

Incorporating community-based learning in a first-year computing unit

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This article reports on a practice-based initiative aimed to encourage a broader understanding among first-year computing students of how information technology impinges on every facet of modern economy and society. The initiative sought to strengthen the link between computing studies and the real-life IT needs within the community by responding to the needs of The Victorian Immigrant and Refugee Women's Coalition (VIRWC). VIRWC required Web interfaces to help its patrons access information related to settlement issues such as housing, health, banking, language, and education. To address this need, a community-based learning component was incorporated in a first-year unit of an undergraduate computing course. Students worked in groups on developing *Settlement Resource Kits*, and wrote a reflective report about their experience. This article describes the development of the community-based learning initiative; outlines its benefits to the stakeholders; and, discusses the challenges associated with its development, implementation, and sustainability. (*Asia-Pacific Journal of Cooperative Education*, 2009, 10(3), 217-227).

KEYWORDS: Community-based learning, computing students, contextual learning, information technology.

According to Brown, Collins and DuGuid (1989), context and situation are essential to all learning, so students need to engage in real activities that have purpose and meaning. This facet is also associated with the experiential way of learning, described by Kolb (1984) and Kolb and Fry (1975) as a cyclical process passing through four stages: experiencing, reflecting, concluding and testing. The experiential method was specifically developed to link theory to practice in a way that would promote *deep* rather than *surface* learning. In response to the benefits of situated and experiential learning to students, universities across Australia have started embedding work integrated learning (WIL) and Learning in the Workplace and Community (LiWC) in their courses (Keating, 2006). Victoria University (VU) incorporated LiWC in its strategic plan as one of its Five Commitments, Commitment 2: "VU will create job ready and community aware graduates whose courses have at least 25% learning in the workplace including opportunities for service learning in the community" (Victoria University, 2007, p. 6). While this aim is to be implemented by 2010, many courses at VU have long included LiWC components. In some courses, such components have always been an integral part mandated by professional bodies; hence, engineering courses include industry-based internships, nursing courses include clinical practices, and education courses include pre-service teachers' placements; in other courses, LiWC elements were included in a less regimented manner, and usually involved final-year students; for instance, final year computing students work in teams to develop software systems for clients external to the University. The introduction of Commitment 2 at VU requires a systematic and systemic approach to its implementation to meet the 25% LiWC objective. It also encourages a review of the existing curricula and pedagogies to provide students at all year levels with opportunities to experience LiWC. The challenge is for course designers to identify ways in which their course can incorporate the 25% LiWC objective. This article presents one response: the development and implementation of a community-based learning component for a first-year introductory computing unit.

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LEARNING IN THE COMMUNITY

LIC (sometimes referred to as community based learning or service learning) is not the same as WIL. WIL generally relates to a practical period within a work placement. It is usually carried out within a single organization, often one identified by a faculty or school, and is of principal benefit to the student. LIC on the other hand, relates to a practical task or project carried out either for or with a community organization. Projects are either suggested by local groups or identified by students through established volunteering networks. LIC aims to benefit both the student and the community and this two-way relationship is the key factor. This aspect of LIC is emphasized by Victoria University, which defines LIC as “A teaching and learning approach that combines community based initiatives with intentional educational activities. The key emphasis in community learning is that of mutual benefit and reciprocity for the student, the University and the community agency or enterprise” (Victoria University, 2008, p. 2).

Most current LIC initiatives aim to create a situation in which students can contribute meaningfully to local community activity while enhancing their own learning, although some focus more on the learning than the task and others more on the community and their needs than those of the students. There are also other initiatives within universities (internships, volunteering programs, and practical placements) that include elements of all these types of initiatives. However where in volunteering the primary goal is the delivery of assistance, and in internships the primary goal is the development of the student, LIC programs, through the development of partnerships, try to deliver both in equal measures (Millican, 2007).

As an approach to learning, LIC is grounded in earlier theories of experiential education (Dewey, 1963; Kolb, 1984), where student learning stems from hands-on experience followed by reflection on that experience and further action. The learning is often assessed through completion of practice diaries or learning logs, followed by a more formal personal reflection. Assessment tends to be based on what a student has gained personally from completing the task, rather than on the quality of their work on the task itself, which might be a problem in technical disciplines, such as IT, where students are assessed more on what they have done or made than their ability to think and write about it. However, according to Heffernan (2001), there are six separate categories of LIC and one of these is *problem-based learning*. This category supports the requirements of technical disciplines in that it requires students to deliver a practical solution to a real-life community problem, as well as reflect on their learning experience.

COMMUNITY NEED

The Victorian Immigrant and Refugee Women’s Coalition (VIRWC) is a not-for-profit organization, that acts as an independent, state-wide advocate for immigrant and refugee women. It promotes access and equity for immigrant and refugee women and works towards achieving cultural, social, economic, political, and educational equality. In March 2007, at an *Eliminating Racism* forum, the Executive Officer of the Coalition shared her concerns about the difficulties that many immigrant and refugee women have in adjusting to life in Australia, and the difficulty of managing their daily lives and their children’s education because of lack of basic computing skills. VIRWC expressed the need for a basic IT training related to these issues for a group of approximately 40 immigrant and refugee women a year

(most of them in the lower socio-economic Western Metropolitan Region of Melbourne in the Cities of Hume & Maribyrnong).

Various educational institutions offer introductory computing courses, but these courses tend to focus on a specific software package, or overall generic computing skills. The needs of the Coalition were different: its patrons required personalized tailor-made IT training focusing on settlement issues and in particular, housing, health, banking, language, and education. The training needed to take into account the heterogeneity of the participants in terms of their previous IT experience, command of English, and cultural background. A unique, custom-made response was required.

RESPONSE TO COMMUNITY NEED – THE PROPOSED IT FOR SETTLEMENT INITIATIVE

The community need provided an opportunity to enact the objectives of the University's strategic plan and in particular its LiWC component. Staff from the School of Computer Science and Mathematics at VU in consultation with VIRWC decided to launch an initiative that would achieve dual outcomes: an educational outcome, namely the development of a community-based learning component in a computing course; and a community outcome, namely facilitation of settlement of refugee and migrant women. The community-based learning component was given a working title of *IT for Settlement* and a grant of AU\$20,000 was secured to support its implementation.

Various possibilities were considered regarding the placement of the component in the computing course; the requirements of the component were carefully examined, as were the curricula of the various course units, and the skill and maturity levels of students (year level). It was decided first-year students would be capable of meeting the requirements of the component and that first-year students were likely to benefit most from engaging in this community-based learning experience. A first year mandatory computing unit, Introduction to Computing and the Internet, was selected as the unit in which the component should be embedded. The rationale for the selection was twofold: a curriculum that was the best fit for purpose, and the mandatory nature of the unit. The curriculum includes topics such as Internet connections, Web design and authoring, characteristics and functions of browsers, resources on the Internet, surfing the Internet (Victoria University, 2008); the study of these topics would develop in students the skills necessary to respond to the VIRWC's needs. In addition, the fact that the unit is a mandatory core unit of the course means that every student in the course would experience community-based learning.

Proposed Operational and Assessment Details

Once a suitable course unit for the incorporation of the component had been determined, its design and implementation details needed to be developed. After further negotiations with the VIRWC, it was agreed that the *IT for Settlement* component would involve the development of a basic, integrated online resource related to settlement issues, and the provision of IT training in using the resource. Considering the extent and nature of the task, it was decided that it should be realized as an assignment spanning approximately three weeks of classes in which the students would:

- Search for, review, and evaluate available online resources related to settlement issues;
- Work in pairs on developing a selected part (e.g., housing) of an overall integrated online *Settlement Resource Kit*;
- Assist migrant and refugee women in learning how to use the *Resource Kit* in an induction workshop; and,
- Write a reflective report about their experience.

The assignment would focus on the main settlement issues of newcomers including:

- Housing – somewhere to live;
- Employment –work, or setting up a business;
- Education – suitable schooling and education options for children and adults;
- Health services – doctors, dentists, hospitals, medicines, emergency care;
- Essential services – electricity, gas, water;
- Transport – public and private, road rules and licenses;
- General services – banking, telecommunications (telephone and internet);
- Shopping – source of favorite foods, ingredients, grocery items, clothing, etc.;
- Social – new friends, going out, tourism, pets;
- Language – help on arrival; and
- Internet service – choice of an Internet service provider and tools to control Internet usage in the home.

Each pair of students would select one of the above topics, or propose an additional one, and research the available online resources on the topic. The research would involve an evaluation of the available resources in terms of their usability for the intended users; matters such as ease of locating and accessing the resource, as well as simplicity of the provided information would have to be considered – according to VIRWC, many of the immigrant and refugee women have limited computing experience and a limited command of English. Next, each pair of students would create a Web page containing links to the selected suitable online resources on their topic, and the individual topical pages would be combined in an overall *Settlement Resource Kit*. Students would then train the immigrant and refugee women on how to use the resource. To evaluate the usefulness and quality of the online resource developed by the students, the participating women would be asked to carry out a set of tasks related to the resource. In addition, they would be asked to complete an evaluation sheet at the end of the workshop to assess the training session. Lastly, the students would reflect on the entire assignment experience and report their reflections in a final report. The assessment of the assignment would account for 25% of the overall assessment of the unit and it would include three tasks: evaluation of the topical online resources, development of the related Web page, and the reflective report.

Relationship to WIL and Engagement Theory

The *IT for Settlement* component fits the description of *contextual learning* – one of eight broad models of work integrated learning derived by Calway and Murphy (2007). Contextual learning “brings real-life experiences into the classroom setting”, encourages students to “learn from doing in a structured way”, and “ensures that students play an active role in their own education” (Calway & Murphy, 2007, p. 15). Most importantly, this model ensures that “ideas, skills and insights learned in a classroom are tested in real life” (Calway & Murphy, 2007, p. 15), rather than studied in isolation; thus *context* is interpreted as *real life*. The model provides the students with an opportunity to apply knowledge to a situation rather than placing them in a work situation; thus it encourages students to learn by applying rather than attempting to make them job-ready. Moreover, this type of WIL is integrated into course content and tends to include a reflective component. The *IT for Settlement* community-based learning component meets all the criteria of contextual learning in that: students develop their Internet skills and knowledge in the context of real-life needs of refugee and immigrant women; they learn by developing an online resource for the community members; and they reflect on the experience.

The *IT for Settlement* component supports even better the premises of engagement theory (Kearsley & Schneiderman, 1999). Engagement theory suggests that students must be engaged in their course work in order for effective learning to occur; the positive impact of

its application on students in Australian and international settings has been reported in Miliszewska, Horwood & McGill (2003) and Miliszewska & Horwood (2006). The theory posits three primary means to accomplish engagement: (1) an emphasis on collaborative efforts, (2) project-based assignments, and (3) non-academic focus. The theory is based on the idea of creating successful collaborative teams that work on tasks that are meaningful to someone outside the classroom. Its core principles are summarized as *relate*, which emphasizes skills that are involved in team effort; *create*, which regards learning as a creative, purposeful activity; and *donate*, which encourages learners to position their learning in terms of wider community involvement. To this end, the *IT for Settlement* presents itself as a perfect example of a real-life application of engagement theory as it is structured around its three key components: students work in pairs (relate); and, each pair is responsible for the development of a Web resource (create) that is important to a local community (donate).

Expected Benefits, Cultural Impact and Wider Outcomes

The *IT for Settlement* initiative was expected to offer a number of unique benefits to its stakeholders:

- Students would gain an appreciation of the importance of IT in society through participation in this community-based learning component;
-The opportunity to relate computing knowledge to real-life needs of the migrant and refugee women would bring relevance to students' learning and raise their social awareness;
-The increased interaction between students, and students and community members would help enhance students' communication skills;
-The *Settlement Resource Kit* for new migrants that would be compiled during the project would continue to serve as a useful resource for new migrants;
-The detailed plan for embedding the community-based learning component in an introductory computing unit would be a useful resource for staff involved in teaching the unit in the future; and
-The initiative is premised on sound educational theory.

The *IT for Settlement* initiative was to include participants from several different sectors including higher education (staff and students), not-for-profit organization, and the community. Hence, it had the added advantage of benefiting from the diversity of the cultural backgrounds, experiences, and approaches of all its participants while addressing a genuine community need. According to VIRWC, many immigrant and refugee women find it extremely difficult to manage their daily living and their children's education because of lack of basic IT skills and this initiative would empower these women to take charge of their own life and families. In a virtual *role reversal*, young adults would be teaching older women and passing on their skills and expertise in a real-life project with direct outcomes; this would promote cultural understanding among participating students. And, the *Settlement Resource Kit* would be developed using simple English for people with English as a second language, and would also provide a practical way to help immigrant and refugee women improve their English skills. In addition, community women undertaking the *IT for Settlement* training would be encouraged to mentor their fellow women community members and encourage them to attend future training programs. It was envisaged that once the basic program was fully operational and sustainable, the development of additional programs based on this model would follow; for example, *IT for working in Australia* – a potential resource for people returning to the workforce.

IT FOR SETTLEMENT - IMPLEMENTATION

The community-based learning component was implemented in the first-year computing unit in semester 2, 2008. The development of the component had been completed, the

semester was already in progress, and the assignment specification was about to be communicated to the students when VIRWC advised of a change of plan: the IT training workshops were to be removed from the plan and the effort should be focused entirely on the development on the Settlement Resource Kits. It turned out that the logistics associated with gathering the immigrant and refugee women at a time convenient to all, transporting them to the University, and providing childcare, just to name a few, have proved too difficult to accommodate. The last-minute change of client requirements necessitated an immediate amendment to the already finalized plan for the community-based learning assignment. The IT training workshops were removed from the plan, and the emphasis on the development of the online resources was increased; the assessment details were amended accordingly.

Twenty-seven students participated in the community-based learning component; they organized themselves into twelve groups of two and one group of three students and selected from a list a settlement issue on which they wanted to develop a Web-based application. From a list of 11 available settlement issues, students chose to develop application on housing (two groups), employment (two groups), education (one group), essential services (two groups), transport (two groups), general services (one group), shopping (one group), and choosing an Internet service provider (one group); no group selected health services, social clubs and networks, or language services.

Review and Evaluation of Existing Resources

Students commenced their assignments with the search for, review, and evaluation of the available online resources related to the settlement issue of their choice. They had to identify the resources used and justify their choice in a Resource Selection Report (400-500 words). They were asked to be mindful of the fact that their application should be suitable for users who may have limited experience with computers, limited English, and were new to Australia. The reports indicated that most students, indeed, had paid attention to the particular needs of the intended users (immigrant and refugee women), for example, a group working on 'essential services' showed empathy and consideration for the new arrivals by providing the following justification for the selection of one of their resources:

The Essential Services Commission is an independent body that regulates energy providers' prices, monitors standards and distributes licenses for the selling of essential services. Informing immigrant and refugee women of the Essential Services Commission allows them to know that there is an organization that will protect their vulnerability when researching who to choose when it comes to energy providers. Peace of mind when in a new country trying to get settled is an invaluable thing.

Similarly, a group searching for 'employment' resources showed a great deal of understanding for the predicament of the potential users:

The best thing about Centrelink for an immigrant is that because they also deal with immigrants on a regular basis, they know how to best cater for their needs and they can refer immigrants to any services needed such as the Language, Literacy and Numeracy Program.

A group working on 'transport' assessed one of the resources from the point of view of non-English speakers and offered the following insights:

The first thing we notice about these big sites regarding transport, Metlink and VicRoads, is that the sites are very complex and intricate and we are sure difficult to navigate, especially if you do not have a very strong grasp of the English language or little experience with computers.

Another group, researching 'shopping', also focused on the likely limited command of English of the future users of the application and endeavored to mitigate against the problem by looking for sources where information was provided in the form of pictures and maps:

Because the users of our application might not be the best at English, we tried to look for resources that use the minimum of complicated language. We did this by selecting resources that use lots of maps and also resources that would include information on how to catch public transport to get to a selected shop.

Lastly, one group ('housing') drew on their personal experiences in looking for a house when conducting their research for the assignment:

A few months ago we came here as international students and were confronted with the problem of finding housing in Melbourne. Our own experiences that we gained when we were searching for housing, helped us select resources for our application. Some of the resources that we used when looking for housing were really helpful and we selected these resources for our application.

This group also paid particular attention to the potential vulnerability of the future users:

Since it is a government institution, the information gathered there is reliable. It is also very important for a person that just came to the country to know that such an organization exists and can help in case of trouble.

Once again, a government Website that provides reliable information, in this case about emergency housing for women; it has important contact details and a 24-hour phone number.

Development and Assessment of Settlement Resource Kits

Having completed the selection of available online resources, students developed an integrated Web-based application on the chosen settlement issue. The application had to meet several technical requirements and include:

- "About Melbourne" page (minimum of 5 paragraphs);
- Frequently Asked Questions (FAQ) page related to the selected settlement issue (minimum of 5 FAQs with answers);
- Links page related to the selected settlement issue (minimum of 5 links); and
- Settlement issue-specific pages (minimum of 4 pages).

In addition, students were asked to use XHTML and CSS for the development of the application; JavaScript was to be used if necessary and applicable to their application. All these requirements reinforced the computing skills and knowledge already developed in the computing unit.

The applications were assessed by the unit coordinators and fellow students; each group of students blindly peer-reviewed applications of two other groups. The assessment criteria reinforced the purpose of the application and the unique requirements of its users as illustrated in Figure 1. In addition, the assessors were invited to provide written comments on the application.

The peer-assessment tended to be generous with an average of 2.95 across all assessments. However, the written comments provided by the peer-assessors indicated closer consideration of the criteria. Some of the comments related to technical requirements:

They should have realized that images will not work due to the fact that we are saving files on a CD. Also, they should have added some of the links to Electricity under the Links section instead of including everything in the Settlement Issue page. But overall, it was very easy to access information.

A very simple website. Images could have helped with the overall look of the web pages. No use of frames. Information provided is very vague. Overall, it will not appeal to any Internet user seeking information.

The scrolling title is really good and makes the web page stand out a lot. Good use of frames. Meets assignment criteria.

		Weak	Fair	Good	Very Good
1.	Adherence to assignment requirements.	1	2	3	4
2.	Clarity of the "About Melbourne" page.	1	2	3	4
3.	Usefulness of the FAQ page (with respect to the selected settlement issue).	1	2	3	4
4.	Usefulness of the "links" page (with respect to the selected settlement issue).	1	2	3	4
5.	Usefulness and clarity of "settlement issue" pages.	1	2	3	4
6.	Ease of navigation to find the relevant information.	1	2	3	4
7.	User friendliness of the user interface (easy to use for people with limited computer experience).	1	2	3	4
8.	Appropriateness and clarity of the language used in the application (easy to understand for users with limited English).	1	2	3	4
9.	The likely usefulness of this application for immigrant and refugee women.	1	2	3	4
10.	Considering all of the above, the overall quality of the application is:	1	2	3	4

FIGURE 1
Assessment criteria for the Settlement Resource application

Other assessors commented on the need to check the spelling, or declared briefly that an application was incomplete and missing required information. Finally, some reviewers showed particular appreciation of extra features included in the applications:

The essential services are covered really well. Nice use of tables and the background picture with a map of Australia!

Student Reflections of the Experience

In addition to compiling a Resource Selection Report and developing an online Settlement Resource application, each student group submitted a Reflective Report about their overall community-based learning experience. The report of 300-400 words included the following sections:

- Strengths and weaknesses (of the developed application);
- Possible future improvements;
- Difficulties encountered; and
- Lessons learned and benefits gained (from developing a real-life application that addresses a real community need).

Overall, the students reflected mostly on the development of a *software application* rather than the development of a *real-life application that aimed to address a real community need*. Some students commented briefly on the need to be careful with the words that they used in their assignment because of the target audience, but most reflected on the technical aspects of software application development. However, there were several groups that reflected on the community-based aspect of their experience. Their reports showed a new understanding of the difficulties faced by new immigrants:

We also gained a new appreciation of how hard it must be to enter a foreign country and know nothing of the language or community (it was quite hard to explain some concepts which seemed simple to us).

We learned that there are many issues in the world, and one of them is refugee women trying to settle in Australia, and that one of their main concerns is education. We also learned how lucky we are to live in Melbourne and not to have the problems that refugees have.

Some students commented on the difficulties associated with deciding on *what was relevant for the new residents from overseas* and then *trying to keep things simple whilst making sure that all the necessary information was presented*. Others appreciated the opportunity to work on the development of a real-life application and liked the independence afforded by the process:

It was good to put to the test what we have learned in a realistic application. Not only did we have to try and make sure we used as much knowledge as we could, but we also had to decide what was appropriate and what was not. It was a good experience to be given a task for which we could design it how we thought it should be without being directed to do each individual thing.

Finally, one group offered a particularly insightful reflection that, at the same time, highlighted an important shortcoming of the community-based learning experience – the lack of personal contact with the refugee women:

In our opinion the weakness of our website is the fact that we have not dealt intensively with the topic yet. It is not enough to read newspapers, watch the news on TV, or search the Internet to get an idea of this issue. To improve our application, we would have to meet immigrant and refugee women to be able to really understand their needs and demands.

CONCLUSIONS

The *IT for Settlement* community-based learning component represents and promotes the philosophy of LiWC, and academics consider it an excellent opportunity to enhance the learning experience of first-year computing students. Likewise, according to the Executive

Officer of VIWRC, the *IT for Settlement* initiative has *immense potential in terms of facilitating settlement for participating refugee and migrant women and their families*. Academics involved in the development of this initiative are equally optimistic regarding its benefits to the participating students, staff, and the University. Collaborations between the various participants have emerged as an important element of this initiative: collaboration between academics and VIRWC in identifying the needs of immigrant and refugee women, and collaboration between the students when working in pairs on the development of the *Settlement Resource Kit*. Recently, a team of four final-year computer science students has completed a real-life project of redeveloping VIRWC's website; the re-development project was assessed as part of students' coursework in a third-year Project unit.

The *IT for Settlement* initiative is only one example of developing a community-based learning experience for first-year computing students. Although unique, the initiative provides a framework that could be applied to other members of the community who could benefit from an increase in general IT knowledge for everyday living, for example senior citizens. However, the initiative is an example of a *retail*, rather than *wholesale*, approach to LiWC and the small scale of the approach raises the question of its sustainability.

On the other hand, the sustainability of the initiative is also premised on the intention to build on the developed framework. Thus the application of the framework to other projects will provide further benefits to local communities. In terms of student *learning in the community*, the sustainability emanates from the change to the curriculum that has been facilitated in the *IT for Settlement* initiative; the curriculum has been already adjusted to include community based learning, and now the community partnership activity can be repeated year after year. At the same time, the initiative has highlighted the value to a community organization of working with a university and this interest in itself provides a route to sustainability.

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