# ICT Capstone projects: 'the edge of chaos'

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## Abstract

The Capstone Project processes and assessment methodologies continue to be problematic.  Experience has led us to review our assessment rubrics and methods with every iteration in attempt to refine and improve the practice and outcomes.

This review has surveyed a broad range of capstone projects describing approaches to practice, assessment and sizing.  In their widest sense capstone projects are described as being ambiguous and complex, tantamount, as this title infers, to artfully practicing as if one is 'on the edge of chaos.' Perhaps more easily viewed from the perspective of capstone project as showcase there have been promising taxonomies mooted or developed to give evidence of skills, practice, knowledge and understanding.

There appears to be, however, a dilemma in terms of creating a succinct vision that might inform the sizing and assessment of projects and enable us to capture its ephemeral nature. Complexity theory appears to go some way towards unpacking relevant factors which could inform the development of tools for assessment and sizing of projects.

There are professional heuristics employed in the sizing of projects and standards for the assessment of capstone projects. From this review it can be seen that a fluid but accurate methodology should be developed which addresses the dilemma in such a way as to provide robust conceptual, pedagogical and sociological sizing and assessment practices.

## 1    Introduction

A capstone project is a culminating project typically undertaken in the final year of a degree. Fincher, Petre and Clark (1999 p. 57) describe the aims of such projects as "to culminate the degree programme with a practical demonstration by the student confirming their ability in the domain, and to make theory "real" by integrating theory and practice through authentic problems, processes and deliverables."

Due to their nature as instances of problem-based and experiential learning in an educational setting, these projects can be described as ambiguous and complex. Some faculties have adopted a reflective process, following an action research methodology, to improve the capstone process and assessment methods.  At Whitireia Community Polytechnic, we also have studied and refined our project process over seven years, supervising and reviewing more than 40 projects in this period. The changes reflect an adaptation of the process to match current industry practice, methodologies and interpretation of learning theory. This paper describes the background to the study, the theories we are using and the methodology for our current review.

## 2    Capstone Projects

Capstone projects can take a number of forms. They may be "unique real projects provided by local businesses to give the students industry experience" (Clark 2005) or projects undertaken by students in simulated learning environments (Cranmer 2006); they may involve tightly constructed "known" problems or real clients with unconstrained or loosely defined problems (Keogh, Sterling and Venables 2007). Students may work on projects as individuals or in teams.

The definition of a capstone project or course varies greatly across disciplines and institutions. Rippon, Booth, Bowie and Jordan (2002) describe two models of capstone courses based on case study. The first model is the traditional Harvard case-based approach, in which there is a simple application of already taught information. However Derek Bok, a president of Harvard University, had important reservations about this model: "Although the case is an excellent device for teaching students to apply theory and technique, it does not provide an ideal way of communicating concepts and analytical methods in the first instance." (Bok in Schon 1983)

The second model is more open ended and designed to enhance critical thinking skills.  Students use cases to 'help make sense of their worlds for themselves' and later [enabling] "students to understand and reflect on the phenomenon of management as a construct to which they could either contribute or challenge."

DeLyser et al (2004) describe a multidisciplinary capstone project where students from three disciplines within the computer or electronic engineering departments are given a series of lectures supported by laboratory based activities. Experiences in the laboratory "drive the content of the lectures." Despite some significant measure of success in terms of understanding they were "less comfortable with qualitative performance criteria, testing and error analysis."

Another form of capstone project described by McGoldrick (2008) requires students in an Economics Course to demonstrate "their acquired skills through an analysis of a topic of their choosing." The significant differences between this and other capstone projects may be ascribed to the sociological expectation of their expected output. However it does appear that concepts which could be fundamental to capstone projects such as team work could be relevant to a socially based capstone project.

Wagenaar (1993), in a sociology course, found that many educational institutions felt that "theory and methods courses constituted the capstone experience." His vision was that a capstone course (project) should be interdisciplinary; it should link knowledge from one course to another, and allow students to be reflective. He did not see the capstone experience as necessarily being attached to assessment but could foresee the time when it might be. He described the concept of a capstone project as being a kind of reflective research report encouraging collaborative activities such as peer review and debate.

Perhaps more familiar to Information Technology educators is the experience of Clark (2005) who describes students working in small groups undertaking real-life projects in the context of local businesses. Mann and Smith (2005) state that the value in using real business projects with real clients is that "the students experience the scope of software engineering with all the implicit difficulties: client issues; complexity of business systems and group work." The aim is to provide students with an opportunity to apply the full range of skills they have learnt and to expose them to real world experience before they move into the workplace. Bridgeman (2003) describes the process that students must follow as one that requires students to "demonstrate sufficient skills, competencies and process to complete their project; plus demonstrate an ability to manage the relationships between these technical and academic processes and outputs".

"Whatever the form of the capstone course, one of its unique characteristics is the balance it strikes between product and process. Capstone courses usually involve completion of a finished product, e.g. research-type paper, formal presentation, software artefact, formal report. Yet at the same time their emphasis is on the methodology and process involved" (Clear et al 2001 p. 1)

Capstone projects by their very nature are a balancing act between a project which is useful and one which can be assessed conveniently. In their article on the role of development methodologies within such projects Mann and Smith (2004 p.1) state:

"A significant challenge in the design of capstone courses is the relationship between process and product. As academics we argue that a strong process will result in a good product but instructors face little direction in the identification of a suitable process."

A number of philosophies have evolved regarding the factors which contribute to a successful project. Annegret

management, but added to this there must be a suitable project definition while Lan & Ginige (2008 p.121) say:

"The success of industry-based projects (capstone projects) used in computing courses depends on a number of factors. These are: i) characteristics of the information system and the client perception, ii) individual student and group characteristics, iii) development methodology used, and iv) the support and supervision provided. Generally academics use a 'trial-by-error' approach in striking the right balance between these factors for the success of capstone projects."

It is impossible to make every project identical, or even remotely similar especially when dealing with diverse needs and required skill sets. David Skelton (2006) has attempted to provide a guide to weighting software based projects in his paper. This allows for a small amount of weighting on the final grade dependant on the complexity of the problem. But as the capstone projects are evolving to include networking and the evaluation of suitability of software available among others, this cannot be applied to all. There is also the issue of the perception by the students of the fairness of both the amount of work required and the assessment process.

The dilemma arises, when scoping projects, as to whether the size and complexity is enough to make the project worthwhile and achievable in the limited amount of time available to complete. There is also the variation in the types of clients, ranging from a commercial software house with strict standards and a novice user who appreciates any help in the area. The expectations placed on the students in these differing environments are hugely diverse and must be managed carefully.

Clear et al (2001) state that the quality and success rates for capstone projects are normally higher than in regular courses, but there is a necessity to ensure that any projects undertaken are not critical to the client or sponsor. The need for critical projects or parts of projects, to focus on targets and deliverables within a set time could jeopardise the broader educational goals and even lead to the exploitation of the students. Where there is scope creep it is common for the students to lack the confidence to confront the client, so the instructor may have to intervene and enter into negotiation with the client.

In his paper analysing the instances of reference to capstone projects within the National Advisory Committee on Computing Qualifications (NACCQ) Noel Bridgeman (2008) looked at 35 papers on the topic, delivered at conferences between 1998 and 2007; 13 of these looked at the goals of capstone projects while six looked at the characteristics of the projects themselves. This is a very strong indication that research into capstone projects is very topical in today's environment where students view education as a means of entering the industry.

## 3   Sizing Projects

"Projects must be viable, have resources available and be of an appropriate size" (Daniels et al 2002). Sizing is the

in coordinating these types of projects, uses their professional judgment, along with that the judgment of the project supervisors, to determine the scalability and resources required and the depth of knowledge needed to ensure an approximately timed project that can be completed within the expected timeframe; in short determining the viability of each project.

This does not always work well, however, as the differences in student team members available to fill the positions, the ability of the student team to work to the potential expected by project staff and the personal issues that creep in can hinder progress. This is where the professional experience of the project staff is required to assist students in adopting pathways that will allow them to attain their goals or that will guide them to rescale the project not only to meet appropriate outcomes for the client but also the academic requirements. One to one support with each project group is achieved by regular meetings with the supervising tutor throughout the project and meetings at least once a month with the Project Coordinator.

Keogh, Stirling and Venables (2007) state "Assessment tasks motivate students to value process; initially perhaps for marks but eventually we hope for value. It is difficult to examine direct educational merit gained by students in their project experience, but we do know the students to experience satisfaction at completing high quality material for a real client."

This value is what the students gain but they are generally motivated by the commitment of the project staff supporting them to complete the goal through their professional understanding of the ICT arena in which these students are working. The assessment phase of the project is in part dependant on the staff having been involved in projects over a period of time and on their understanding of the professional standards the students need to attain in academia.

As well as the inside knowledge developed to scale, size or scope each aspect of the project to meet the requirements, an understanding of both professional and academic requirements is employed by the project staff to manage the projects.

Professional heuristics are used to determine scalability, viability and scope in the sizing of all projects. The Project Coordinator initially evaluates potential projects, then the Project Supervisors are involved in a more detailed evaluation before the projects start. Once the projects start the confirmation of the project scope is established through project meetings held with the supervisors and project teams. The supervisors use their professional skills to scale the project based on project progress and the team's ability to reach the goal required for assessment.

While a robust process is important in the development of a successful capstone project, if we are to present students with the opportunity to practice in an industry-like environment, it is important that the process we support is allied to current practice.

Xia and Lee (2005) claim that 'Information systems (IS) development is inherently complex because it must deal with not only technological issues but organizational factors. They quote Shenhar who reminds us that with reference to developing theories regarding project management "one size does not fit all"

In searching for a wider ranging model for real life practice, complexity theory offers the potential to inform capstone projects and consequently their sizing. Complexity theory is often used interchangeably with chaos theory. It has been variously described as ambiguous, evolving, adaptive, flexible, dynamic, "rather like a spider web or geodesic dome" (Maslow 1965) being affected by and affecting any number of agents. The organic references in complexity theory appear to have the potential to validate the more ephemeral constraints in capstone projects such as the understanding of complex systems. Despite its apparently wide open nature complexity theory describes an agent's activity within an identifiable environment, albeit one with potential to shift.

Petzinger (1998) has been more forthright in his description. "Complexity is the way the world is…it is not a programme…it defies methodology…has to be customized…It is the situation that complexity addresses." In using this as a model for capstone projects we could rephrase it as; the capstone project is the way the world is, it is not a programme, defies methodology, must be customized and addresses a situation. These appear to be highly relevant jumping off points for forming appropriate assessment.

An organization subject to complexity theory evolves with its environment through self-organization (Colman, 1999). Self organization from within a community of practice promotes the motivation which leads to innovation. (Coleman 1999). It can produce outcomes if strategies are put in place to make it self organising. (Coleman 1999, Xia and Lee 2005, Innes and Booher 2000) However as Innes and Booher warn us this system improves only so "long as they [that is people, molecules etc] get feedback and so long as they have the capacity to respond." This is what the student participant in a capstone project might require.

An appropriate metaphor for complexity theory situated in an organisation as capstone projects is the biological system. It is populated by numerous particles, cells, creatures, plants groups, environments on so on. Each ultimately dependent of the other to evolve, change and affect change. The same is so with complexity theory in the context of capstone projects. Many agents, actors, artefacts, environments, relationships and so on enable the evolution of outcomes within the context of an environment. Petzinger (1998) describes Kauffman's understanding of living systems as being at their most robust and efficient in the narrow space between stability and disorder- poised at "the edge of chaos."

The capstone project could ultimately function best in that netherworld between chaos and complexity. It is active, fluid, functions within boundaries in an environment where a wide range of factors are expected to influence

outcomes and is predicated on the ability of the student to manage the project by managing self.

It is premature to draw any particular conclusions about the way the mentor in the capstone project keeps the student project from descending into chaos using complexity. However closer inspection of complexity theory in terms of the management of a capstone project should be considered as the source of the insight a mentor needs to assess contexts, mediation of tools and their innate complexity.

In an attempt to rationalise the complexity inherent within the projects we offer the following framework in a paper by Xia and Lee (2005 p.55)

|  | Structural | Dynamic |
|---|---|---|
| Organizational | Structural Organizational Complexity (SORG) | Dynamic Organizational Complexity (DORG) |
| Technological | Structural IT Complexity (SIT) | Dynamic IT Complexity (DIT) |

These factors give the high level framework incorporating two common dimensions which could be used to conceptualize and measure the complexity of Information System Development Projects (ISDP) These dimensions are structural versus dynamic and organizational versus technology, and may be broken down even further into characteristics which need to be taken into account when assessing the complexity of a project.

In their paper Xia & Lee break down the high level factors in the following way:

SORG as the multiplicity and interdependency of organizational elements including the various stakeholders such as end users, project team, and external contractors or vendors.

SIT as the multiplicity and interdependency of technological elements including technology platform, software environments, data processing requirements, and other integrated systems.

DORG as the rate and pattern of changes in the organizational environments, including changes in user needs, business processes and organizational structures.

DIT as the rate and pattern of changes in the IT environment, including changes in IT infrastructure, architecture and software development tools. This framework was tested intensely by Xia and Lee who concluded that

" The results of confirmatory data analysis suggested that the 15-item measurement of ISDP complexity developed in this research exhibited adequate levels of measurement properties.......The measures were shown to satisfy criteria related to unidimensionality, convergent validity, discriminate validity and nomological validity" (Xia & Lee, 2005 p. 72)

These criteria will be used initially to review our past projects and establish validity for Student Capstone Projects. It is then intended to use this as a basis for the development of a predictive model to assist in sizing of student projects.

## 4    Assessment

A core part of the project process is embodied in the assessment methodology. Assessment is a critical part of the overall design of the project process. James, McInnis and Devlin (2002) and reported by the Centre for the Study of Higher Education in Australia (2003):

"The relationship between assessment practices and the overall quality of teaching and learning is often underestimated, yet assessment requirements and the clarity of assessment criteria and standards significantly influence the effectiveness of student learning. Carefully designed assessment contributes directly to the way students approach their study and therefore contributes indirectly, but powerfully, to the quality of their learning" (p.1).

The capstone course is, by definition, the final course in the sequence of learning activities and the objective is to enable a learning experience to engage student critical thinking at the higher levels, as identified in the well known Bloom's taxonomy. Bloom's taxonomy identifies six major levels or categories of learning (Bloom 1956). The most basic category is 1) knowledge, which essentially entails memorization or identification of facts. Following knowledge comes 2) comprehension, which focuses on meaning and intent, 3) application, which applies existing knowledge to new situations, 4) analysis, which enables deeper understanding through decomposition of concepts into components, 5) synthesis, the final level of learning which combines components to form original conclusions, and 6) evaluation which is used in conjunction with the other five categories. (Hartzel et al 2003).

During the 1990's, a former student of Bloom's, Lorin Anderson, led an initiative to update this taxonomy, hoping to create revised taxonomy that would be more relevant to students and teachers in the 21st century. This time "representatives of three groups [were present]: cognitive psychologists, curriculum theorists and instructional researchers, and testing and assessment specialists" (Anderson & Krathwohl 2001 p. xxviii). Published in 2001 this revision contains significant changes. With the changes in society since the original taxonomy was proposed the Revised Bloom's Taxonomy provides an even more powerful tool to fit today's teachers' needs. The Revised Taxonomy Table matrix "provides a clear, concise visual representation" (Krathwohl 2002) between educational goals and products or activities.

In this matrix capstone projects would be described as in the highest level of the matrix, the 'Create' level of the Cognitive dimension and the Meta-Cognitive Knowledge Dimension.

| The Knowledge Dimension | The Cognitive Process Dimension | | | | | |
|---|---|---|---|---|---|---|
| | Remember | Understand | Apply | Analyze | Evaluate | Create |
| Factual Knowledge | List | Summarize | Classify | Order | Rank | Combine |
| Conceptual Knowledge | Describe | Interpret | Experiment | Explain | Assess | Plan |
| Procedural Knowledge | Tabulate | Predict | Calculate | Differentiate | Conclude | Compose |
| Meta-Cognitive Knowledge | Appropriate Use | Execute | Construct | Achieve | Action | Actualize |

An approach advocated by economics educators is one that is based on Hansen's proficiencies: Following the advice of a group of scholars (Hansen 1986, 1998, and 2001, Siegfried 2001 and Siegfried et. al 1991) many economics departments have responded to a call for a "deepening" of the economics curriculum by developing capstone courses and/or honours programs (Siegfried 2001). Hansen (1986, 2001) argued that educators needed to help students develop a set of proficiencies that cannot all be achieved through traditional classes based only on lecture and exams. The six proficiencies discussed by Hansen (2001) are:

1. Access existing knowledge
2. Display command of existing knowledge
3. Interpret existing knowledge
4. Interpret and manipulate data
5. Apply existing knowledge
6. Create new knowledge

The capstone project experience would generally be described as proficiency level 5 and many address proficiency level 6, with research components and the development of new and unique solutions. Many students will demonstrate all six proficiencies through the completion of a well designed capstone experience. The approach to the development of curricula and the capstone experience advocated by Hansen (2001) emphasized the importance of helping students develop these proficiencies with pedagogical approaches involving active learning such as those advocated by Saunders and Walstad (1998).

Hansen's sixth proficiency is the most challenging for undergraduates since it requires the creation of new knowledge. Each capstone project is required to make some sort of original contribution and is not a repeat of previous work. While most capstone projects would not be considered groundbreaking work, they almost all create new knowledge. Some students create new software solutions, others apply new development techniques and still others compare technologies and evaluate performance. Undergraduate students can make original contributions and most enjoy the opportunity to do this in the capstone project.

The revised Bloom's taxonomy and Hansen's proficiencies provide different perspectives for the evaluation of the levels attained by project students. Analysing past projects from the perspective of Hansen's proficiencies and the revised Bloom's Taxonomy will be used to improve understanding of levels attained by students and methods of measuring this attainment.

## 5    Conclusion

Capstone Project process and assessment methodologies continue to be problematic. This paper has identified three frameworks that will be used to analyse past projects. To improve understanding of the complexity inherent in capstone projects, and therefore to better understand the size of individual projects, we intend to undertake an analysis of past projects using the framework for measuring ISDP Complexity. Past projects will also be analysed using Hansen's proficiencies and the revised Bloom's taxonomy to develop a deeper understanding of the proficiency level achieved by students through the capstone experience. The results of these analyses will be used to inform the creation of a new assessment model for the Information Technology Capstone Project.

## 6    References

Anderson, L. W. and Krathwohl, D. R. (Eds.). (2001): *A taxonomy for learning, teaching and assessing:a revision of Bloom's Taxonomy of educational objectives:* Complete edition, New York : Longman.

Bloom, B. S. (Ed.). (1956): *Taxonomy of educational objectives: the classification of education goals: handbook 1:cognitive domain.* New York, McKay.

Bridgeman, N. C. (2003). *Project Success: Defining, Designing, Constructing & Presenting a Capstone Project.* Paper presented at the 16th Annual Conference of the NACCQ, Palmerston North, NZ.

Bridgeman, N. (2008): Capstone Projects: An NACCQ Retrospective. *Proc.21st Annual Conference of the NACCQ,* Auckland, NZ.

Centre for the Study of Higher Education. (2003): Core principles of effective assessment. *Australian University Teaching Committee*. Accessed January 15, 2008. http://www.cshe.unimelb.edu.au/assessinglearning/docs/CorePrinciples.pdf

Clark, N. (2005): Evaluating student teams developing unique industry projects. *Proc. 7th Australasian Conference on Computing Education,* Australia, **42**: 21-30. Accessed March 10, 2009.

http://portal.acm.org/citation.cfm?id=1082424.1082428)

Clear,T., Goldweber, M., Young, F., Leidig, P. and Scott, K. (2001): Resources for instructors of capstone courses in computing. *ACM SIGCSE Bulletin* **33**(4): 93 – 113.

Colman, H.C. Jnr (1999): What enables self organizing behaviour in businesses. *Emergence* **1**(1): 33-47.

Cranmer, S. (2006): Enhancing graduate employability: best intentions and mixed outcomes. *Studies in Higher Education* **31**(2): 1-21.

Daniels, M., Faulkner, X. and Newman, I. (2002): Open ended group projects: motivating students and preparing them for the 'real world'. *Proc. 15th Conference on Software Engineering Education and Training*, Covington, KY, USA, 115-126.

DeLyser, R.R., Quine, R.W., Rullkoeter, P. J. and Armentrout, D.L. (2004): A sophomore capstone course in Measurement and data acquisition. *IEEE Transactions on Education* **47**(4): 453-458.

Fincher, S., Petre, M. and Clark, M. (2001): *Computer science project work: principles and pragmatics.* London, Springer.

Goold, A. (2003): Providing process for projects in capstone courses. *Proc. 8th Annual Conference on Innovation and Technology in Computer Science Education*, 26 – 29.

Hansen, W. L. (1986): What knowledge is most worth knowing for economics majors? *American Economic Review* **76**(2), 377-403.

Hansen, W. L. (1998): Integrating the practice of writing into economics instruction, in William E. Becker and Michael Watts, Eds. *Teaching Economics to Undergraduates: Alternatives to Chalk and Talk,* pp. 79-118.

Hansen, W. L. (2001): Expected proficiencies for undergraduate economics majors. *Journal of Economic Education* **32**(3), 231-242.

Hartzel, K.S., Spangler, W.E., Gal-Or, M. and Jones, T.H. (2003): A case-based approach to integrating an Information Technology curriculum. *Information Systems Education Journal* **1**(47). Accessed March 16, 2009. (http://isedj.org/1/47/)

James, R., McInnis, C. and Devlin, M. (2002): *Assessing learning in Australian Universities.* Canberra: Australian Universities Teaching Committee. Accessed February 1, 2009. (http://www.cshe.unimelb.edu.au/assessinglearning)

Innes, J. and Booher, D. (2000): Indicators for sustainable communities: a strategy building on complexity theory and distributed intelligence. *Planning Theory & Practice* **1**(2), 173- 186.

Keogh, K., Sterling, L. and Venables, A. (2007): A scalable and portable structure for conducting successful year-long undergraduate software team projects. *Journal of Information Technology Education* **6**: 516 - 540. Accessed February 1 2009. (http://jite.org/indexes/Vol6.htm)

Krathwohl, D. R. (2002): A revision of bloom's taxonomy: an overview. *Theory into Practice,* **41** (4), 212-218.

Lan, Y. and Ginige, J. A. (2008): Towards criteria based allocation of capstone projects for an enhanced learning experience. *Proc. International Conference on Computer Science and Software Engineering,* Wuhan, China.

Mann, S. and Smith, L. (2004): Role of the development methodology and prototyping within capstone projects. *Proc. 18th Annual Conference of the NACCQ*, Tauranga, NZ.

Mann, S. and L. Smith (2005): Technical complexity of projects in software engineering. *Proc. 18th Annual Conference of the NACCQ,* Bay of Plenty, NZ, *NACCQ.* 249-254.

Maslow, A. (1965): *Eupsychian Management.* Homewood, IL, Dorsey Richard D. Irwan.

McGoldrick, K. (2008): Doing economics:enhancing skills through a process-oriented senior research course. *Journal of Economic Education* **39**(4): 342-356.

Petzinger, T. (1998): The Gurus speak: complexity and organizations: a panel discussion on complex systems. *Emergence.* 73-91.

Rippin, C.B., Booth., Bowie, S. and Jordan, J. (2002): A complex case: using the case study method to explore uncertainty and ambiguity in undergraduate business education. *Teaching in Higher Education* **7**(4).

Saunders, P. and Walstad, W. B., eds. (1998): *Teaching undergraduate economics: a handbook for instructors.* New York, Irwin/McGraw Hill.

Schembri, Dr S. (2007): A reflective account of WIL: from the students' perspective. *Proc. ATN Evaluation and Assessment Conference,* Brisbane, Australia.

Schön, D.A. (1983): *The reflective practitioner: how professionals think in action.* New York, Basic Books.

Siegfried, J. J. (2001): Principles for a successful undergradute economics honors program. *The Journal of Economic Education* **32**(2), 169-177.

Siegfried, J. J., Bartlett, R. L.; Hansen, W. L., Kelley, Allen C., McCloskey, D. N. and Tietenberg, T. H. (1991):The status and prospects of the economics major. *The Journal of Economic Education* **22**(3),197-224.

Skelton, D. (2006): The tension between academic marking and practical industry evaluation: a discussion of current practice. *Proc. Conference of the New Zealand Association for Cooperative Education,* Queenstown, New Zealand.

Xia, W. and Lee, G. (2005): Complexity of Information Systems development projects: conceptualization and measurement development. *Journal of Management Information Systems* **22**(1):45-83.

Wagenaar, T.C. (1993): The capstone course. *Teaching Sociology* **21**(3): 209-214.