcomes. The short term outcomes that were identified were primarily centred around the resources that were produced as well as the benefits of automating peer assessment for large student cohorts. An interesting and valuable outcome that was strongly reflected within the data was the ESG members' views on the benefits of networking with other colleagues from other institutions. There was no evidence from the ESG that they actually utilised the PETS process, however the evaluator is aware that two of the ESG members are in non-teaching roles and one is championing a competing peer assessment tool so these results are not surprising. Notwithstanding the inability to personally implement the PETS system at their own institutions, the ESG members claimed they had made strong efforts to disseminate the project results to their colleagues and peers.

In regard to the processes utilised in managing the project, the ESG members reflected the typical difficulties in collaborating on inter-institutional projects of this kind where excessive academic workloads and large distances militate against an optimal, smooth and close collaborative engagement with the project. It is common knowledge that the successes of ALTC projects are primarily the sole responsibility of the first CI. The ESG members made numerous positive comments on the leadership skills and efforts made by the first CI in achieving the outcomes of the project, however there were some comments that reflected a need to have either more frequent meetings than the first two SG planning meetings or a third meeting which although having been planned appears to not have been implemented.

There appeared to be a low level of awareness of the ESG members on the extent of the dissemination achieved in the project, yet a high agreement that the results should be further disseminated and funding sought for leveraging the results through future workshops and presentations across the sector. There was a solid indication that all of the ESG members had made an effort to assist with disseminating the project outcomes. There was also an insightful suggestion from one of the ESG members that the PETS system could form a useful starting point for extending the concept to advance cooperative learning within engineering education. This could form the basis for a future funding proposal.

EVALUATORS SUMMARY

While it is difficult to pronounce an accurate judgment by retrospectively examining the project processes from documentation and synthesising verbal reflections ex post facto, the project appears to have clearly and successfully achieved all of its stated outcomes. The one minor exception; that of developing a fully functional team allocation module, would appear to be due to a misplaced expectation (albeit in good faith) that university IT services should be able to produce a product to specification within the same time and budgetary constraints as a commercial service. In addition to this, difficulty was experienced with implementing the Belbin model due to IP constraints on its

use. There are also some concerns with porting the team allocation functionality within the various Learning Management Systems operated by universities across the sector.
The development of the WebPAf peer assessment tool is, in and of itself, unremarkable in comparison to other peer assessment tools on the market. However, the provision of free distribution and initial setup and support made and carried out by the project leader with a large number of local stakeholders both internal and external to the lead institution as well as the collaborative links made with The University of Loughborough who provided the original source code, reflects a commitment to sharing best practice across the sector both nationally and internationally and is to be highly commended. The PETS Instructors Manual is also an excellent product reflecting a deep understanding of the learning needs of academic staff in adopting team peer review. The high quality of this manual is attested to by having been recently accepted as a published book. The Online Student Training Module is also of a high quality and a freely available and valuable online resource for academics who may attempt to integrate student learning activities in conjunction with or without the peer assessment tool.

However, what distinguishes the outcomes of this project from other products available to the sector are the pedagogical principles that underpin the systems design of the PETS process. The concept of developing teaming skills and improving team performance purposefully and proactively through explicit team training and mentoring and not simply focusing on eliminating social loafing through the use of the assessment tool as well as the appreciation for cultural barriers to change that are reflected in the modular design of the PETS system of instruction is exemplary. The modularity of the system recognises that a fully developed system may not fully penetrate into academic practice but uptakes of various parts of the system can provide a useful foothold for change. Additionally the learning resources and reliance on active engagement of mentors can help influence staff attitudes through learning. Having single-handedly implemented an online peer review system at the University of New South Wales back in 2004, I can attest from experience just how much easier and how much more effective student learning would have been if these resources had been available to me back then.

The processes utilised to manage the project appeared to be adequate, although a final project wrap-up ESG meeting may have helped improve the overall feelings of engagement with the outcomes. The project however distinguished itself by achieving a high level of dissemination through workshops and invited presentations at a large number of institutions. Whilst there was evidence of successful publication of the project outcomes, there was perhaps room for one or two additional conference papers. Nevertheless, there was ample evidence of extensive interest in the results and adoption of the approach from many institutions including the lead institution. There is also strong evidence of uptake within and across the disciplines which provides a strong argument for considering of future funding by the ALTC to capitalise on the advances that were made by this project.

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6.0 Conclusions and recommendations

Conclusions

The PETS process is a highly successful system for proactively ensuring teams' success – team dysfunction is identified, monitored and mentored with the result that student teams do not fail to meet learning objectives due to team problems. The resources developed with funding from the ALTC have successfully expedited the process and are being used across disciplines and across institutions. They will continue to be disseminated and made available for use to the higher education sector. The process, and the specific resources developed to support the process, have found wide application at higher education instutions in Australia and internationally. Table 4 details how the PETS process and the associated resources are being utilised. Interest in the process and resources has also been expressed by institutions in Great Britain, Ireland, and Europe.

Table 4: PETS Process Utilisation and Interest

	Institution
PETS process	The University of Queensland (Engineering: Journalism and Communication: Science), The University of Melbourne (Engineering: Arts), RMIT University (Engineering), University of Southern Queensland (Engineering), University of Technology Sydney (Engineering), The University of Cape Town, SA (Engineering)
WebPAf	The University of Queensland (Engineering, Journalism and Communication), The University of Western Australia (Engineering), Monash University (Engineering), The University of Tasmania (Engineering), The University of Canterbury, NZ (Engineering), The University of Cape Town, SA (Engineering)
Working in Teams online module	The University of Queensland (Health; Engineering; Journalism and Communication; Geography, Planning & Environmental management): The University of Adelaide (Management, Natural and Built Environments)

In addition, two spin off projects involving team work and dissemination will serve to further increase the usability of the resources generated by this project.

Recommendations

It is possible that the PETS process could be automated further such that it interfaces with proprietary systems such as *Blackboard* and *Si-Net* already in use at tertiary institutions. The research team tested the efficacy of such integration within institutions that have stand-alone courseware systems and some integration has been possible.

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