Between Two Worlds: Use of reflection for assessing industry-collaborative student projects

Karen Thompson

The Business School, Bournemouth University

Presented at the 2nd conference *Excellence in Learning and Teaching for Project Management*, Bournemouth University, September 2005

Abstract

Information systems projects in the 'real' world continue to have a poor success rate. Industry-collaborative student projects seem to have no greater success - so do such projects socialize students into project failure? This paper looks at the conflict between learning and performance that crystallizes at the point of assessment. The impact of assessing reflective material is discussed and the role of double-loop learning in project performance is explored.

Introduction

Industry-collaborative student projects are designed to help bridge the gap between the academic world on the one hand and the 'real' world of work, on the other. Some argue that 'employability' and higher education are compatible (for example Knight and Yorke 2003), however there are important differences between the two worlds. Tension between the two worlds crystallizes at the point of assessment as students attempt to present themselves in such a way as to try and win favour with two different Princes simultaneously.

The world of higher education can be characterized as a world of learning. The limitations of formal, classroom learning have increasingly been highlighted, and there has been a growing interest in learning as situated in social practice. A social perspective on learning focuses on the way people make sense of their experiences. Dewey defined learning as a continuous reorganization and reconstruction of experience through a process of reflection. From this socially constructed

1

perspective, industry-collaborative projects can be seen as an example of situated learning and as a process of socialization, or enculturation, into 'real' world culture.

Final year students on undergraduate programmes in Business Information Systems at Bournemouth University collaborate with real-world organizations to develop systems that meet genuine business requirements and solve real organizational problems. Each project team is assigned an academic tutor but the projects are found by students, then planned, organized and run by self-selected student teams. It is not considered sufficient for students to simply build an excellent system – assessment includes consideration of the impact the project has had on the real world organization. As far as is possible, these projects are intended to provide students with an authentic real world experience.

The real world, in contrast to academia, can be characterized as performance orientated. Managing and implementing a project is typically interpreted as a dynamic process with considerable pressure to meet deadlines, achieve cost targets and satisfy stakeholders. In the face of pressure to perform, reflection and learning are often not a priority. Barriers to learning are considered to permeate the work environment (see for example Preskill and Torres 1999:101, Shaw and Perkins 1991). The very nature of project management has been interpreted as a barrier to learning and innovation due to an emphasis on rigid control (Turner 2005:13). Information systems projects in the real world continue to have a poor success rate. On time, on budget and with required features and functions, are frequently used as criteria for success. Against such criteria success rates of 20-30% are frequently cited (see for example research by The Standish Group, 2004). Student projects seem to have no greater success than real world projects so, in this respect, industry-collaborative student projects can be considered authentic.

While recognizing that much can be learnt from projects that are less than successful, a social perspective on learning suggests the experience could be socializing students into a culture of project failure. The implication of this may be that higher education is providing a disservice to both students and to the wider project management community. This was the starting point for research to explore how tension between learning and performance is played out in the assessment of industry-collaborative projects. The initial findings of research into the tension between learning and performance in projects are discussed in this paper.

A small-scale study using a qualitative approach was carried out within the Business School at Bournemouth University. In 2005 25 BSc Business Information Systems students completed industry-collaborative projects. Students' reflective accounts of their projects submitted for assessment were used as a primary source of data. These reflective accounts were considered to be illustrative of what students consider to be important about their projects for their future practice, or what they think the assessors consider important about practice, and therefore provided a means of interrogating the phenomena.

Conceptual background

Reflection is considered essential for professional practice, critical thinking and learning. Without reflection learning fails to develop from trial and error learning to higher levels of learning (Bateson 1973). Reflective material is widely used to assess experience but limited research makes it difficult to know how and what to assess. Taking a socially constructed view of assessment, recent development in social psychology provide conceptual and theoretical bases for suggesting that a student's performance in an assessment can be understood only in terms of the student's attempt to influence the assessors, by following some (implicit or explicit) rules about how one does this (Holmes 1995:5).   When reflective material is to be assessed, it has been suggested that the imperative to do well academically discourages students from engaging in honest and open reflection (Hargreaves 2003). The idea that reflective material can represent a true and accurate account of experience is clearly unrealistic. What reflective material can illustrate is an 'understanding of acceptable professional behaviour, or the dilemmas faced in practice' (ibid). In this study, students' reflections were used to gain insight into their perceptions. Furthermore, it seems likely that the reflections on their projects will contribute to the repertoire of images, ideas, examples and actions that they will draw upon in the future to inform decision-making and so contribute to shaping future practice.

Early models of experiential learning (e.g. Dewey and Lewin), including the influential Kolb's Learning Cycle, feature reflection in a single feedback loop. Schön's work on organisational learning, and in particular his collaborative work with Argyris (1974, 1978), produced the concept of 'double-loop learning' and raised awareness of its importance in organisational learning.   Reflection features in both single and double-loop learning but the scope of reflection is significantly different.

A key role of reflection is to reveal theory-in-use and explore the congruence with espoused theory. To explain theory-in-use Argyris and Schön (1974) initially looked to three elements:

> **Governing variables:** dimensions that people are trying to keep within acceptable limits. Any action is likely to impact upon a number of such variables, so any situation can trigger a trade-off among governing variables.
> **Action strategies:** the moves and plans used by people to keep their governing values within the acceptable range.
> **Consequences:** what happens as a result of an action. These can be both intended - those the actor believe will result - and unintended. In addition those consequences can be for the self, and/or for others.
>
> (Anderson 1997)

Where the consequences of the strategy used are what the person wanted, then the theory-in-use is confirmed. However, there can be a mismatch between the intended outcome and the actual consequences. When a mismatch occurs, Argyris and Schön suggest two responses and these can be seen in the notion of single and double-loop learning, as shown in fig. 1.
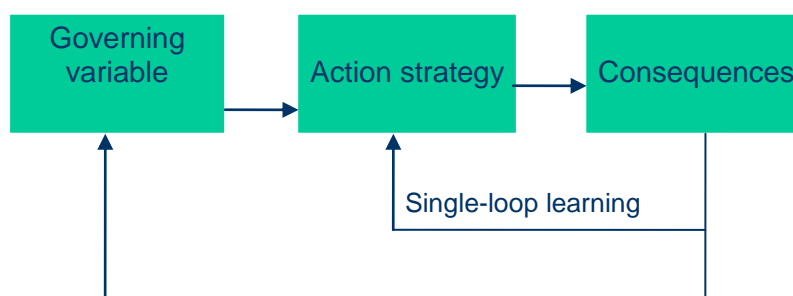

Fig. 1 Single and double-loop learning (Argyris and Schön 1974)

The idea of double-loop contributes in two ways to experiential learning theory:

> [1] Abstract conceptualisation now becomes something one can analyse and work from.
> [2] Unlike Dewey's, Lewin's or Kolb's learning cycle, where one had, so to speak, to make a mistake and reflect upon it […] it is now possible […] to

learn by simply reflecting critically upon the theory-in-action. In other words, it is no longer necessary to go through the entire learning circle in order to develop the theory further. It is sufficient to readjust the theory through double-loop learning.

(Finger and Asún 2000: 45-6)

In single-loop learning, the emphasis is on 'techniques and making techniques more efficient' (Usher and Bryant 1989:87).   Single-loop learning involves following some sort of predefined plan, and as a result is both less risky and affords greater control. There is some similarity between the notion of single-loop learning and the metaphor of 'map-reading' used by Lester (1999).   Lester argues that that map-reading is an inadequate conceptualization of professional work, and 'map-making' professionalism is necessary where practice is involved with dilemmas of value and with creating congruent outcomes in complex social, ethical and economic contexts. Map-making professionalism involves active experimentation and construction of practice; problems must be defined as well as solved and not only is the nature of the territory constantly changing, but territorial boundaries are beginning to blur and dissolve (ibid.). Double-loop learning is therefore a necessity for professional practice, particularly where project work is involved. The implications for professional development are highlighted by Lester who argues that an education in map-reading may encourage limiting beliefs that blunt the development of map-making capabilities.

Argyris and Schön (1974) argued that double-loop learning was necessary for organizational learning to take place. Recently, Back and Seaker (2004) make the case that project success depends upon building a team that practices, incorporates and nurtures double-loop learning. Using personality preferences derived from the Myers-Briggs Index, Back and Seaker propose that certain personality types may be more predisposed towards double-loop learning than others. They suggest personality preferences favouring intuition, thinking and perceiving are more likely to practice in a double-loop manner. Other personal traits relevant to learning are the theories we hold about ourselves: self-theories.

American social psychologist, Carol Dweck (1999), has explored the effects of self-theories on learning. She links malleable self-theories with an increased likelihood of persisting in the face of difficulty and with choosing learning goals over performance goals. Self-theories are thought to be significant not just for learning but in the

workplace too, and feature in Knight and Yorke's (2002) model of employability. Attention to the psychological conditions underpinning a person's performance would seem to be an important factor in the tension between learning and performance.

Argyris and Schön modelled the characteristics of theory-in-use that they thought would inhibit or enhance double-loop learning. Model I is said to inhibit double-loop learning and is shaped by an implicit disposition to win and avoid embarrassment. Model I is predominantly defensive and therefore the potential for growth and learning is seriously impaired:

> If my behaviour is driven by my not wanting to be seen as incompetent, this may lead me to hide things from myself and others, in order to avoid feelings of incompetence. For example, if my behaviour is driven by wanting to be competent, honest evaluation of my behaviour by myself and others would be welcome and useful.
>
> (Anderson 1997)

A summary of model I theory-in-use is provided in table 1. In contrast, Model II theory-in-use encourages open communication, testing of assumptions and beliefs and surfacing conflict. Argyris claimed that just about all the participants in his studies operated from values consistent with Model I but, when asked, espoused Model II values (Smith 2001). Indeed, employing Model II in difficult interpersonal interactions 'requires profound attentiveness and skill for human beings socialized in a Model I world' (Edmondson and Moingeon 1999:162). The characteristics of model II theories-in-use are summarized in table 2.   In this study, the characteristics of Model I and Model II theory-in-use contributed to the conceptual framework used for discourse analysis.

Table 1. ***Model I Theory-in-use Characteristics***

The Governing Values are:
Achieve the purpose as the actor defines it
Win, do not lose
Suppress negative feelings
Emphasize rationality

Primary Strategies are:
Control environment and task unilaterally
Protect self and others unilaterally

Usually operationalized by:
Unillustrated attributions and evaluations e.g.. "You seem unmotivated"
Advocating courses of action which discourage inquiry e.g. "Lets not talk about the past, that's over."
Treating ones' own views as obviously correct
Making covert attributions and evaluations
Face-saving moves such as leaving potentially embarrassing facts unstated

Consequences include:
Defensive relationships
Low freedom of choice
Reduced production of valid information
Little public testing of ideas

(adapted from Argyris, Putnam & McLain Smith 1985, p. 89 in Smith 2001)

Table 2. ***Model II Theory-in-use Characteristics***

The Governing Values include:
Valid information
Free and informed choice
Internal commitment

Strategies include:
Sharing control
Participation in design and implementation of action

Operationalized by:
Attribution and evaluation illustrated with relatively directly observable data
Surfacing conflicting view
Encouraging public testing of evaluations

Consequences should include:
Minimally defensive relationships
High freedom of choice
Increased likelihood of double-loop learning

(adapted from Anderson 1997)

Analysis and findings 1

Discourse analysis was used to interrogate students' critical reviews and project presentations. A series of binary oppositions were isolated within the discourse used by students to describe their project experiences. These binary oppositions were then used to characterize students' reflections and the data generated was the number of students where corresponding evidence was found. A student was only counted in a specific category if strong supporting evidence was found, as a result the number of students on both sides of an 'opposition' does not always equal the total number of students.   A range of data categories were explored in the research and this paper focuses on those that are particularly relevant to double-loop learning.

Analysis focused on data categories that were reflective of specific aspects of learning and personal traits, and the relevant binary oppositions are shown in table 3.

Table 3. Binary oppositions identified in student reflections

Learning

Functional knowledge	- Declarative knowledge
Communication, discussion	- Working alone, no discussion
Teamwork	- Lack of support / separation from team
Problem-work	- 'Business as usual'

Personal traits

Focus on learning goals	- Focus on performance goals
Malleable self-theories	- Fixed self-theories
Model II theory-in-use	- Model I theory-in-use

Key results from the initial analysis are shown in table 4. Reflection on functional knowledge, communication and teamwork by a majority of students was broadly consistent with expectations for this type of learning experience. Given the nature of project work, it is perhaps surprising that 'problem-work' featured in the reflections of only 32% of students. A strong emphasis on performance goals was expected, given the extent to which the discourse of project management is performance-orientated. Dweck (1999) suggests there is a potential for conflict between performance and learning and students' reflections suggests only about one third of students (36%)

actively pursued learning goals. It seems unlikely that students' considered learning unimportant in the context of assessment within higher education.

Argyris found most people operate with model I theory-in-use so it is not surprising that model I theory-in-use was indicated for about half of the students in this study (52%).   Argyris also found most people espoused model II, so discourse analysis of reflective material seems to have been useful in detecting characteristics of theory-in-use.   Evidence of model II theory-in-use was detected for only just over a quarter of students (28%) and no clear evidence was found to indicate either model I or model II theory-in-use for the remaining 20%.

Table 4. Key individual results

Key data category	Percentage of students (n=25)
Functional knowledge	68
Communications	84
Teamwork	68
Problem-work	32
Performance goals	64
Learning goals	36
Fixed self-theories	16
Malleable self-theories	20
Model I Theory-in-use	52
Model II Theory-in-use	28

Analysis and findings 2

A second stage of analysis was conducted by dividing the students into two cohorts based on the grade they received in another unit that had an individual assignment to develop business solutions. When the data was analysed by cohort, as shown in table 5, some patterns were observed. Cohort A represents the students who could be considered academically 'stronger' and, unsurprisingly, the categories of data related to learning all featured in the reflections of these students to a greater extent than the reflections of students who could be considered academically 'weaker'. In

the categories of data relating to personal traits the differences between academically stronger and weaker students were marked. More of the academically stronger students emphasised pursuit of learning goals as well as performance goals. The academically stronger students also seemed to hold malleable self-theories and have operated with model II theory-in-use. In contrast, the academically weaker students reflected less on learning goals, seemed more likely to hold fixed self-theories and have operated with model I theory-in-use.

Table 5. Key results by cohort

Key data category	% of cohort A (n=13 students with > 55% in ISP)	% of cohort B (n=12 students with <= 55% in ISP)
Functional knowledge	85	42
Communications	100	67
Teamwork	92	42
Problem-work	54	8
Performance goals	85	42
Learning goals	62	8
Fixed self-theories	0	33
Malleable self-theories	38	0
Model I Theory-in-use	31	92
Model II Theory-in-use	54	0

Analysis and findings 3

Further patterns were detected when the data was analysed by team (tables 6 and 7). All the students who seemed to have operated with model II theory-in-use were concentrated in two teams: called type-2 teams. All the students whose reflections suggest they hold malleable self-theories were also found in these type-2 teams. In two other teams, all the members seemed to have operated with model I theory-in-use: type-1 teams. It was particularly interesting that one of the type-1 teams was entirely made up of academically stronger students and the reflections of this team suggested they had actively avoided pursuing learning goals, taking the view that a

successful performance by the team was more important. The other type-1 team comprised academically weaker students who seemed to develop as a team rather late in their project and their choices, perhaps understandably with time running out, seemed to be orientated towards performance rather than learning.   Members of the remaining two teams seem to have reflected on their experience in very different ways and no clear pattern were discernable. These were called type-0 teams and the conclusion tentatively drawn was that their development faltered and group norms were not developed. In contrast, type-2 teams seem to have developed norms associated with learning based on model II theory-in-use and type-1 teams norms associated with performance based on model I theory-in-use.

Table 6. Key results by team

Key data category	% of type-2 team members (n=8)	% of type-1 team members (n=7)	% of type-0 team members (n=10)
Functional knowledge	100	100	40
Communications	100	43	60
Teamwork	100	57	60
Problem-work	88	0	10
Performance goals	88	57	50
Learning goals	100	0(-)	10(-)
Fixed self-theories	0	29	20
Malleable self-theories	63	0	0
Model I Theory-in-use	0	100	60
Model II Theory-in-use	88	0	0

(-) denotes active avoidance of learning goals.

Table 7. Distribution of cohorts between team types		
	Number of students from cohort A	**Number of students from cohort B**
Team type 2	7	1
Team type 1	3	4
Team type 0	3	7

Conclusions and recommendations

The starting point for this enquiry was a concern regarding how tension between learning and performance plays out in the assessment of practitioner projects. BIS practitioner projects aim to bridge the gap between a world of learning, on the one hand, and a world of performance on the other. Double-loop learning is considered to be important for organisations and for individuals to operate effectively in a dynamic environment, particularly when working in teams and undertaking projects. However, the discourse of project management tends to emphasize the rational, with a focus on the tangible (sensing rather than intuiting) and encourages dealing with the environment in a planned and orderly way (judging rather than perceiving – Back and Seaker 2004).   Double-loop learning is difficult where much is at stake and in a project environment often much is at stake. The pressure to perform both academically and in the real world creates tension in the context within which these student projects and their assessment take place. The challenge where students undertake industry-collaborative projects is to ensure that learning is not driven out by the pressure to perform.

Dweck (1999) suggests that learning goals can be driven out by performance goals. In this study, the tension between learning and performance does seem to create a dilemma for students. The findings suggest that both the academic capability of individual students and the development of organizational norms influence how tension between learning and performance is played out. For many students, pressure to perform seems to have pushed out learning goals, although about a third seem to have successfully combined performance and learning. The students who combined performance and learning seemed to do so because they were part of a team that developed organisational norms that supported learning. For the limited data in this study, it seems that both these requirements had to be met; as some

students were academically strong and in a team that developed organizational norms, but never-the-less seem to have chosen performance over learning.

The implications for learning and teaching include:

- A need to scaffold the formation of student teams in such a way that group norms supportive of learning are developed [while taking care not to adversely impact student autonomy – an impossible goal perhaps?].
- Encouraging academically 'weaker' students to balance learning and performance goals effectively.
- Attempting to influence project discourse in a way that is compatible with model II theory-in-use thereby increasing the likelihood of double-loop learning [perhaps ensuring the discourse of assessment explicitly reflects, for example, surfacing conflicting views].

Further research required includes:

- Develop approaches to scaffolding student team development without inhibiting autonomy.
- Explore the relationship between double-loop learning and success in industry projects.
- Investigate the role of self-theories in group work.
- Explore the relationship between double-loop learning and self-theories.

Contact details:
Karen Thompson
Lecturer in Information Systems and Project Management
Institute of Business and Law
Christchurch House
Bournemouth University
Talbot Campus
Fern Barrow
Poole
Dorset. U.K.
Email: kthompso@bournemouth.ac.uk

References

Anderson, L. (1997) *Argyris and Schön's theory on congruence and learning* [On line]. Was available at http://www.scu.edu.au/schools/sawd/arr/argyris.html
Argyris, M. and Schön, D. (1974) *Theory in Practice. Increasing professional effectiveness.* San Francisco: Jossey-Bass

Argyris, M. and Schön, D. (1978) *Organizational learning: A theory of action perspective.* Reading, Mass: Addison Wesley

Back, K. M. and Seaker, R. (2004) 'Project Performance: Implications of personality Preferences and Double Loop Learning' *Journal of American Academy of Business, Cambridge.* Vol. 4 Iss. 1-2 pg 292

Bateson, G. (1973) *Steps to and Ecology of Mind.* London: Paladin

Dweck, C. S. (1999) *Self-Theories: Their Role in Motivation, Personality, and Development.* Philadelphia, USA: Taylor & Francis

Edmondson, A. and Moingeon, B. (1999) 'Learning, trust and organizational change'. In Easterby-Smith, M., Burgoyne, J. and Araujo, L. (eds.) *Organizational Learning and the Learning Organization: Developments in theory and practice.* London:Sage
Finger, M. and Asún, M. (2000) *Adult Education at the Crossroads. Learning our way out*, London: Zed Books.

Hargreaves, J. (2003) 'So how do you feel about that? Assessing reflective practice'. *Nurse Education Today* Vol. 24 Iss. 3 pgs. 196-201 Available online: www.sciencedirect.com/science [Accessed 06/07/2004]

Holmes, L. (1995) 'Competence and Capability: From 'Confidence Trick' to the Construction of the Graduate Identity'. Available on-line: www.re-skill.org.uk/grads/cc_grdid.htm [Accessed: 24/3/2005]

Knight, P.T. and Yorke, M. (2002) 'Employability Through the Curriculum'. *Tertiary Education and Management.* Dec. Vol. 8 No. 4 pg. 261-276

Knight, P.T. and Yorke, M. (2003) *Assessment, Learning and Employability.* Maidenhead, Berkshire: SRHE and OU Press/McGraw-Hill

Lester, S. (1999) 'From map-reader to map-maker: approaches to moving beyond knowledge and competence'. In O'Reilly, D., Cunningham, L. and Lester, S. (eds) *Developing the Capable Practitioner: Professional Capability through Higher Education.* London: Kogan Page

Preskill, H. and Torres, R.T. (1999) 'The Role of Evaluative Enquiry in Creating Learning Organizations'. In Easterby-Smith, M., Burgoyne, J. and Araujo, L. (eds.) *Organizational Learning and the Learning Organization: Developments in theory and practice.* London:Sage

Shaw, R.B. and Perkins, D.N.T. (1991) 'Teaching organisations to learn'. *Organization Development Journal.* Vol 9 (4): 1-12

Smith, M. K. (2001) 'Chris Argyris: theories of action, double-loop learning and organizational learning'. *the encyclopedia of informal education*, www.infed.org/thinkers/argyris.htm. Last update: 28.1.2005 [accessed 27/4/2005]

Standish Group, The (2004) *2004 Third Quarter Research Report.* Available on-line: www.standishgroup.com/sample_research/PDFpages/q3-spotlight.pdf [accessed 15/7/2005]

Turner, J.R. (2005) 'Barriers to innovation and learning' *Project Manager Today*. Issue:May pg.12-14

Usher, R. and Bryant, I. (1989) *Adult Education as Theory, Practice and Research*, London: Routledge.