

Applying the Community of Practice Approach to Individual IT Projects

Peter Strazdins,
Department of Computer Science,
College of Engineering and Computer Science,
The Australian National University

Tenth Australasian Computing Education Conference (ACE2008),
24 Jan 2008

(slides available from <http://cs.anu.edu.au/~Peter.Strazdins/seminars>)



THE AUSTRALIAN NATIONAL UNIVERSITY

1 Overview

- objectives
- background to the Masters of IT projects at ANU
- what is a Community of Practice?
 - related work
 - other educational ideas involved
- design principles
- implementation
- results: anecdotal, surveys, student performance
- conclusions
 - lessons learned and important factors for success
 - where to from here?

2 Objectives

- improve the learning of generic research-related skills in project students
 - project management, implementation issues, presentations (verbal communication) and report writing (written communication)
 - latter includes style, structure, literature search, citations / attribution
 - important: part of DEST's CEQ, support research-based education, and are 'lifelong skills'!
 - important for the students: their assessment will be primarily focused on the quality of these!
 - improve the project experience for the students
 - this can in turn influence learning (especially in the longer term)
 - how best to do this?
 - leave it to the supervisor(s)?
 - run a separate course?
- or . . .

3 Background to the Masters IT projects

- Master and GradDip in IT project courses formed a ‘capstone’ for their respective (‘eScience’) degree
 - implementation projects: IP06 (6 units), IP12 (12 units)
 - research projects: RP06 / RP18 (6 + 18 units)
- all projects are individual, normally with an internal (experienced!) supervisor and possibly also an external supervisor or client
- clearly defined learning objectives and structure
- what the students achieved was often very exciting!
- but still some problems, e.g. quality of reports, sometimes insufficient attributions, lack of social context e.g. final presentations only attended by examiners. . .
- what could be done with the 2006 (S1) and 2007 (S1) project students?

year	course				intensity		gender		background		facil. supr.	
	IP06	IP12	RP06	RP18	P/T	F/T	M	F	ESL	non-ESL	prim.	sec.
2006	1	2	2	2	1	6	6	1	2	5	2	5
2007	0	5	1	4	1	9	7	3	9	1	0	4

4 Communities of Practice

- Community of Practice (CoP): a group of people with a common interest collaborate to solve problems in that area, and learn of each others' ideas and experiences
- 3 key elements:
 - mutual engagement (ME)
 - a joint enterprise (JE)
 - a shared repertoire (SR)
- arises from the observation that learning is a fundamentally social phenomenon; hence social aspects are central to learning
- desirable properties include:
 - the group is committed to the shared task and to each other
 - discussions remain focused but members are free to express feelings
 - the leader (if any) does not dominate; different members can take different roles

5 Related Work in Communities of Practice

- seems to be little literature dealing directly with CoPs in individual projects
- existing literature concentrates on:
 - commercial contexts
 - use in distributed, virtual communities (web-based technologies)
- study on IT digital media student group projects with start-up companies (Rohde et al, 2005)
 - each group (including client) formed a CoP
 - found also required a “distinguished supervisor”(facilitator)
 - had face-to-face and on-line contact
 - found to work well generally

but there was inherently a much stronger common purpose than in this context

6 Other Key Ideas from Educational Literature, Leading to...

as well as CoPs, the following key ideas:

- action research: cyclic process of planning, acting observing, reflecting
 - systematic observation and evaluation to improve teaching practice
- reflective writing is a tool often used to assist this
 - requires regular student feedback to be gained and analyzed!
- use of formative assessment techniques, including peer feedback
- experiential learning, for deeper understanding and stronger motivation

lead to the idea to form a CoP amongst the Masters IT project students:

- the project co-ordinator as leader / facilitator
- use action research and reflective writing for rapid cycles of feedback / improvement
- involve the students in each others' projects; utilize their collective experience
- promote an enjoyable experience for all at the same time!

7 Design Principles

- organize study meetings in two phases:
 - Phase 1: weeks 1–7 (begin project work in the right way)
 - Phase 2: weeks 10–15 (polish off for final submission)
 - apply action research method (including surveys in weeks 3 and 15)
- guiding principles were according to that of the CoP:
 - choose topics with a known need, useful during each phase (JE)
 - make use of previous students' work (good & bad!) (ME)
 - make use of the students' work in progress (esp. phase 2) (ME)
 - make use of members' views and experiences (ME)
 - give members as much say as possible (JE)
 - foster interactions outside the meetings (JE)
- these, and member feedback, led to the 2006 (2007) schedule

8 Implementation

- topics for 2006 / 2007:

Phase 1:

Elements of Good Presentations

Initial Project Presentations*

Presentation Review; Managing Your Project

Literature reviews, Citations and Attribution

Report Writing: Structure and Setting Out

Phase 2:

Implementation and Evaluation Issues

Writing Up Reports: Finer Details

Improving Presentations

Final Project Presentations*

(* 'plenary sessions')

- however, topics should (to an extent) be dictated by the CoP's needs
- materials based on an excellent text Writing for Computer Science (Justin Zobel, 2004) and ANU's Academic Skills Center materials
- also studied presentations / reports from previous semester (esp. those of the RP18 students!)
- students evaluate each others' presentations (formally) and draft reports (informally)

9 Evaluation: Student Experience

- high positivity (scale from 0 to 5) in surveys on potential (P) / actual value of sessions (in current project (A), in general (B))

session:	2006:			2007:		
	(P)	(A)	(B)	(P)	(A)	(B)
Elements of Good Presentations	4.2	4.0		4.4	4.4	
Presentation Review; Managing Your Project	4.5	4.2	3.7	4.2	4.2	4.2
Literature reviews, Citations and Attributions	3.5	4.2	3.4	3.7	4.0	4.0
Report Writing: Structure and Setting Out	4.0	4.3	4.3	3.9	4.5	4.5
Implementation and Evaluation Issues	4.0	3.8	3.6	3.7	4.1	4.2
Writing Up Reports: Finer Details	4.5	4.5	3.3	4.0	4.2	4.1
Improving Presentations	4.5	4.3	3.2	4.0	4.5	4.1

- anecdotal evidence supports emergence of good group behavior, e.g.:
 - “a definite improvement in morale over last semester”
 - several positive expressions that feedback was being acted on
 - spontaneous continuation of discussions after sessions ended
 - ‘experienced’ (RP18) students proved invaluable!
 - emergence of 3 ‘enthusiasts’; the one in 2006 became a facilitator!
 - spontaneous lunch after last 2006 session (and later the Bar!)

10 Evaluation: Impact on Student Performance

- generally high quality of presentations (relative to background), as evaluated by author (as examiner)
 - on a scale from -2 (very poor) to +2 (very good), averaged over 14 criteria:
 - 0.6 (2006 - ESL); 1.1 (2006 - all); 0.6 (2006 - all)
 - ESL speakers mostly spoke well and clearly; notably less effective in the use of body language and maintaining audience contact
 - overall, strongest in presentation structure, weakest in strength of conclusions
- similar for report writing
 - averaged over 7 criteria, same scale:
 - 1.3 (2006 S1 - all); 1.0 (2007 S1 - all); 0.5 (2006 S2 - all)
 - all but 2+3 reports met all criteria well in 2006 S1 + 2007 S1
 - 2006 S2 cohort had no CoP sessions on report writing; their background was extremely similar to 2007 S1 cohort

11 Conclusions

- the Community of Practice approach was (cost-) effective!
 - common purpose of improving generic skills sufficient to establish a cohesive and effective CoP
 - modest time commitment for facilitator; utilizes the students as a resource instead!
- significantly enhanced the students' experience during the culminating phase of their degrees; some evidence of improved skills
- believe it was unique application of CoPs
 - rapid application of action research method acted synergistically! (JE)
- still areas for improvement:
 - foster more active participation in the more reserved (ESL) students
 - promote more outside-session interactions (electronic message board?)
 - make more use of social opportunities
- *“expert level peer communities work well”*

12 Important Factors in Establishing a good CoP

- rapid implementation of feedback
- promotion of collective ownership
- utilizing support from (senior) members
 - an 'enthusiast' will work wonders!
 - RP06 + RP18 structure helped
- use of previous (and, more importantly, current) projects
- peer evaluation for formative feedback
- the facilitator: genuine enthusiasm, expertise, knowledge and prior/current relationship with the students
 - must foster rather than control the group
- group size 6–12 seems optimal
- importance of social aspects in education shouldn't be underestimated!

13 Where to from here?

- more details on the Masters CoP web page
- so what did all of this have to do with IT?
- the Masters and GradDip in IT (eScience) degrees are now replaced by the Master in Computing
 - single semester IP12 project course only
 - a CoP is formally part of the course's structure
 - this was necessary to get ACS accreditation!
- could be integrated into Honours year as part of a 6 unit Milestone Papers and Research Skills course
 - students apply the principles to their ongoing research projects
 - assessed on initial presentations and drafts of partial theses
- the CoP approach in this context needs more trials & objective (!) evaluations
 - but small numbers; large effects of prior experiences and skills

14 Questions ???