“Research skills are vital in all facets of life”: Research perceptions, expectations and experiences of undergraduate students

Catherine Lang
Swinburne University of Technology, Melbourne, Australia
clang@swin.edu.au

Simone Buzwell
Swinburne University of Technology, Melbourne, Australia
sbuzwell@swinburne.edu.au

Our university, like many others in Australia, is determined to explore different strategies to build stronger research experiences for undergraduate students into the curriculum. During the course of a recent investigation, students were surveyed to ascertain their perceptions, expectations and experiences of research in their undergraduate degrees. The purpose of the student survey was to explore students’ attitudes to a proposal for a research intensive minor which was being proposed as an option in undergraduate courses. The student responses indicate that the majority of those surveyed had a varied and broad understanding of what constituted research. Many of the student opinions and definitions specifically related to the discipline that they were currently studying. We were pleased to find that many of those surveyed expressed an appreciation of the importance of independent research skills to their future employability. The findings from this survey contribute the student voice to the wider discourse around building stronger teaching–research links into undergraduate degree programs.

Keywords: research experience, undergraduate courses, student voice

Introduction

In order to explore how to increase the number of students studying for an Honours qualification, particularly in the 3+1 model of an additional research year, after a three year Bachelor qualification, the authors explored students’ perception of research and strategies to build stronger research experiences for undergraduate students into the curriculum. There is a need to encourage more students to consider the Honours qualification because it is the primary resource pool for recruiting PhD students, and a decline in interest at the undergraduate level indicates a decline in potential PhD students overall. In addition, enhancing the research experience for undergraduates may contribute to a positive learning experience. Indeed, the importance of introducing students to the culture of research throughout their undergraduate degree is strongly advocated by academics in the teaching and learning arena (Brew, 2009; Healey, 2009). In the metropolitan Australian university where the current research was conducted, a teaching and learning project was initiated to investigate strategies to improve undergraduate student research experiences and potentially produce more research students in the process. An important first step in this process is increasing the number of Honours students. This is because a recent review of universities indicated that there existed “a tacit understanding that a dynamic Honours program is the basis of a dynamic research culture within a university” (Zeegers & Barron, 2008, p. 1). Some
of the larger faculties in this institution could convince less than a handful of students annually to continue studying for their Honours qualification in the traditional 3+1 model; resulting in few students continuing on to postgraduate research degrees. Concurrently the discourse around developing strong research skills in undergraduate students was growing in importance throughout the university.

In the current project the viability of encouraging faculties to invite high achieving students to enrol in a specific set of (4) units [that is, subjects] that would be acknowledged as a research and development minor within a degree program was investigated. A part of the minor would entail that the students work with current researchers in one of the several research centres in the university. The aim was to strengthen the teaching–research links between research centres, research active academics and undergraduate students based on recommendations that “involvement in research [is seen] as central to the motivations of many staff and that potentially this involvement can significantly benefit students” (Jenkins, Breen, Lindsay, & Brew, 2002, p. 3). While benefiting students, the minor may also benefit faculties by encouraging research intensive academics to be involved in undergraduate teaching through supervision of students, and therefore help to break down:

… polarization around what are increasingly portrayed as two distinct set of activities: high quality, high impact research that contributes to the Research Quality Framework, and high quality teaching that results in student satisfaction and thus contributes to positive performances on the Learning and Teaching Performance Fund indicators (Krause, 2007, p. 3).

The proposed research and development minor was not considered as a replacement for the Honours year but more as a ‘taster’ experience for students. To ensure that the voices of all stakeholders were heard, a student survey to explore their perceptions of research was carried out. In the present paper these student views about what constitutes research in their undergraduate degree, their experiences with research to date and whether they regard research as an important part of their education are reported. This project contributes to the current honours discourse by affirming the important position that research experiences hold in relation to student engagement (Baldwin, 2005).

In this paper a justification of the importance of building research experiences into undergraduate programs is presented. An overview of the Australian Honours year is followed by a description of the sampling method used to explore student opinion on the suggested research minor. This is followed by the findings and discussion from the survey data. The concluding discussion incorporates the acknowledgement that this model strengthens the teaching–research nexus for students considering a higher degree by research while acknowledging that “only a minority of undergraduates have the ability and the wish to pursue their studies at postgraduate level” (Jenkins, et al., 2002, p. 7).

The importance of research in undergraduate degrees

The research and development minor investigated in this project was the outcome of conversation and consultation with a wide variety of university stakeholders that included faculty-based academics, teaching and learning Deans, undergraduate program coordinators and researchers based in research centres who, in some cases, had no undergraduate teaching commitments. The literature also provided a number of case studies and recommendations that contributed to the proposal for the credit-bearing research and development minor.
It is widely acknowledged that active research experiences contribute to student motivation and engagement.

Students are more likely to engage actively in the total learning process when their curiosity is stimulated by the research question. Solving research problems can help students to organize their thinking, develop more creative thinking, and gain confidence in their own intellectual abilities (Beckman & Hensel, 2009, p. 43).

Further, Healy and Jenkins proposed that “… all undergraduate students in all higher education institutions should experience learning through, and about, research and inquiry” (Healey & Jenkins, 2009, p. 3). They quoted the Chief Executive of the Higher Education Academy for emphasis:

We need to encourage universities and colleges to explore new methods of curriculum … that extend student to their limits … (Healey & Jenkins, 2009, p. 5).

The authors of the present paper overwhelmingly ascribe to Healey and Jenkins’s belief and the focus of the current project was on the introduction of a credit-bearing research minor. The focus of other projects at the university was on embedding research experiences in undergraduate curriculum units. It is felt by the current authors that both methods are needed to enhance the research experience of undergraduates; however, the focus of the present paper is on an initiative that was designed to target those students who were more likely to continue on a research trajectory to a postgraduate research degree.

The teaching–research nexus is currently a topic of great interest in higher education. An Australian Learning and Teaching Council (ALTC) funded project has examined the complexity of the teaching–research nexus in contemporary higher education and the possible ways in which research and teaching could be linked for the enhancement of student learning (Krause, Arkoudis, James, & McCullogh, 2008). The resultant website provides examples of good practice in Australian universities and drew on many resources to present different ways of thinking about research and teaching. The focus on the website is:

[A] discipline-based approach because the nature of knowledge construction and research methods differ between disciplines (Healy cited in Krause, et al., 2008).

Healy and Jenkins (2009) constructed a model of the nature of undergraduate research. In the model there are four quadrants, the two lower quadrants describe student experiences of research where they primarily take the role of audience. In the upper quadrants of the model students take the role of active participants in the research process, either through engaging in research discussions or actually undertaking research inquiry. These authors suggest that “too much teaching and learning is in the bottom half of the model” (Healey & Jenkins, 2009, p. 7), that is research-led and research-oriented, and not enough on research-tutored and research-based, the activities of the upper half. This model informed and confirmed the development of the current research and development minor where students would be actively involved in research.

The idea to introduce the option of a research development minor is supported by the case made by Baldwin (2005) for the introduction of innovative curriculum to strengthen research
connections in undergraduate programs. Furthermore, Baldwin suggested examples of strategies advised to introduce students to research which included the following:

Teach research methods, techniques and skills explicitly within subjects (Baldwin, 2005, p. 7).

Involve students in departmental research projects (Baldwin, 2005).

Encourage students to feel part of the research culture of the department (Baldwin, 2005, p. 9).

These suggestions resonated with the focus of the current project, underpinning the development of the research-tutored and research-based credit bearing units that constitute the undergraduate research minor outlined as follows:

**Unit 1: Research methods**
This unit would introduce students to qualitative and quantitative research methodologies. It has yet to be determined if the unit would be discipline specific, or provide a cross-discipline approach to research.

**Unit 2: Seminar series**
This unit could capitalise on some of the structures used in US universities. Students who have research minors read widely and present to their peers often across disciplines, providing a wide scope and outlook to the many permutations of research possibilities.

**Units 3 and 4: Research project**
Under close tutelage of an active researcher, students would be expected to conduct research with a final product outcome such as a conference poster, short paper or journal contribution. As stated in the introduction, allowing research specialists to become involved in undergraduate student teaching will help to break down the binary divisions of research and teaching existing within university faculties.

It was proposed that Units 1 to 4 would be fully credit bearing and contribute to a Research and Development minor stream that would be shown on the student’s academic transcript. In the course of the current project, an investigation into the Australian university Honours qualification was conducted because of its relevance and importance to the postgraduate research student pipeline. A summary of this qualification is presented in the next section.

**The Australian Honours**
The Australian Honours qualification is funded as an undergraduate degree and is regarded as a key qualification for the awarding of PhD research scholarships. Indeed, according to the University of Sydney Academic Board, the principles of the Honours year is widely believed to “provide research training opportunities to students demonstrating special proficiency” (2007). It should be noted that honours degrees in the Australian education system are unique in that they do not come in a single form and all honours degrees are not the same (Buzwell, 2008). Structures vary within and between universities, often according to discipline (Kiley, et al., 2009). That said, Honours degrees are widely regarded by academics as an important preparation for Higher Degrees Research, and the awarding of PhD scholarships. Kiley et al. reported that there are three main characteristics of the Honours year; firstly the advancement of discipline knowledge, secondly provision of research training and lastly the development of a substantial independent research thesis or project.
Thus the Honours year has a substantial research focus and students would benefit from some research training prior to commencing an important year that may determine their chance of receiving a postgraduate scholarship and embarking on a research pathway.

In most disciplines in Australia honours consists of one extra year after the three year Bachelor’s degree (3+1 model) and students must meet entry requirements to be accepted. In some disciplines (Engineering in particular), the Honours qualification can be part of a four year integrated or embedded qualification. In the Engineering example, students can complete a component of their honours each year, conduct extra study, or be awarded Honours according to grades achieved in core units throughout the degree (Buzwell, 2008).

While the Honours year is still the norm in Australia, many universities across the world have moved to the Bologna model (a three year undergraduate degree, a two year Masters degree, a three year PhD degree). This has the potential of making the Honours year obsolete in the international environment. Key findings from Kiley et al. (2009) ALTC project were that the Honours qualification is still highly valued but considered under-marketed outside Australia, suggesting that it is timely to consider how Australian Honours degrees can best contribute to both the Australian student experience and the number and quality of Australian postgraduate research students.

Several Australian universities have approached the declining student interest in the Honours year by providing different research pathways to students. For example, an interstate metropolitan university advertised a Master of Philosophy to Bachelor degree graduates. This is a two year Masters qualification similar to the Bologna model advertised with a scholarship (The Australian, November, 2009). Students in this program would be encouraged to convert their enrolment to a PhD during their course if they show particular aptitude to research, therefore opening a pathway to improving the numbers of higher degree research students.

There are other examples of Australian universities adapting to declining Honours enrolments and a changing international research environment by adjusting the nature of enrolment for Honours students and treating them similar to postgraduate students by providing unique support and opportunities equivalent to PhD students (for example, Griffith University and Monash University). The reality remains that Honours is still the primary pathway to qualify for a postgraduate research scholarship in Australia, and unless this changes the Honours qualification will retain its relevance, hence it is important for curriculum innovations such as the research and development minor to be explored and developed.

**Method and research instrument**

The method used to collect data to ascertain student attitude to the proposed research minor is described in this section. Justification for the selection process is also included. The survey tool and method was approved by the university’s Ethics committee.

The proposed research and development minor consists of four units [that is, subjects] of a student’s 300 or 400 credit point degree. One unit is worth 12.5 credit points. It was suggested that the research and development minor proposal targeted, and would only be available for, high achieving (Distinction average) students. The suggestion made was for these students to be invited to change from a discipline-specific minor to focus on research. This involves several steps as explained below.
1. The first part of the process is to invite high achieving students to participate in a research showcase event. Student participation is ascertained by grades attained in the previous two semesters of their course (Distinction average [75+] is recommended). The justification for limiting the showcase to students with Distinction averages ensures that only academically capable students would be placed in the research centres or with research active academics in faculties. This would ensure that both parties gained maximum benefit from the program.

2. The showcase event involves research active academics who are willing to supervise students giving a short presentation about their current projects and potential opportunities for students. After the event interested students would be encouraged to enrol into the research minor. The involvement of postgraduate students from the Research Centres in a supervisory role is an option that would provide economies of scale in research supervision and help build research communities.

3. The students would then complete Units 1 and 2 of the minor giving them a suitable introduction to research methodology and literature. The final two units would be conducted in a tutelage relationship with the researcher or a particular research group. This could be completed in semester or over a summer term.

The above proposal was discussed with a wide variety of stakeholders within the university and conditional approval for the minor was given. To obtain the student perspective, and to ascertain if there would indeed be any student interest in a research and development minor, an online survey was developed using a commonly used survey tool. One hundred and forty three current students who were recipients of Vice Chancellor’s scholarships, an indicator of high academic performance, were identified as participants to be invited to complete the survey. The survey relied on the following qualitative open-ended questions to determine students’ understanding of, and experiences with, research to date in their degrees:

1. What is your definition or understanding of research in general?
2. What experiences have you had of research in your degree to date?
3. Would you be interested in taking up the above research minor (or co-major) option?
4. Do you think the Research and Development Minor would add to your future career opportunities?
5. Are you currently considering furthering your undergraduate degree with an Honours or PhD research degree?
6. We are considering offering this option ONLY to students with a Distinction (75+) average in their first year of studies. Would you qualify (or have qualified) for this option? [answer could be Yes/No/Rather not disclose]

After obtaining Ethics approval, all Vice Chancellor Scholarship students (n=143) were invited to participate via an e-mail request. The students were in all stages of their undergraduate degree. This survey was carried out for two weeks in November, 2009. Responses were summarised and are presented in the next session.

Findings and discussion

Over the two week period that the survey was ‘live’ there were 64 stored responses, however only 39 were fully completed (45% response rate). Some background demographic information was collected to enable a profile to be formed of the type of high achieving student who may be interested in furthering their research options.
As is to be expected, the respondents were all in the 18 to 23 age group because Vice Chancellor Scholarships are provided specifically to school leavers who enter university with high academic results from their final year of high school. The respondents were also representative of the five faculties in our university; with the highest proportion from the Engineering discipline (35.9%, n=14) and the next highest from the Social Sciences (20.51%; n=8). All faculties from the university were represented, but there were only a few from the Information, Communications and Technology faculty (8% or n=3). Almost two-thirds of the students were enrolled in double degrees, for example Business/Arts or Engineering/Computer Science. The last part of the demographic information collected related to academic performance. We were probing to determine if the students were maintaining the same exceptional results that helped them become scholarship recipients, and would qualify for entry into the research option, that is, would they have a Distinction average in their results to date. Almost sixty percent (59%) responded positively (n=38), one negatively, and 39% (n=25) chose not to answer this question. This indicates that there is indeed a cohort of students who would meet the stringent entry requirements; however, whether there would be a desire to change their discipline specific minor to a more general and potentially broader research minor required further investigation.

It was considered important to determine the student understanding of research first of all. The first question in the survey asked students to define research in general. There was a breadth of definitions that covered most aspects of research with the words “investigate, searching, seeking, collecting, learning and discovering”, occurring throughout the responses suggesting that students often have a discipline based knowledge of the research process.

For example:

Investigating something that has not been fully defined in order to gain further understanding of it.

Research is conducting surveys, experiments and studies to support or contradict a theory or thought.

Examining existing literature and/or conducting original studies/experiments to draw conclusions for the wider academic and practical world.

Only one student wrote a comment that could be construed as a negative response:

Something I have no interest in.

In the next question the research experiences the students had to date in their undergraduate programs was explored. In response to this question, three students wrote “none” and six responded with “minimal, minor or not much”. Of those who did perceive that they had had research experiences in their degree, the responses fell quite evenly into practical and theoretical experiences. We are defining practical as active participation in a research project by collecting primary data or conducting observations in the field, and theoretical as conducting a literature review or library research. The majority of the students had some research experience in their undergraduate degree and one-third felt the need to comment on the value of the experience, for example:

Not much which require only very elementary research skills …
Fairly lightweight until final year project …

Most subjects I’ve studied required little more than a good understanding of the text book …

These somewhat negative responses could be taken to suggest that these high-achieving students had not been academically challenged by their current research experiences in their undergraduate program.

More than two-thirds responded “Yes” to the question “Would you be interested in taking up the research minor option?” This response indicates that there is reasonable student interest in trialling the research minor option. Those who did not respond positively to the question had a variety of reasons for doing so from seeing no value in the minor, for example “No, more work for little gain”, to already feeling that they were adequately prepared for a research future, “No, although I am interested in the research area, I feel my current course (psychology and psychophysiology) sufficiently prepares me for research work.”

The majority however agreed that the minor would add to their future career opportunities, some typical responses were (quoted as written):

I believe this would as you can expand upon your research in the workforce.

Even if don’t use the research in your job, the knowledge is always useful and can help in the future.

Yes definitely – research skills are vital in all facets of life. Many jobs require the employee to have gained these skills in there [sic] studies.

Research is the basis of development in many industries.

Just under one-third of the students surveyed were already considering an Honours or PhD research degree after completing their Bachelor qualification, while only two responded definitively “No”, with the rest of the respondents undecided. These findings indicate that the majority of students may be interested in the research minor option. Future research could also explore why two thirds of these high achieving students were not contemplating and honours or PhD research degree in their future. Exploring this issue could add to our understanding of student perceptions of the barriers to commencing postgraduate research degrees. However, some students are simply seeking something different, for example:

I will be pleased to give studying a break for a while when I graduate. I did not have a break between Year 12 and uni, therefore will have studied for 17 years straight. During my IBL [Industry Based Learning] placement I enjoyed the ability to enjoy my weekends without having to balance the demands of study, and I look forward to this permanently when I graduate. I would however like to do a short course when I graduate: a Certificate IV in Training and Assessment. My potential postgraduate study may include an MBA or Masters of Human Resource Management (as is my Bachelor of Business major), but this requires at least [a] 5 years gap – which I will enjoy. I cannot see myself pursuing a PhD, as at time, I believe it can be seen as impractical, or too academic.
Conclusion

We surveyed high achieving students to determine their understanding, perceptions and experiences with research and to test the acceptance for a research minor. The general response from the student survey to the research minor proposal was positive enabling us to assume that there is an interest and market for this initiative. The justification of a series of credit bearing units as opposed to co-curricular activities appears to provide credibility to research. In addition, the majority of these students (responding positively) perceive that research is integral to career and future job prospects, thus research appears to be valued. Given these positive views towards research by the majority (of high achieving students) it is hoped that the proposed research minor will also introduce more students into the postgraduate research pipeline and give them an opportunity to develop skills that will enhance their university experience.

It is important that we educate students in how to conduct and interpret research. Exploring the ways in which we could do this better is the first step in enhancing how we achieve an increase in both the number and quality of our postgraduate research students.

Engaging undergraduate students in research and inquiry, develops important graduate attributes, engages students meaningfully in higher education and prepares them for a twenty-first century world of work in which knowing how to inquire and critically evaluate knowledge is of increasing importance (Brew, 2009, p. 19).

A trial of the research minor is proposed and will be evaluated after the first instantiation of the full four units. Longitudinal research will be used to explore if taking a research and development minor is likely to firstly, lead to a number of these high achieving students applying for and being accepted into Honours programs; and secondly if these students are more successful in their Honours program than those who did not complete a Research and Development minor.

Research skills are thought to be critical for the nation’s future prosperity. In a recent speech at the Universities Australia Conference, the Deputy Prime Minister Julia Gillard stated (4 March 2009) that we live in:

an era when investment in knowledge and skills promises to be the ultimate determinant of national and individual prosperity … our nation will never be at its fairest if we under-develop the talents and abilities of our most gifted.

For research talents and abilities to develop in our university students it is imperative that we explore ways to enthuse our potential future researchers and devise curriculum that gives them the chance to experience the enjoyment of taking an active part in the research process. The aim of the current project was to hear the student voice. We now know that our high achieving undergraduate students have a good understanding of what research is, and a substantial number of those surveyed would be interested in undertaking a research minor that may assist them in becoming one of Australia’s future researchers.
References


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