Applying the Community of Practice Approach to Individual IT Projects

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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?

<table>
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<tr>
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<th>course</th>
<th>intensity</th>
<th>gender</th>
<th>background</th>
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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 contract
  - 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!
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))

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<th>(B)</th>
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- 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!)
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
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 ???