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Higher Degree Research students at the centre of transformational practice: an evidence based approach

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Students enrolled in higher degree by research (HDR) courses come from varied backgrounds with wide ranging research skills and experience. While the number of students graduating with a PhD continues to climb, so too does the prospect that less than half will find employment in the university sector (Edwards, Radloff, & Coates, 2009). Industry demands graduates who possess broad based transferable skills that can be utilised across a range of positions and sectors. The recent *Review of Australia's Research Training System (RTS)* for the Australian Council of Learned Academies (ACOLA) (McGagh et al., 2016) identified skills in data collection, design of research questions, information seeking and ethical conduct, as just some of the transferable skills required by graduates engaged in diverse career paths. Against the backdrop of industry graduate requirements, university research rich agendas and globalisation of higher education, this paper will report on transforming curriculum of IFN001: Advanced Information Research Skills (AIRS), a mandatory coursework unit (subject) for students entering the PhD program at Queensland University of Technology (QUT). This study adopts an evidence based approach triangulating longitudinal student feedback data (2007-2016), best practice and current literature to inform curriculum transformation. Ongoing curriculum enhancement is framed through the lens of the student by examining qualitative student feedback over time. This paper will identify consistent themes across time, and the challenges faced by AIRS curriculum designers in addressing the needs of students, and industry in developing relevant transferable skill sets.

Keywords: HDR students, evaluation, curriculum design, curriculum enhancement

Introduction

Findings from the Research Training System (RTS) review identify areas which require an overhaul to ensure research students develop transferrable and recognisable research skills that guarantee Australia meets its research needs for the 21st century. Imperative to this endeavour is the industry stated requirements that HDR graduates possess research skills and capabilities applicable across academic and industry contexts, including and not limited to the

areas of data collection, design of research questions and information seeking. Although the review recognises the need for the development of broader transferrable research skills and acknowledges the commitment by some universities to develop student research competencies, this paper explores the review's recommendation that skills development must be flexible with avoidance of a standardised non-tailored approach to training. An absence in the review is discussion about the creation of learning environments that empower and support the transition to the research environment (Tobbell, O'Donnell, & Zammit, 2008) that connect students with students thereby creating communities of practice (Chiang, 2003), that enhance social inclusion and sense of belonging (Curtin, Stewart, & Ostrove, 2012; Matheson & Sutcliffe, 2017) whilst developing research skills and capabilities.

We argue that a mandatory coursework unit at the commencement of the HDR research journey ensures students are 'research ready' by requiring demonstration of requisite skills and capabilities. Further, we assert that participation in IFN001 provides a supportive learning environment in the critical first months of candidature impacting on the student's research identity and assisting them to 'become' that researcher. The growing diversity of the QUT HDR cohort in terms of discipline, age, and educational background and country of origin provides a compelling case for developing clearly identified pathways to assist HDR students to transition into the 'researcher role' and researcher identity (Wenger, 1998). IFN001 requires commencing HDR students to demonstrate many of the capabilities identified by the RTS review as necessary to operate as effective researchers and to develop and maintain the tenets of research best practice into their future careers.

Through the lens of IFN001 this paper examines longitudinal student feedback data, provides themes and impressions gained from the student voice, discusses curriculum enhancement based on student feedback and draws parallels between the content of IFN001 and those attributes identified as required by industry.

Context

Student Demographics

In 2016 the QUT HDR cohort comprised of 2655 students. More than half were enrolled in a part time capacity and 66% were domestic students with the remaining 34% identified as international. The male to female ratio was approximately 54% to 46%. While the majority of students fell within the 25 to 34 age bracket, 43% were aged 35 or older, including 20% who were 45 or older. This profile aligns broadly with the wider Australian postgraduate student cohort based on 2015 data from the Department of Education and Training which identified approximately 68% of students as domestic, although the male to female ratio nationally was more evenly distributed (Department of Education and Training, 2017). QUT HDR enrolments by Faculty and Division are identified in Figure 1.

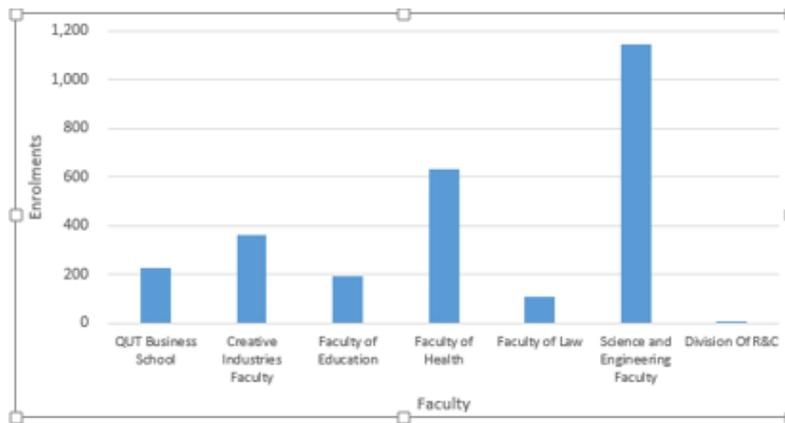


Figure 1: QUT HDR enrolments by Faculty and Division

Rationale for mandatory status of IFN001 as identified by the Research Students Centre, QUT

The structured nature of the unit ensures that all students experience a consistent introduction and grounding in a timely manner that is scaffolded and formally assessed. This ensures that students are set up for candidature, early months are productive and students feel engaged in a community of scholars. Ultimately this ensures that students are able to meet QUT’s research training objectives: firstly that QUT graduate high quality postgraduate research students who meet the needs of industry, government, the professions and the community. Secondly aligns with the research graduate capability of attainment of advanced information processing skills and knowledge of advanced information technology and other research technologies. In addition, the unit and unit learning outcomes provide benefits in benchmarking to ensure all students have the same skills and provides risk management processes in the areas of data management, ethical conduct and academic integrity.

Context of IFN001

IFN001 is a 4-credit point coursework requirement of enrolment for Doctor of Philosophy (PhD) and some Masters by Research students at QUT, the first mandatory unit of its kind in Australian higher education. The unit, now over 25 years old, lays the foundations for independent research, critical evaluation of information, effective management of information and research data and knowledge of the scholarly publishing terrain (see Table 1). Although a mandatory unit, covering standardised content, the assessment resource log is an individualised piece of work, geared toward each student’s research project. The course work has three objectives the first, preparing students for early program milestones. The assessment is due within the first three to six months of the course to ensure students develop mastery of information resources, research skills, and strategies for conducting a quality literature review. The second objective is to set the scene for research at QUT by introducing policies, processes and structures around data management, copyright, academic integrity and scholarly publishing. Finally, IFN001 aims to develop best practice foundational research skills, processes and structures applicable immediately and relevant for future research endeavours.

The unit provides a blended learning experience combining online content with optional face to face workshops enabling students to choose how and when they interact with the learning resources. Examination of how students engaged with IFN001 in 2016 showed that 30% of students completed the unit using online resources only, 6% attended workshops only, while 64% did a combination of both (i.e. 70% of IFN001 students took advantage of face to face workshops). The unit provides ample face to face workshops throughout the year with 117

sessions offered in 2016. All content is licensed for re-use under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Australia License.

Table 1 IFN001: Advanced Information Research Skills (AIRS) Curriculum

AIRS 1	AIRS 2	AIRS 3	AIRS 4
Formulating a good research question	Comprehensive Searching	Information management including bibliographic management	Selecting what and where to publish
Preliminary Searching	Citation Searching	Data Management including data management plan	Tracking academic impact
Academic Integrity	Keeping up to date	Collaboration	Applying for grants

The single graded assessment item for this unit is a Resource Log, requiring students to demonstrate their skills and capabilities of IFN001 content through the lens of their individual research context. The assessment template and criteria are available on the [IFN001: AIRS website](#).

Corporate Reporting at QUT

QUT is an autonomous public higher education provider with responsibilities to both internal and external stakeholders. Over the last two decades, QUT has grown an increasingly robust survey culture resulting in strong engagement with stakeholders. During this time our course quality assurance systems have matured and become more sophisticated in capturing and effectively using student and staff data to transform curricula in a meaningful way. Student feedback surveys included LEX from 2007-2012 which was sent to students once a semester. Automated Pulse and Insight Surveys were developed in 2013 and continue to be used. Each semester the Pulse Survey (PS) is launched in weeks 4-5 and Insight Survey (IS) in week 13. Pulse survey feedback allows the teaching team to address students' responses in a timely manner midway through the semester.

Methodology

Ethical clearance was gained through QUT's Office of Research and Integrity and the project was deemed low risk. This study draws on QUT's retrospective and current corporate reporting data from the three survey tools mentioned above: LEX (2007-2012), Pulse and Insight Surveys (2013-2016). Student survey response rates for IFN001 are high and have increased from 32% (2014) to 43% (2016). In total, approximately 4000 IFN001 students were surveyed between 2007 and 2016, 1871 completed surveys with 606 students providing additional open comments. It is these 606 open comments that were coded to ascertain student' responses to their learning experience in IFN001. Thematic analysis was used whereby patterns within the data are identified and emerging themes become the categories for analysis (Fereday & Muir-Cochrane, 2006, p. 82).

Nvivo was used to code and analyse the 606 open comments. Adopting an iterative and reflexive process, an initial sample of 200 comments was free coded to identify emerging themes. Coding is a subjective process (Bazeley & Jackson, 2013) and Nvivo facilitated a consistent transparent approach. To address the issue of subjectivity, the team established agreed terminology and categorisation of themes, and continually reviewed coding patterns. Coding then continued on the remaining 406 open comments. Ongoing discussion among authors was critical to this data analysis process.

Theoretical Perspective

Bourdieu’s notion of habitus (1984) applied to higher education provides a theoretical lens in which to frame the HDR student’s individual lived experience. The habitus of the university represents a structure that organises individual and institutional practices and perceptions of those practices. It consists of our beliefs, thoughts and understandings of social spaces simultaneously generating and constituting cultural capital (Enright, Rynne, & Alfrey, 2017).

Different disciplines reproduce specific forms of ‘habitus’ that can create tensions between: the habitus of the diverse cohort of HDR students and their lived experience; the habitus of the university, and specific units.

Discussion of Themes

While specific themes emerged from examination of the data it was clear that each theme does not exist in isolation and are intrinsically linked in creating the totality of the student experience. The three core themes to be discussed in detail are:

The Learning environment (Habitus); Capacity building of the HDR student; and the Pedagogical design of IFN001. These themes and subthemes are indicated in Table 2.

Table 2: Positive Themes emerging from Student Feedback Surveys IFN001

Learning environment (Habitus)	Capacity building - HDR student	Pedagogical design of IFN001
<ul style="list-style-type: none"> • Connectivity/Sense of Belonging • Flexibility • Staff • Feedback 	<ul style="list-style-type: none"> • Researcher Identity • Confidence • Self - Efficacy 	<ul style="list-style-type: none"> • Curriculum • Blended learning approach • Practicality and usefulness of the unit

Student feedback acknowledges IFN001 as a culture embedded within university culture and values – the institutional habitus. The IFN001 habitus provides a diverse cohort of transitioning HDR students with a sense of belonging as evidenced in the comment below:

I believe this class is running optimally. It doesn't even feel like a class, it has a family orientated welcoming and nurturing vibe. I am in love with QUT. I have had a much better experience at QUT in 4 weeks than I ever had within 4 years at XXX. (PS_Sem2_ 2015)

Connectedness is critical to retention, progression and active learning. International students, mature age students, students new to QUT and ongoing QUT students also echoed this sentiment.

IFN001 is proving to be particularly useful to me as a HDR student returning to study after a long absence. (IS_Sem1_2016)

Extremely useful for mature age students who have been working in industry for some time and have not previously been involved in academic research. (PS_Sem1_2016)

IFN001 occurs when the student is commencing life as a researcher at QUT. Zhang (2016) notes that while the transition for all graduate students poses both social and academic challenges, international students must also negotiate language barriers, cultural differences and an unfamiliar learning environment. Duranczyk (2015) discussed the importance of creating an environment where graduate students felt a genuine sense of belonging and connection both through creating social interactions and providing regular academic support. Son and Park (2014) point to international PhD students in Australia facing both cultural challenges as well as significant differences in the learning environment. The participants in that study identified the use of technology and multimedia resources, an expectation of greater independent research study outside of the classroom and engagement in collaborative study practices as distinguishing features of the Australian academic environment. The IFN001 cohort also includes domestic students who have significant non-academic life experience and who may not have engaged in formal education for some years. Mallman & Lee (2016) identify that such students in an undergraduate program felt some barriers to their ability to fully “fit-in” with more traditional students. Similar sentiments were identified in our survey data.

Hence, the IFN001 learning environment and pedagogical design offers commencing students an opportunity to build familiarity with the research and learning environment at QUT. Student feedback acknowledges this consistently across time. Flexibility in modes of engagement, and encouragement to focus study on curriculum areas of most need acknowledges the diverse cohort.

I appreciated the quality and coverage of the online participation... (IS_Sem1_2016)

Students engage with practical tasks in conducting literature searches using QUT Library resources. They are encouraged to build relationships with Liaison Librarians, who can be an integral support service throughout their research process. Interactions with the staff of the unit are seen as a major benefit by students.

I thought the staff were wonderful. They were very helpful both during the class and afterwards. The course content was also very enjoyable and rewarding. (IS_Sem1_2013)

Workshops where students are encouraged to interact with each other and verbalise their research interests initiate the building of both professional and social networks. The requirements of the assessment task ensure students have an understanding of the legal and ethical requirements underpinning research at this institution.

I have a lot of unanswered questions before commencing my research...I really found answers to my questions. Further the course benefitted my research life in an incomparable manner. (PS_Sem1_2016)

IFN001 provides a unique space (habitus) for HDR students to: transition into an academic space, develop and consolidate the required information and research skills and practices for graduate employability and researcher identity.

The course was very valuable and I use many of the things I learned in the class on a daily basis. (IS_Sem1_2016)

While the majority of open ended comments are positive there were also a small number of constructive feedback that fall into three main themes - Logistical issues, Perceptions of skill level and the Pedagogical design of IFN001 (Table 3). All comments are considered in the context of listening to the student voice while maintaining the integrity of the unit. These comments often act as a catalyst for further change and development.

Table 3: Constructive Themes emerging from Student Feedback Surveys IFN001

Logistical issues	Perceptions of skill level	Pedagogical design of IFN001
<ul style="list-style-type: none"> • Availability of spaces in workshops • Timing of unit 	<ul style="list-style-type: none"> • Different disciplinary needs • Differing faculty perceptions 	<ul style="list-style-type: none"> • Assessment • Flow of workshop • Generic nature of unit • Mandatory unit

Our analysis accords with the developing body of literature around postgraduate educational transitions and how early positive learning experiences can shape social interaction, active participation (Matheson & Sutcliffe, 2017), communities of practice, academic self-efficacy and self-confidence (Chesnut, Siwatu, & Haeni Young, 2015; Tobbell et al., 2008). The notion of transition involves alterations in identity, changing from an old way of being to something new (Tobbell et al., 2008). Communities of practice are formed by groups coming together through a common purpose, activity, time or location often sharing a collective learning (Lahenius, 2012). Whilst IFN001 can be considered a formal community of practice, students meet in the workshops, connect and create their own informal communities of practice. The benefits of such interactions are many fold and have been shown to increase self-confidence and sense of belonging, the importance of which, needs to be further understood by program and course designers to create spaces that enable learning. Intertwined is the individual's sense of competence for specific research related tasks – research or academic self-efficacy (Chesnut et al., 2015; Tobbell et al., 2008), where experiencing success or seeing others succeed will increase confidence and likely predict future success.

Outcomes - Transforming the Curriculum

The challenge is to meet the information and research training needs of the heterogeneous nature of the HDR population, in a dynamically changing research terrain to ensure a relevant and stimulating curriculum. In 2011 an external Higher Education Research Consultant, with expertise in literacy programs for research students, conducted a review of the IFN001 curriculum and made significant recommendations. Recommendations were based on the research skills and capabilities required by contemporary researchers and included (i) scholarly publishing and communication (ii) data management (iii) intellectual property and copyright (iv) use of online collaboration tools. These additions to the curriculum were considered baseline skills for the new researcher (Mooney, Collie, Nicholson, & Sosulski, 2014; Nicholson & Sosulski, 2014). Whilst an internal project team developed good quality

resources in the areas outlined above, it later became clear through student responses to Pulse and Insight surveys in 2013, that many students were troubled by aspects of IFN001. Students requested more engaging online content, more relevant and improved access to online learning resources, and less didactic teaching in face to face workshops. These problems with the curriculum needed to be addressed to provide clearer learning outcomes, alignment of content to assessment requirements and to the way students would engage with the content.

Drawing on Biggs' (1996) approach to curriculum development the IFN001 teaching team in 2014, constructively aligned the curriculum by developing coherence between the learning outcomes, assessment and the teaching methods. The objective of the redesign process was to make intrinsic links between the content of the workshops, teaching strategies, the marking criteria and the resource log questions. The marking criteria was reworked to ensure continuity and clarity between the resource log questions and the grading system. Underpinned by active learning principles the workshops were redesigned to include activities such as pair and share, elevator pitch, trigger questions to open discussion and small and large group discussions. IFN001 is delivered on a continuing basis throughout the academic year with a constantly changing student cohort. This impacts the ability to conduct pre and post evaluation exercises with a consistent student population. However, consistency in Pulse and Insight Survey questions provide a robust data source to inform curriculum design.

The curriculum redesign of the workshops was highly rated by students as expressed by the following comments:

IFN001 is proving to be particularly useful to me as a HDR student returning to research after a long absence. The course structure and the assistance and guidance available at QUT is exceptional and a credit to the university. (PS_Sem2_2016)

I found the material and the Resource Log really useful. This will help me immensely with my research. (IS_Sem1_2016)

Through this unit I acquired a reasonable understanding of technological knowledge needed for the access and storage of data. It also clarified the research approach at different levels, from normative on citations to the spreading of data through conferences, papers. (IS_Sem1_2016)

Enhancing the quality of student learning is at the forefront of what we do. Embedded in the QUT Real World Learning 2020 Vision is that the learner experience will be “enhanced through online and blended learning technologies and tools” (Queensland University of Technology, 2016). Based on this tenet and feedback from students, IFN001 has been offered in blended mode since 2012 with the aim of providing flexibility for how students engage with course materials.

The mixture of workshops and online modules gives great support to new students. The quality of the materials is very high, and I think it is an excellent unit for the beginning of the Postgraduate studies. (PS_Sem2_2016)

..I love the way I can do it on my own time on-line. (IS_Sem1_2013)

The redesign of the curriculum as discussed previously, raised several questions about the online delivery of the unit and drew attention to the disparity between content in face to face

workshops and that provided online. With data indicating approximately one third of students enrolled in IFN001 engage with the content fully and solely online any such disparity is a matter of concern.

The authors contend that universities need to provide equivalence of information and learning resources in both the online and face to face learning environments. Workshop recordings were made available using Echo 360, ensuring that IFN001 complies with university policy. Although there are concerns about video lectures not encouraging active learning, feedback from our HDR cohort has been positive, highlighted by the student comments below:

The recorded materials were useful and made learning flexible to my needs. (PS_Sem1_2015)

These comments resonate with the literature, with some students requesting even more recorded lectures while others, specifically students from non-English speaking backgrounds appreciate the ability to pause, rewind and take their time over learning (see O'Callaghan, Neumann, Jones, & Creed, 2015). In keeping with the issue of equity of information between the information students receive in workshops and that which is expressed online it became clear that students attending workshops were receiving more tips and advice about how to answer the assessment questions. The solution was to create an assignment presentation which included the advice given in face to face workshops. This is reflected in a new resource launched on the IFN001: AIRS website this year <http://airs.library.qut.edu.au/#assessment>.

Recently I had the opportunity to try the new webpage of AIRS. It is really interactive and guidance to complete the resource log is fantastic. (IS_Sem2_2016)

The mandatory nature of the unit has attracted feedback from a small number of students relating to perceived lack of relevance of the unit to HDRs. Students more often than not acknowledge the benefits of IFN001 for others however not relevant to their circumstances due to their perceived competency levels and HDR level of study.

I feel this unit is completely unnecessary for any student who has previously done an Honours or research Master's degree. Speaking from the honours side, I have just completed a year of writing project proposals, literature reviews, a thesis and several critiques. (PS_Sem1_2016)

However, Molteni & Chen's (2015) research indicates that students can experience a mismatch in their self-perceptions and confidence levels around skill competencies, evident in the student comments below:

I have studied previously at QUT and was dreading attending these sessions as I was concerned I would already know how to do everything we did in this course... But XXX kept the sessions interesting and I came out learning many new things. (PS_Sem1_2015)

Responding to student feedback and the need to provide a standardised approach to research skills training, enhancements were made to the IFN001: AIRS website in 2016. Recognising the diversity of IFN001 participants including the pre-existing skill set of many students, the website now includes options to personalise the student's experience of the unit content. The visual design encourages the student to tailor their engagement with those aspects of most personal use. A diagnostic tool is now included to assist students with existing high level research skills and prior knowledge to better target aspects of the assessment and assist them

to make informed decisions about engagement with the unit:
<http://IFN.library.qut.edu.au/#learningplan>.

We encourage students to consider their existing skills and gaps in knowledge and empower them to self-assess and then engage with the relevant learning resources and resource log.

Implications for practice

It is recommended that the emphasis of HDR student coursework should be on developing transferable skills for a diverse, quickly changing and complicated employment terrain. The skills outlined by RTS review identified data collection, design of research questions, information seeking and ethical conduct, as just some of the transferable skills required by graduates engaged in diverse career paths, the very skills embedded within IFN001. As a mandatory unit exposing students to these skills early in their research careers IFN001 supports QUT in producing graduates with real world capabilities.

Universities invest significant resources in collecting extensive student data which when properly interrogated and analysed provides a rich source of information about the quality of a student's learning experience. This paper provides an example of how using this data and consciously incorporating the student voice into a process of continual curriculum improvement can transform a unit by putting the student at the centre of the learning environment. The key is to access the corporate data available to you and think about how this can be used to improve curriculum design and enhance the student experience.

Additionally this paper emphasises the importance of creating learning spaces and experiences that connect HDR students to each other, the university research environment. Thereby assisting students to explore the notion of "becoming" that researcher which is imperative for successful transition, research skills development and capacity and advancement into future careers. A further implication from the study is to consider how to encourage research self-efficacy, sense of belonging, communities of practice and notions of transition when developing researcher training sessions.

Conclusion

The notion of habitus was used to frame the dynamic nature of IFN001 from 2007-2016. The IFN001 unit is reflexive in its' continual transformation of curriculum across time. This has been in response to the demands of a changing HDR cohort, institutional and national expectations and industry and professional body requirements. The RTS review highlights the dearth of longitudinal data relating to HDR graduate employment. Similarly, higher education relies on disparate corporate reporting strategies to gauge the learning and teaching experiences of HDRs. How this is engaged with varies and is specific to the cultural habitus (norms, values, structure) of the institution. IFN001: Advanced Information Research Skills (AIRS) demonstrates how 'putting into practice' engagement with student feedback in conjunction with internal and external drivers results in a dynamic and transformational unit.

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