ICT Mediated Collaborative Learning: A Learner-Centred Approach to Improving ICT Literary and Employability of Business Graduates

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1.   Introduction

This paper examines the creation of customised Information Communication Technology (ICT) intensive collaborative learning spaces to facilitate effective teamwork and enhance communication and problem solving skills of students in Business degrees at Victoria University. A recent survey (2006) of business practitioners, HR managers, business alumni and academics, reveals that ICT literacy is rated by all groups as the most important area of academic and technical knowledge. Moreover, alumni rated 'business information systems' as the most important subject studied in relation to the performance of their current role, while knowledge and understanding of information technology was highlighted by business respondents as critical for future business graduates. This paper examines an innovative approach to teaching utilising ICT mediated collaborative learning spaces that enable a range of innovative learning activities including: team-based work and information exchange; research and reporting; resource discovery and data mining; multimedia reporting, idea organizing, and presentation construction; e-portfolios and peer review; local and remote collaborative exchange, including international collaboration between project teams working in Melbourne, Kuala Lumpur and Liaoning. Innovation in curricula, pedagogy and learning spaces is essential to developing ICT literacy for future managers and industry leaders.

2.   A Survey of Business and Business Alumni

A survey conducted in October 2006 asked a range of respondents to consider the professional skills required of new business graduates. Responses were attracted from a broad range of industry and occupation categories with 343 business practitioners and 385 alumni completing the survey.

Respondents were asked to consider and identify the academic knowledge and technical skills required of a new business graduate and rate each area by level of importance ranging on a five point Likert scale ranging from 'unimportant' (1), 'moderately important' (2), 'important' (3), 'very important' (4), and 'essential' (5). Because each area of knowledge was expected to be rated positively, the Likert scale provided a larger number of positive response options to better gauge the level of support for each knowledge area.

Academic Knowledge (Ranked in Descending Order)	Total (mean score)	Business (mean score)	Alumni (mean score)	F(726,2)	Sig.
1. Computer literacy	4.22	4.15	4.27	2.228	.108
2. Business communications	3.73**	3.61	3.82↑↑	4.731	.009
3. Ethics of business	3.7**	3.84	3.54↓↓	7.774	.001
4. Information literacy and analysis skills	3.59**	3.52	3.57	7.628	.001
5. Organisational behaviour	3.55	3.53	3.62	2.777	.065
6. Project management skills	3.51	3.51		n/a	n/a
7. Financial literacy	3.39*	3.5↑	3.3	3.749	.025
8. Strategic planning and implementation skills	3.37	3.35		.466╁	.643
9. Innovation and entrepreneurial skills	3.29*	3.21	3.4↑	3.733	.026
10. Marketing principles	3.18*	3.11	3.28↑	3.214	.042
11. Accounting principles	3.08*	3.18	2.99↓	3.15	.044
12. Business and commercial law	3.05	3.05	3.04	.025	.976
13. International business environment	2.99***	2.79↓↓↓	3.14	11.611	.000
14. Economic principles	2.93	2.98	2.86	1.512	.223
15. Statistical methods	2.7	2.72	2.63	2.292	.104
16. Mathematical methods	2.63	2.63	2.61	.399	.672

* Significance level ANOVA $p<.05$; ** Significance level ANOVA $p<.01$; *** Significance level ANOVA $p<.001$
↑Significance level S-N-K $p<.05$; ↑↑ Significance level S-N-K $p<.01$; ↑↑↑ Significance level S-N-K $p<.001$
↓Significance level S-N-K $p<.05$; ↓↓ Significance level S-N-K $p<.01$; ↓↓↓ Significance level S-N-K $p<.001$
╁ Students independent samples t-test used as survey item as only 2 groups represented for that item.

Computer literacy was ranked the most important area of academic knowledge by both business and alumni, followed by business communications, business ethics and information literacy and analytical skills.

Businesses practitioners/professionals rated financial literacy as significantly more important than alumni, however where businesses differed the most from Alumni was in their evaluation of international business environment, rating it as significantly less important than other skills and knowledge. Alumni differed from businesses in rating innovation and entrepreneurial skills and marketing principles as more important, and accounting principles as less important. Mathematical methods, statistical methods and economic principles were rated least important by both business and alumni respondents.

Business graduates are typically required to undertake a set of compulsory core or generic business units of study. Alumni were asked to indicate the level of importance of each of eight units of study to performing their current role. The results are presented (in rank order) in Table 2.

Table 2: Ranking of Core Business Units of Study

Core unit of study	Alumni (mean score)
1. Information Systems	3.71
2. Management and Organisational Behaviour	3.56
3. Introduction to Marketing	3.32
4. Accounting for Decision Making	3.18
5. Business Law	3.07
6. Macro Economic Principles	2.84
7. Micro Economic Principles	2.82
8. Business Statistics	2.7

Information systems was ranked most highly in terms of subject importance among business alumni. This correlates with the outcome of the previous academic knowledge section of the survey (see Table 1) where computer literacy ranked most highly as an area of academic knowledge. After Information Systems, Management and Organisation Behaviour, Introduction to Marketing and Accounting for Decision Making were ranked as the most important core subjects. The high ranking of Introduction to Marketing and Accounting for Decision Making reflects the fact that 46.6% of alumni respondents completed their business degree with an Accounting or Marketing specialisation.

3. Trends Emerging in Business

When asked to identify the required skills and attributes of graduates in their business and their industry generally, common responses from business respondents and alumni included 'flexibility', 'adaptability' and 'the ability to multi-task'. In addition, many business respondents also emphasised the importance of 'soft skills' (also known as employability skills and graduate attributes), given that technical skills

are both more easily learnt on the job and undergoing constant change. Further, with rapid changes in many industries due to technological advancement, the need for students to be able to undertake self-motivated, ongoing education has been emphasised by business respondents and alumni alike – and this would include both technological and soft skills.

Responses highlighted the continuing changes of an ever expanding global business economy, and indicated that a thorough understanding of international business will become increasingly important; in such a context, a strong cross-cultural awareness will be essential. Again, there was a consensus amongst business respondents and alumni that high-level communication skills will become increasingly important, including strong presentation, written communication and web-based skills.

In addition, business respondents overwhelming agreed that changes in their business and industry will impact on the type of graduates employed in the future. Business requires that future graduates see themselves as part of a team, are well rounded in their approach, have a broad range of interests and experiences and are able to see current and future changes in the

world as opportunities rather than threats. Essentially, survey respondents highlight the importance of universities teaching, students, above all, how to learn.

4. Collaborative Learning Spaces

"Spaces are themselves agents for change. Change spaces will change practice"[1]

The key messages emanating from the research constituting the Review of the Bachelor of Business (2006) included:
•   the need for units to develop personal and professional skills and attributes to add value beyond specific technical and academic knowledge
•   a focus on developing graduates who can demonstrate flexibility, adaptability and willingness to respond to change
•   the importance of communication skills, teamwork, and motivation; and
•   the value of Learning in the Workplace and Community.

The challenge for VU was to develop business curriculum, teaching practices and learning activities that develop high order thinking skills that encompass both cognitive and dispositional dimensions. The development of skills and the cultivation of attributes are the central focus of the three new Professional Development (PD) units of study introduced from 2008 for all Bachelor of Business courses. These units of study have adopted a learner-centred,

collaborative learning model which emphasises the social dimensions of learning and work and moves away from a lecture-tutorial model of teaching and learning where the teacher can sometimes be perceived as the single authority of a discipline area. This collaborative learning approach requires a paradigm shift in the faculty's general approach to teaching and learning, one that needs to be supported by new educational environments. The functionality and ambience of the collaborative classroom is as important to the learning experience as the learner-centred curriculum and pedagogy. These learning environments need to support and enable the student-teacher, student-content and student-student relationships.

The findings of this survey has lead to the development of three new units of study in VU's Buisness degree in a project called the Business Edge. Based on the basic learning theory that students learn by doing, these units were designed to be taught in a new learning space: one that would enable collaboration, investigation and performance. Victoria University has committed to the creation of new collaborative learning places to support the new Professional Development units of study embedded within every Bachelor of Business degree from 2008. These purpose-build spaces holding 40 students have required a radically altered timetable to move away from lectures and tutorials to seminars and a reconfiguration of both what is taught and how teaching occurs.

The new learning environments, pedagogy and content have transformed the student from:
•   listener, observer, and note-taker to active problem-solver,

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[1] Joint Information Systems Committee (JISC), Designing Space for Effective Learning: A Guide to 21st Century Learning Space Design, p. 30, viewed 30/03/2008 at http://www.jisc.ac.uk/uploaded_documents/JISClearningspaces.pdf

contributor, discussant and producer of knowledge;

- having low or moderate expectations of preparation for class to high ones;
- a private presence in the classroom (and few or no risks therein) to a public one, with many risks;
- attendance purely a personal choice to attendance influenced by peer expectations and in class activities being explicitly aligned with assessment;
- having responsibilities and self-definition associated with learning independently to those associated with learning inter-dependently;
- experiencing limited flexible teacher-student interactions, from one-on-one advising through small group coaching to whole of class leading
- seeing teachers and texts as primary sources of authority and knowledge, to seeing peers, oneself, and the thinking of the community as additional and important sources of authority and knowledge.[2]

Project deliverables of the Business Learning Experience project that incorporates the Professional Development units of study include nine customized collaborative learning places to support the delivery of the new units. These technology-intensive learning environments will facilitate:

- Team-based student work and information exchange
- The development of information literacy skills
- Seminar-style research and reporting
- Resource discovery and data mining
- Multimedia reporting, idea organizing, and presentation construction
- Local and remote collaborative exchange
- Collaborative activities

The classroom environment has been designed to provide for a seamless transition between whole of class, team, group and individual activities. It has been designed to encourage communication between all members of the class and to support constructivist learning activities sometimes using online resources.

The three new mandatory professional development units, BFP1101, 2001 and 3001, have been introduced for all commencing Business students starting in semester one this year (2008). These units are not only innovative due to their scope and focus on specific personal and professional attributes/skills, but they also require a non-traditional form of teaching and learning in order to be successful. Traditional lectures and tutorials will be replaced with a learner-centered collaborative learning approach to project work, critical thinking and problem working. Students will be located in five (5) clusters of eight (8) students, with each cluster accommodating two teams of four (4) students. A room configuration with five customized collaborative learning zones will therefore provide a space for forty students. Rather than provide all

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[2] Jean MacGregor, "Collaborative Learning: Reframing the Classroom", viewed 10/03/2008 at
http://teaching.uchicago.edu/pod/macgregor.html

students with individual internet access, each team is provided with one laptop to better encourage collaboration. We wanted to avoid the practice of students communicating only with a computer and while we have certainly embedded online activities (using both Blackboard and a range of other online resources), technology should not dominate the seminar: face-to-face communication between students and between the facilitator and students is regarded as crucial to the development of critical thinking and communication skills.

Conventional lecture and tutorial rooms, which typically have students in linear rows facing the lecture at the front of the classroom, impede student-student and student-teacher engagement and do not facilitate a seamless transition from whole of class (presentation by teacher, student or guest speaker) to group or team modes of teaching and learning. The collaborative learning spaces have adopted emerging best practice principles in learning environment design including the following principles:

- Rooms have a "wide" rather than a "long" orientation
- Furniture to allow the formation of small teams that allow group discussion and problem working
- Whiteboards provided for each cluster to facilitate group work and mind mapping
- One computer for each team of four students
- Computers positioned to allow each student's line of sight to other students
- Capacity for computers to be removed as a focal point of activities and configured so as

to not interfere with interpersonal communication
- AV projection, including capacity for teams to report back/present from each zone.[3]

There are a number of collaborative learning environment models that could be adopted to support these principles including the "Cecil Scutt Model", "Alice Hoy Model", "Podium Model", "Boardroom Model" and "Café Format". Each of these models provide for close teacher proximity to all students and teams and a more intimate atmosphere for teams.

5. ICT Mediated Learning Activities

Transformation of the teaching approach and the newly defined curriculum of the three PD units which underpins the need for new types of learning and teaching environments is directly aligned with the Making VU vision. The focus on learner-centred pedagogy prepares students for their chosen careers through identification and cultivation of needed attributes and skills as articulated by the industry. Moreover, such an interactive pedagogy explicitly delivers a key outcome identified in the VU Strategic Plan (1.10) to "Provide high standard facilities that optimize the learning environment to meet the teaching, learning and social needs of the University community".

Professional Development 1 has been running this year (2008) and students are generally enthusiastic in

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[3] Adapted from "Design Considerations for Collaborative Learning Spaces", University of Melbourne, viewed 15/03/2008 at http://www.infodiv.unimelb.edu.au/tss/enhanc e/TSDG.html

participating in learning activities. Typical activities in this unit that use ICT in class adopt a constructivist approach whereby "education is about conceptual change, not just the acquisition of information" (Biggs, 2003: 68). Using ICT is about accessing academic resources, developing information literacy skills (such as accessing data bases but also evaluating the value of online resources more broadly), developing global perspectives, encouraging comparative analyses of phenomena, presenting information using graphic information as well as text. A few examples provide a sense of the variety of activities that are possible and the range of skills that can be encouraged.

Some in class activities use WebCT. A weekly activity in WebCT has ten online news sources from around the world including *China Daily News*, *The Fiji Times*, *Aljazeera* and *The Times of India*. In teams, students need to examine one source, identify the lead story, summarise the lead story, discuss any business implications of the lead story and discuss how the cultural biases of the author or publication might impact on the representation of the story. Students can use online resources to clarify meanings and research background information. They can use PowerPoint to report back to the whole of class. Not only do students develop a range of analytical, communication and team work skills in this exercise; importantly, they also develop global perspectives and an increased cultural awareness.

ICTs have been used to encourage inclusive practice. All too often in the classroom, students who are accustomed to and who enjoy communicative pedagogies tend to

enthusiastically respond to questions and requests to report back. Online discussion offers another forum for participation and one in which students who are less comfortable speaking can have a voice. Common online discussion activities required students to contribute to the collaborative construction of knowledge through reflecting on their own experience and sharing in an online forum. For example, one activity that examined students' multiple identities asked students to list a number of identity communities with which they identified: students were then asked to name a time when they were proud to belong to one of their communities and to name a time where they were ashamed to belong to one of their communities. Importantly, there are no wrong answers here and everyone can contribute. Some studies have suggested that men over-proportionally speak at the face-to-face classroom whereas women over-proportionally post messages in online conferences (Caspi, Chajut and Sapota, 2008) and research into the gendered nature of communication in these units will be undertaken.

In an age of information overload, it is more important than ever for students to be able to find appropriate information and to be able to evaluate that information. Many activities in the curriculum highlight this need and develop students' information literacy skills. One such activity uses poststructuralist approaches that assume the meaning is in the *différance*: students compare and contrast online sources of information and evaluate why some are credible and others are not. One exercise asks them to consider Wikipedia, Uncyclopedia and an online journal produced by a university.

Uncyclopedia is a parody of Wikipedia and promotes itself as "the content-free encyclopedia that anyone can edit": as such it provides a shocking reminder to students that Wikipedia and all online sources need to be actively evaluated.

Another activity using ICT is linked to developing students' self awareness through online quizzes and reflective exercises. In week 2, students are required to form teams of four on the basis of the following criteria: they must have a mix of discipline areas in their team (eg Accounting, Events Management, Hospitality and Tourism, Information Systems, Law, etc); they must have a gender balance; they must have at least one person who is bilingual; they must have someone who has done an online quiz that categorises them as a leader, a doer, a carer or a thinker.[4] This exercise is designed to stimulate thinking about personal attributes, professional skills and interests. It is also designed to get a mix of skills in each team,

Finally, there is a wealth of resources online and students are encouraged to view short videos in YouTube, do online quizzes, participate in online research – and for each of these activities they need to connect, apply, critique, integrate or report back. Students are encouraged to produce knowledge as well and the use of ICTs in these units supports that aim.

Concluding Comments
Victoria University has a range of teaching and learning policies that encourage active learning and a range of skills and attributes that are reflected in our Core Graduate Attributes – which attributes are similar to the skills and knowledge identified by Business

and Alumni respondents of the Business Review survey. In particular, VU's Learning and Teaching Policy (2004) plainly states that "the purpose of teaching is to enable learning". The policy also expresses a commitment to active learning that involves "both autonomous and collaborative learning". The Professional Development units operationalise these principles particularly in relation to learning activities being aligned to both learning outcomes and assessment tasks. In order to be able to develop, practise and assess communication skills, team work and the like, new and appropriate spaces, curriculum and technologies are a must.

The establishment of these collaborative learning spaces have enabled:

- a variety of teaching styles and learning activities recognising the diversity of student approaches to learning.
- flexible teacher-student interactions, from one-on-one advising through to small group coaching and whole-of-class leading
- the implementation of the Bachelor of Business Review findings which confirmed that learner-centred pedagogy is critical to developing a sense of learning community
- the development of team skills, self awareness and reflective practice, critical thinking and decision making and an appreciation of diversity
- a business student learning experience that adds value beyond the discipline and technical knowledge in its cultivation of professional and personal attributes highly valued by employers

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[4] This online quiz is available at http://www.uclan.ac.uk/facs/class/cfe/eggs/teamworking.htm

The collaborative learning spaces have delivered on a key goal enunciated in the Guidelines on Learning that Informs Teaching, namely, to "create and maintain engaging and effective learning environments" (Guidelines 14-16). The Professional Development unit spaces have facilitated the following outcomes:

- Supported students to learn cooperatively with peers – rather than in an individualistic or competitive way. With a mix of individual and team assessment and activity, the balance between autonomous and collaborative work and even autonomous work within collaborative work has been carefully developed through assessment tasks.
- Supported students to develop interpersonal, professional and cognitive skills to a higher level
- Created a community of learners thereby increasing student motivation and engagement through dialogue between students and teachers and among students (in and out of class) in project work, through WebCT and via email.
- Developed higher-order thinking skills such as analysis, synthesis and evaluation through a range of both formative and summative assessment tasks.

The expected outcomes of the Professional Development units are currently being met through students being more actively engaged in the learning experience, through strengthened student-student and student-teacher relationships and there is no doubt that the pedagogy and vision that is the Business Learning Experience is supported by the combination of creative use of ICT and new teaching spaces.

References

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