**HOW TO DECIDE WHAT KNOWLEDGE AND SKILLS TO DEVELOP**

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| **Introduction** |

During your candidature, you will be granted opportunities to learn extensive knowledge and skills—knowledge and skills that could help you complete your thesis and thrive in your career. For example, you could develop advanced skills in data mining, grounded theory, professional writing, networking, and data sharing. To acquire these capabilities, you could

* attend the workshops the university organizes, such as the research enhancement program
* seek funding to attend workshops and conferences in other states or nations
* access either free and paid online courses from Lynda.com, courser.org, udemy.com, udacity.com, Kahn academy, Vitae, YouTube, and many other sites
* read books and articles that are accessible from the university library or other locations.

But, which workshops and courses should you complete? In which sequence should you complete these workshops and courses? Which activities should you undertake to help you learn, remember, and apply the material? And how you can demonstrate that you have completed these workshops and courses—to substantiate your progress and credibility. This document is designed to help you answer these questions.

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| **Did you know?** | In general, people invest more time and effort into a goal—such as completing a thesis—than to the means to achieve this goals—such as developing the skills to complete this thesis (see faculty.chicagobooth.edu/ayelet.fishbach/research/Investing%20in%20Goals.pdf. |

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| **Task 1: Determine if and when you want to complete the various themes** |

Your first task is to decide which themes are relevant to you. You might want to complete this task with your supervisors or peers. Some themes, such as career skills, are relevant to all candidates. Other themes, such as qualitative techniques to collect and analyse data, may be relevant to some candidates only. Perhaps

* Skim the first column in the following table.
* In the second column, specify which of the optional themes are relevant to you. For example, if you plan to conduct at least some qualitative research, the theme “Qualitative techniques to collect and analyse data” is relevant to you.
* In the third column, specify the number of hours or days you plan to dedicate to each theme. To illustrate, if your project is potentially risky, you might dedicate 8 days to “Research integrity and safety”. If your project is not risky and not empirical, you might dedicate only 1.5 days to this theme.

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| Theme | Optional | Suggested time | Start date | End date | Current | Achieved |
| Induction | No | 1 day in Week 1 |  |  |  |  |
| Literature reviews   * Library skills * Grey literature * Systematic reviews * Endnote | No | 1 to 5 days in Year 1 |  |  |  |  |
| Developing research questions | No | 1 day in Month 1 |  |  |  |  |
| Extending your knowledge about your specific field   * Theories and concepts * Practice and industry | No | 2 to 20 days across the course |  |  |  |  |
| Research integrity and safety   * Ethics * Research integrity * Safety * Agreements such as data management and IP * Legislation | No | 1.5 to 4 days in Year 1 |  |  |  |  |
| Research overview   * Research philosophies * Categories of quantitative data analysis techniques * Categories of qualitative approaches | No | 2 days in Year 1 |  |  |  |  |
| Quantitative techniques to collect and extract data | Yes | 0 to 15 days across the course |  |  |  |  |
| Quantitative techniques to analyse data | Yes | 0 to 30 days across the course |  |  |  |  |
| Qualitative theoretical perspectives | Yes | 0 to 5 days in Year 1 |  |  |  |  |
| Qualitative approaches to collect and analyse data | Yes | 0 to 20 days across the course |  |  |  |  |
| Project management   * Time management * Budgeting * Stakeholder engagement | No | 1 to 5 days in Year 1 |  |  |  |  |
| Personal development   * Resilience * Motivation * Social skills * Conflict resolution | No | 3 days across the course |  |  |  |  |
| Career skills   * Networking * Job applications * Funding applications * IT skills * Leadership skills | No | 6 days across the course |  |  |  |  |
| Communication   * Writing skills * Thesis submission * Presentation skills * Publishing skills | No | 10 days across the course |  |  |  |  |

The other columns could help you organize your time. Specifically

* In the columns labelled start date and end date, indicate the dates in which you might start and complete these themes respectively
* In the column labelled current, tick the box to indicate which skills you are developing now.
* In the column labelled achieved, tick the box to indicate that you have completed some theme.

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| **Task 2: For each theme, determine which specific topics might be most relevant to you** |

Your second task is to decide the specific topics in which you would like to extend your knowledge and skills. You should complete this task in consultation with your supervisors or peers. To achieve this goal

* The first column presents a series of specific topics within each theme. Delete the rows or topics that are not relevant to you.
* If you like, insert additional rows to represent specific topics that were overlooked in this table
* In the second column, specify the approximate number of hours or days you would like to dedicate to each topic. The number of days you planned to dedicate to each theme could guide these decisions.
* Overall, across your candidature, PhD candidates should dedicate about 40 days, equivalent to 300 hours, to training and development. Masters by Research candidates should dedicate half this time to training and development.

The third column presents a few training opportunities, workshops, and courses you could explore to learn about each topic. This column, for example, indicates

* which CDU website resources could be relevant to each topic
* whether the research enhancement program, conducted twice a year, is relevant to each topic.

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| Specific topic | Time | Sources of training and development |
| **Induction** |  |  |
| Milestones you need to complete |  | * Research enhancement program * CDU website: Induction |
| Helpful contacts |  | * CDU website: Contacts |
| Services at CDU |  |  |
| Darwin and surrounds |  |  |
| The culture and practices in HDR |  | * CDU website: Induction |
| **Literature reviews** |  |  |
| Library and search skills |  | * Research enhancement program |
| Writing research proposals |  |  |
| Searching the grey literature—beyond journal articles and scholarly books |  | * CDU website: How to begin your research and conduct lit reviews |
| Systematic reviews and meta-analyses |  | * CDU website: How to begin your research and conduct lit reviews |
| Endnote or other reference management software |  |  |
| **Developing research questions** |  |  |
| How to extend past research |  |  |
| Creativity and innovation skills |  | * CDU website: How to begin your research and conduct lit reviews |
| **Extending your knowledge about your field** |  |  |
| Relevant theories, concepts, frameworks |  |  |
| Relevant knowledge about application |  |  |
| Relevant knowledge about the industry |  |  |
| **Research integrity and safety** |  |  |
| Human ethics |  | * Research enhancement program * CDU website: Ethics, integrity, agreements, and conflict |
| Animal ethics |  | * Research enhancement program |
| Research misconduct |  | * Research enhancement program |
| Biosafety |  |  |
| Safety with chemicals |  |  |
| Safety with travel |  |  |
| Risk management |  |  |
| Data management and sharing |  | * CDU website: Ethics, integrity, agreements, and conflict |
| Intellectual property |  |  |
| Authorship agreements |  |  |
| Relevant legislation |  |  |
| **Research overview** |  |  |
| Research philosophies and theoretical perspectives |  |  |
| The main categories of quantitative data analysis techniques |  | * CDU website: Choosing your research methodology and methods |
| Overview of the main issues in quantitative data analysis, such as statistical significance, statistical control, and statistical power |  |  |
| The main qualitative approaches |  | * CDU website: Choosing your research methodology and methods |
| Mixed-methods approaches |  | * CDU website: Choosing your research methodology and methods |
| **Quantitative techniques to collect and extract data** |  |  |
| Surveys |  |  |
| Online survey software, such as Qualtrics |  |  |
| Biological measures |  |  |
| Performance measures |  |  |
| Chemical analyses |  |  |
| Genomic analyses |  |  |
| Archival data |  |  |
| **Quantitative techniques to analyse data** |  |  |
| Introduction to SPSS |  | * Research enhancement program |
| Introduction to Stata |  |  |
| Introduction to R |  | * Research enhancement program |
| Bayesian statistics |  |  |
| Between-subject analyses—such as t-tests or MANOVAs |  |  |
| Cluster analyses |  |  |
| Data mining and decision trees |  |  |
| Geographic information systems and mapping |  |  |
| Machine learning |  |  |
| Multi-level modelling |  |  |
| Multiple regression and correlation |  |  |
| Non-parametric statistics |  |  |
| ROC curves |  |  |
| Scale development, like factor analyses |  |  |
| Social network analyses |  |  |
| Structural equation modelling |  |  |
| Survival analyses |  |  |
| Time series analyses |  |  |
| Within-subject or mixed-model analyses such as mixed-model ANOVAs |  |  |
| **Qualitative theoretical perspectives** |  |  |
| Phenomenology |  |  |
| Symbolic interactionism |  |  |
| Pragmatism |  |  |
| Critical theories |  |  |
| Other theoretical perspectives, such as intuitive enquiry |  |  |
| **Qualitative techniques to collect and analyse data** |  |  |
| Case studies |  |  |
| Ethnography, including critical and institutional |  |  |
| Action research |  |  |
| Participatory action research |  |  |
| Auto-ethnography |  |  |
| Thematic analysis |  |  |
| Content analyses and the framework method |  |  |
| Grounded theory |  |  |
| Narrative enquiry |  |  |
| Conversation analysis |  |  |
| Discourse analysis |  |  |
| Interviews and focus groups |  |  |
| Analysis of documents and records |  |  |
| Observations |  |  |
| Artefacts: social media, physical remnants |  |  |
| Qualitative software, such as NVIVO or Atlas |  | * Research enhancement program |
| **Projects management** |  |  |
| Time management and research plans |  |  |
| Budgeting |  |  |
| Stakeholder and community engagement |  |  |
| **Personal development** |  |  |
| Resilience |  |  |
| Motivation |  |  |
| Cognitive skills: memory, learning, decision making, and intelligence |  |  |
| Social skills |  |  |
| Conflict resolution |  |  |
| Healthy behaviours |  |  |
| **Career skills** |  |  |
| Networking |  | * CDU website: Publications, communication, and networking |
| Job applications and interviews |  | * CDU website: Career development |
| Grant and funding applications |  |  |
| IT skills |  |  |
| Leadership skills |  |  |
| **Communication** |  |  |
| Writing skills |  | * CDU website: How to write more effectively |
| Thesis editing, preparation, & submission |  |  |
| Presentation skills |  | * CDU website: Confirmation of candidature and progress reports |
| Publishing skills |  | * CDU website: Publications, communication, and networking |

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| **Task 3: identify and choose other relevant courses, workshops, and materials** |

Over time, you will identify more courses, workshops, and materials to populate the third column in the previous table. Your third task is to explore websites that could help you achieve this goal. Here are some relevant websites:

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| Website | Cost | Process |
| Coursera | Free |  |
| Kahn academy | Free |  |
| Lynda.com | Free for CDU candidates | * Accessible from the cdu portal |
| www.udacity.com | Usually free |  |
| www.udemy.com | Often about $20 a course but can be more | * Press sign-in and follow the instructions * Press log-in and then search for courses * Contact your College HDR administrator to clarify how to pay for these courses |
| www.vitae.ac.uk | Free for CDU candidates | * Press Log in * Register—and use your staff or student email * The section called Publications is especially helpful |

We will gradually construct documents that offer guidance on which courses might be most suitable. These documents, for example, will specify the pre-requisites, difficulty, quality, and duration of each course. This information is publicly available but can be hard to locate immediately.

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| **Task 4: Document your participation** |

After you complete each course, workshop, article, or book, you should collate evidence of your achievement. For example, you could

* Summarize the insights you gained—perhaps one page for every one to two hours of learning
* Retain the articles you read, together with highlights or notes
* Retain certificates you receive for completing a course

This evidence is primarily recorded for your benefit. However, if your progress is perceived as unsatisfactory, you can supply this evidence to substantiate your efforts. Alternatively, the office of research and innovation might occasionally audit this evidence to gauge the extent to which research candidates are developing skills.