Securing Australia’s Future – Research Training System Review
Discussion Paper and Consultation Questions

Response by the Council of Australian University Librarians (CAUL)

Prepared by Wendy Abbott, chair CAUL Learning & Teaching Advisory Committee &
University Librarian at Bond University

Contact the CAUL Office on 02 6125 2990 or caul@caul.edu.au
The Council of Australian University Librarians (CAUL) is pleased to have the opportunity to contribute to the Review of Australia’s Research Training System.

Australian university libraries are increasingly becoming genuine partners in the research enterprise, making an important contribution to the research performance of their university. University libraries play a key role in enabling researchers at all stages in their academic careers to develop sophisticated information skills. Those skills, particularly high level information literacy and information management skills (including, more recently, data management and data sharing skills) are essential elements of any rigorous research training program and librarians are increasingly working with supervisors and other campus agencies to support development of these skills.

Such skills need to be continually developed and refreshed in response to the dynamic changes within the scholarly dissemination and scholarly publishing environments as well as in response to the increasingly multi-disciplinary and trans-disciplinary nature of much research.

Taking into account variations across institutions, libraries contribute to skills development by teaching information seeking and use skills, citation and referencing, ethical and proper use of information, copyright requirements, presentation and time management skills, bibliometric analysis, data management and other research support activities. The method of teaching ranges from the creation of online tutorials and other guides to specialist literature, classroom teaching, special seminars and classes, integration of skills development into coursework and teaching of entire research methods programs and units. Generally speaking skills development programs start at undergraduate level, but many are pitched at research level students. This is particularly true of data management training, which addresses the effective creation and use of research data within the Australian Code for the Responsible Conduct of Research. Libraries play an increasing role in e-research support activities such as data management.

In order to ensure doctoral students develop the sophisticated information literacy and information management skills that will contribute to their success as high quality researchers, CAUL recommends that advanced information literacy training components designed and conducted by librarians should be embedded in formal research training courses required as part of research higher degrees.

It is in the context of the contribution made by libraries to successful research training and support that the following comments are made in response to the Discussion Paper and Consultation Questions.
PRODUCING HIGH QUALITY RESEARCHERS

1. What are the research skills and experiences needed to be an effective researcher?

To be an effective researcher, Research Higher Degree (HDR) students need to develop high level information skills and librarians are increasingly playing a role in working with research students, supervisors and other campus agencies to support development of these skills.

High level information literacy and information management skills include, but are not limited to: information seeking and use skills, skills in analysis, criticism, citation management and referencing, ethical and proper use of information, copyright requirements, presentation/communication, research dissemination and scholarly publishing, bibliometric analysis, data management and sharing, and data/digital literacy.

Emerging technologies are having far-reaching impacts on the research process and on the skills required by HDR students. The “evolving nature of the scholarly record” and an “increasing focus on research data management” are just two trends identified in the recent NMC Horizon Report: 2015 Library Edition which have implications for libraries and researchers (Johnson, Adams Becker, Estrada & Freeman, 2015). These trends place growing demands on librarians to support research students in developing their skills and keeping up-to-date with innovations. For example, scholarly outputs are no longer restricted to the traditional journal article format but may include data sets and other non-traditional research outputs (videos, etc.) and research students must have access to professional, contemporary services and resources to continually refine their skills so that they can thrive in this networked environment.

To become effective researchers, HDR students need to be guided and supported to shape the direction of their research, to develop capacities for independent research (including the requisite information literacy, information management, research dissemination and research data management skills) and to present and publish their research findings.

In terms of learning experiences, studies have shown that while doctoral students acknowledge the value of information literacy skills to successful completion of their dissertations, research supervisors do not focus on advising on information skills development or the literature review process (Green & Macauley, 2007, p. 323).

The specialised roles of information advice and training for information literacy skills development are typically undertaken by librarians and Australian university libraries have developed a range of programs, workshops, seminars, one-on-one consultations as well as online interactive learning experiences to support research students in developing the sophisticated information skills they require (Keller, 2015). The Advanced Information Research Skills (AIRS) course offered at QUT is regarded as a leader in the field. AIRS is a credit bearing component of QUTs doctoral program which is designed and facilitated by librarians (CAUL, 2013).

Other desirable information literacy learning experiences for HDR students include opportunities for participating in scholarly publishing, including the dissemination of research outputs, using
institutional (library-led) publishing and repositories, particularly where traditional publishers’
timeframes or requirements (e.g. cost) do not allow for timely dissemination of research findings,
and for research data dissemination.

2. What broader transferable qualities do HDR graduates need to develop to succeed in a
wide range of career pathways? Should these skills be assessed, and if so, how?

In addition to the sophisticated information literacy and information management skills described
above, research students need to develop a range of transferable qualities that correlate closely
with Library training initiatives/experiences and that contribute to successful employment
outcomes. They include:

- Digital literacy which broadens the concept of information literacy to encompass
understanding digital research tools and networked information.
- Communication and collaboration skills including traditional and new media skills (social
media, etc.) and networking skills.
- Technological literacy including the ability to exploit digital tools for modelling, visualisation,
digital fabrication, etc. to engage in high-order problem solving.
- Methodological skills including the ability to use research software tools such as NVivo (for
qualitative data analysis), Qualtics (online survey software), etc.

In terms of assessing skills development, the QUT AIRS model of a fully accredited information
literacy course for doctoral students (referred to above) has demonstrated the value of using both
formative and summative assessment in improving the quality of student learning (Tweedale, Fell,

As more Australian universities adopt and expand the range of formal research training courses for
HDR students the opportunity to teach and assess transferrable skills such as information literacy,
digital literacy, technological literacy, data management and methodological skills as part of a
doctoral curriculum will become more wide-spread.

3. What other broader capabilities should HDR graduates develop during their research
training?

Broader skills training should be an essential component of Australian higher degrees by research,
particularly within the disciplinary context, using recognised frameworks and standards, within the
coursework curricula. Partnerships within the disciplinary contexts would include engaging with
those who have knowledge of the discipline and the broader skills development requirements to
provide a disciplinary interpretation in the skills training.

For example, new skills and capabilities are required in all disciplines in the management of research
data, for example the understanding and application of appropriate scheme, e.g. metadata to
organise their outputs and facilitate effective discovery. This is not just as a compliance issue but
the means of producing globally-relevant research in the new knowledge environment.
This applies not just to researchers who produce large data sets and use high performance computing. Uncurated data in small datasets remains inaccessible if researchers do not have the skills to manage it or do not know how to seek advice from those who can help with preservation, curation, discovery and retrieval; that is, data scientists and librarians.

In addition to research data management, other broader skills HDR students could develop include project management, research ethics, presentation skills, communication planning, copyright and intellectual property management.

CONTRIBUTING TO AUSTRALIA’S FUTURE PROSPERITY AND WELLBEING

4. What skills and capabilities do employers in Australia need from HDR graduates?

Employers to respond.

5. What research skills and capabilities are needed to ensure Australia’s research system remains internationally competitive?

To ensure Australia’s research system remains internationally competitive HDR students need to develop skills and an understanding of the research evaluation environment. This includes skills in research publication evaluation/quality measures peer review and bibliometrics, including an understanding of the use and misuse of metrics, both traditional and ‘new’ or alternative metrics. Integral to this is the need for researchers to keep track of both the scholarly quality and broader impact of their work, with skills needed in managing their researcher identity and online profile; for example, by using internationally recognised researcher identity systems such as ORCID.

Researchers need to develop skills and capabilities in scholarly publishing and scholarly communication including publication/sharing of research datasets. With dedicated infrastructure designed to easily support the dissemination of research outputs, including data, these outputs can be shared and this in turn helps to drive innovation and build research capacity across disciplinary and geographic boundaries.

In some instances, policies and practices in research data management, ethics and intellectual property can work at cross-purposes. For example, evidence suggests that it is easier to gain clearance from ethics committees if data remains restricted, thus discouraging researchers from sharing their data in any usable way. Further government encouragement for a holistic approach to research policy in these areas would improve information sharing through open access publication and other initiatives.

6. What research skills and capabilities are needed from HDR graduates to ensure Australia is ready to meet current and future social, economic and environmental challenges?

To meet these challenges, the research training system must develop researchers with the skills to shape the future direction of their research in a global context, to develop capacities for independent research (including the requisite information and digital literacy, information management, research dissemination and research data management skills), to develop capacity for
effective national and international collaborative research initiatives, and to present and publish
their research findings in quality outlets.

Social, economic and environmental challenges will require a multidisciplinary research approach,
and HDR students will therefore require skills for participating in and driving multidisciplinary and
collaborative research efforts.

HDR graduates should have well developed skills in emerging technologies to enable them to take
advantage of new models of scholarly communication that will ensure rapid dissemination of their
research findings through innovative mechanisms and processes. This includes institutional
repositories and institutional publishers with technology enabled rapid turnaround environments
with minimal cost for researchers. With the increasing emphasis on Open Access to research
outputs (both publications and datasets) by funding agencies globally, researchers must understand
trends in scholarly publishing, and must develop effective research output and data management
practices, including the effective creation, use and re-use (i.e. sharing) of research data as outlined
within the Code for the Responsible Conduct of Research.

RESEARCH TRAINING SYSTEM

7. What features of the research training system should be retained to ensure our graduates
are internationally competitive?

Universities to respond.

8. How should the research training system be structured to produce high quality researchers
who can contribute to Australia’s future prosperity and wellbeing?

The trend towards providing formal research training courses as part of the requirements of
research higher degree programs affords the opportunity to ensure research students receive
appropriate training in a broad range of transferrable skills such as information literacy.

Sophisticated information literacy and information management skills will contribute to the success
of HDR students as high quality researchers and CAUL recommends that advanced information and
digital literacy training components conducted by librarians should be embedded in formal research
training courses. Libraries and librarians are uniquely qualified to provide information consultancy
and teach skills in information seeking and use (re-use), citation and referencing, ethical and proper
use of information, copyright requirements, presentation and time management and bibliometric
analysis. Librarians are also enhancing their skills sets and providing other academic support
activities, including data management training, which addresses the effective creation and use of
research data within the Australian Code for the Responsible Conduct of Research.

There is a strong and growing body of evidence that the training provided by libraries and, indeed
active use of scholarly resources, substantially improves student performance. For example,
Monash University has demonstrated a positive link between training and student performance and
the University of Wollongong has analysed use of library-provided scholarly resources and shown a
strong positive correlation between high library use and improved student performance.
9. How can entry and exit pathways to and from research training be better structured?

*Universities to respond.*

10. How can barriers to participation in HDR programs be overcome so that more candidates from non-traditional backgrounds, including indigenous students, undertake research training?

In addition to targeted programs such as HDR scholarships, evidence shows that the pipeline of undergraduate students from non-traditional backgrounds into research higher degrees can be improved by additional support and training provided by librarians. For example, a recent survey of Australian university libraries demonstrated a wide range of additional library support and training is directed towards improving educational outcomes for Indigenous students (CAUL, 2014). Librarians are in a prime position to provide additional information skills training and research support so that both undergraduate and HDR students from non-traditional backgrounds develop the sophisticated information skills they require as students and researchers.

**REFERENCES**


