



UNIVERSITY OF WALES: TRINITY SAINT DAVID
PRIFYSGOL CYMRU: Y DRINDOD DEWI SANT

School of Applied Computing

Research Methods
ACCC5006

MODULE CODE: ACCC5006
TITLE: Research Methods

LEVEL: 5
CREDITS: 10

JACS CODE: I100

AIM(S)

To underpin academic research and the third year major project, and to provide students with a comprehensive and systematic understanding of the knowledge and skills needed to collect, interpret, analyse, synthesise and present data using appropriate research methods. The module will extend the student's technical expertise in information systems development such that s/he is able to evaluate the suitability of different development methods for different situations.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to demonstrate the ability to:

1. Review critically the current research literature pertinent to a research topic and communicate the results of the research to specialist and non-specialist audiences.
2. Demonstrate a sound understanding of research and development strategies and use these to produce a proposal suitable for a Major Project that meets ethical and sustainability guidelines.

INDICATIVE CONTENT

- Research principles and approaches (e.g. the research process, purpose, sources of data including primary/secondary research, quantitative/qualitative data, objective/hypothesis formation, reliability, validity, generalisability)
- Research design strategies, (e.g. experiments, surveys, case studies), their advantages and limitations, and their suitability to a variety of research contexts
- Data collection & sampling methods (e.g. interviews, questionnaires, observation), and their advantages and limitations in a variety of contexts
- Data analysis of both qualitative and quantitative information, including the use of appropriate computer software
- Developing and structuring a research proposal: problem identification, formulating aims/hypotheses, sampling, sustainability and ethical issues and the practicalities of design
- Referencing conventions (e.g. the Harvard system, numeric system)
- Critical, analytical thinking and writing

LEARNING AND TEACHING STRATEGY

Students are required to critically analyse journal papers and produce a project proposal based on a self-selected topic. This module, therefore, requires that students demonstrate a high level of self-direction and initiative, and take responsibility for the direction of their own learning. This is reflected in the teaching and learning strategy implemented. Lectures will be used to introduce conceptual, theoretical issues and key ideas and will allow students to engage in discussion on the application of the theoretical concepts to practical situations. For the exploration of these topics and their application to practical, pathway-specific situations and case studies, tutorials are the most appropriate strategy. During tutorials a flexible, student-led approach will be taken; students will discuss and develop individual project ideas, and will be given the opportunity to consult with topic specialists amongst the teaching team.

The allocation of teaching to deliver the module is:

Activity type	Hours	Percentage
Scheduled learning	30	30%
Independent learning	70	70%
Placement learning	0	
TOTAL	100	100%

ASSESSMENT

Assessment Component 1 – Coursework - 20%

Write a 400-word gobbet based upon one of several published papers relevant to their degree line.

Exemplar:

Reference text: Turing, Alan (1936). On Computable Numbers, with an Application to the Entscheidungsproblem. Proceedings of the London Mathematical Society 42:230-265.

Write a 400-word critique of the paper provided. This should cover the following factors:

- Context (20%) – What is the context of the paper? Are the authors big names in their field (or did they go on to become such)? What else was going on in the field at the time?
- Analysis (60%) – What are the key developments that this paper is describing? How important is this nowadays? What did it lead to? How does it differ from the other
- Evaluation (20%) – How important was the development reported in the paper? How long did it take to have an effect upon the field?

DON'Ts and DOs for Students

DON'Ts

- DON'T write an essay about the subject the paper relates to. If you are given a paper by Alan Turing then don't write an essay about who Turing was, but instead discuss the contents of the paper, their context and their impact
- DON'T just paraphrase what is already in the piece. You need to evaluate that information as well.
- DON'T get carried away writing a short biography of the author: only include information of the author that is relevant to assessing the value of this particular paper.
- DON'T write an introduction and conclusion like with an essay.

DOs

- DO include cross-references to any other primary sources, written or otherwise, that you are aware of that contrast or corroborate with what is said in this paper.
- DO include a bibliography showing everything you have read in preparing your critique, even if it is not specifically cited. The references and bibliography do NOT count towards the word count.
- DO be PRECISE, CONCISE and STRICT about only sticking to relevant information: you've only got 400 words. The use of bullet points is acceptable.

Assessment Component 2 – Coursework - 80%

2000-word report. Students are required to write a project proposal for the major project that they will complete in their third year.

Exemplar:

Identify an area of study, relevant to your degree pathway, in which you would like to conduct your own research for your B.Sc. final year research dissertation or project.

Produce a project proposal in which you introduce and justify your chosen research. The document should contain the following sections:

1. INTRODUCTION / BACKGROUND TO THE PROPOSED RESEARCH

- Give your research a working title.
- Describe clearly the background to the subject area of study. This should involve a short critical review of the literature pertaining to your research topic (diverse sources such as academic, governmental and industrial literature). Ensure that all literature sources identified are referenced correctly (use the numeric system of referencing, and append a reference list and, where appropriate, a bibliography).
- Provide the reader with an understanding of the field in which your study lies and an idea of where and how your study fits into this field. In other words, you must justify a rationale for the study, based on the literature review. Why is the research worth doing? Is it topical, interesting, controversial, applied in a new context, etc? Have there been similar studies? Is there a gap?
- If relevant, introduce the industry/organisation/context that is being investigated.
- Define one overarching aim of the study (the research purpose). Construct a series of objectives that specify what you will do to achieve the aim (typically 3 or 4 objectives). The objectives represent major components that direct your activity, i.e. to breakdown the study into identifiable sub-tasks. Ensure that they are SMARTly phrased, incorporating higher order verbs (to analyse..., to evaluate..., to design and develop... etc.).
- What are your expected outcomes/deliverables? What will you submit at the end of the study? A set of recommendations based on synthesis of primary and secondary research? Models and algorithms developed to address specific problems? Web design guidelines?

2. RESEARCH & DEVELOPMENT METHODS

- Where relevant, identify and *justify* the research methods that you will use to gather your data and/or evaluate your results. This *may* include:
 - Research philosophy and approach (positivism or phenomenology? Induction or deduction?)
 - Research strategy (experiment, case study, survey, etc.)
 - The study population and sample (who are they, do you have access?)
 - Data collection methods for each objective (interview, questionnaire, observation, document review, etc.).
 - Reliability and validity

- If relevant, identify and *justify* any development methods and techniques that you will use as part of systems development (e.g. lifecycle models, AGILE approach, prototyping, UML, storyboards, etc.).
- Identify risks/limitations/ethical/legal issues and ways that you might deal with those risks.
- How will you analyse the data/evaluate your results? (e.g. SPSS, content analysis, compare with user requirements and aims and objectives, software tests, user tests, benchmarks, etc.) What statistical techniques do you plan to use?

3. RESOURCES & PLANNING

- Identify any **resources** required (computer systems, application packages and programming languages to be used, access to journals or people).
- Construct a Gantt chart that demonstrates evidence of project planning and management. Identify the timescales for each component of the study. Make sure that your Gantt chart suitably represents the research and development models you have chosen to use.

Assessment Summary

Activity type	Percentage
Written	0%
Coursework	100%
Practical	0%
TOTAL	100%

BIBLIOGRAPHY

Essential

Marder, M. (2011) *Research Methods for Science*, Cambridge University Press: Cambridge.

Weaver, P. (2004) *Success in Your Project: a Guide to Student System Development Projects*, Prentice Hall: Harlow

Background

Avison, D. and Fitzgerald, G. (2007) 4th Edition, *Information Systems Development: Methodologies, Techniques and Tools*, McGraw-Hill: Maidenhead.

Baase, S. (2008) 3rd Edition *A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet*: International Edition, Pearson: NY

Collis, J. and Hussey, R. (2009) 3rd Edition, *Business Research: a Practical Guide for Undergraduate and Postgraduate Students*, Palgrave Macmillan: Basingstoke

Klein, G. and Dabney, A. (2013) *The Cartoon Guide To Statistics*, Hill and Wang: NY.

Quinn, M. J. (2009) 3rd Edition, *Ethics for the Information Age: International Edition*, Pearson: NY

Yin, R K. (2008) 4th Edition, *Case Study Research: Design and Methods*, Sage: Beverly Hills.

Websites

<http://www.acm.org>

<http://www.ieee.org>

<http://www.bcs.org>

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