Research Methods in Computing (COMP09092)

Lecture 1

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Module Aims

- Provide necessary **skills and knowledge** to plan and undertake a substantial computing-related research project
- Examine the skills and knowledge necessary in order to **specify and design an appropriate research study**, as well as **justify choice of suitable research methods**
- Provide firm foundation for students going on to **Hons Year level for the Hons Project**
- As well as being **relevant to research and investigation activities commonly undertaken within many organisations** (for those not going on to Hons Year)

Module Aims

Students will be introduced to:

- **Evaluating secondary resources** in undertaking an appropriate **literature or technical review**;
- different **research methods** used for undertaking research in computing related areas;
- specific **research tools and techniques** commonly used when undertaking research in computing related areas;
- **writing a research proposal** and recognising the importance of addressing key issues relating to **research ethics**

Assessments

- **Coursework** (investigative/research based report) worth 100%
- Choose a **suitable research area** relevant to your programme (with the agreement of your tutor)
- Identify relevant **aims and objectives** for the research area and produce a **literature or technical review** for that area
- As well as consideration of **relevant research (or design / development) approaches / techniques** for the research area you have identified

Assessments

- **There is no Examination**
- **Submission date** – Friday 17th March 2017)
- All submissions must be uploaded to **Turnitin** (details to follow)

What Constitutes Research?

- Something important relating to your subject area that raises **issues, questions, doubts or choices** requiring further investigation
- The topic should have **significance and importance to other people** (not meaningless and trivial)
- The topic should be approached in a **'scholarly' fashion –** concerned with **methodology**, i.e. how you are doing the research to ensure **rigour and robustness** of the work

What Constitutes Research?

- Need to **communicate the research work** and findings in an appropriate manner
- Need to provide **evidence to support points** to convince the reader of your work
- Style of writing needs to be **measured and academic** rather than informal ‘chat with a mate’ or sensational tabloid newspaper style

Why do Research?

- If organisations are to be successful and survive then they need to **evolve**, **continue to develop** and **move forward**
- They need to keep **up-to-date** with the latest concepts, thinking, strategies, technologies and practices
- They may be viewed as **innovators** in driving an area forward or they maybe **followers** trying to keep up with latest trends and thinking
- This is all driven by **research** – whether it be within an industry or academic context

Why do Research?

- All organisations need to be thinking about how to do things **quicker, easier, better, cheaper, more cost effectively, more efficiently, more innovatively** etc
- If they don't then chances are they will not survive for very long
- The world is moving at a rapid pace – people and organisations need to **keep up and even stay ahead**

Why do Research?

- In order to be successful in your future careers – you need to be doing **research** of some sort whether that be of a **formal** or **informal nature**

- Some of the technologies and platforms you are learning about now in your degrees may soon be out-of-date

- There may well be lots of new technologies and innovations coming along after you have graduated

Why do Research?

- You need to keep up with developments and **know how to research** into latest developments

- How are the latest innovations and developments relevant both to **you and the companies** you may work for in the future?

Why do Research?

- IT industry ecosystem evolving rapidly
- Time from **conception to market** cut from years to months
- Companies must **remain agile and respond quickly to market changes** driven by new technologies
- **Continuous consumer demand** for new and exciting products

What Constitutes Research?

Good academic research is characterised by:

- Sufficient data sources
- Appropriate data sources
- Accurately recorded
- No hidden assumptions
- Conclusions well-founded
- Properly presented

What Constitutes Research?

Reasons for doing research can include:

- Add to the body of knowledge
- To solve a problem
- To find out what happens
- To find evidence to inform practice
- To develop a greater understanding of an area
- To test or disprove a theory
- To come up with a better way
- To understand another person’s point or view

Ethical Approval

- Any research that involves working in **sensitive areas** requires a detailed form to be completed and the proposed study to be put forward for consideration by the University's Ethics Committee

- Nearly all companies now have **strict ethical approval guidelines and processes**

- Whether you are conducting research with an academic or industrial organisation it is vital that you are **aware of an organisation's ethical procedures**

Ethical Approval

Issues that need to be considered include:

- Are the participants and subjects from any vulnerable group or (e.g. NHS patients, children)?
- Are the participants and subjects of the study in any way unable to give free and informed consent within the meaning of the Mental Capacity Act 2005 to the best of your knowledge?
- Are you asking questions that are likely to be considered impertinent or to cause distress to any of the participants?
- Are any of the subjects in a special relationship with the applicant (e.g. family members)?
- Does your project pose any risk to either yourself or the participant?

Ethical Approval

Research that may fall into the category of ethically sensitive can include:

- Working with children, schools, vulnerable or at risk adults or groups
- Work involving access to personal records or data protection issues
- Work involving content and issues that might be likely to cause offence

Ethical Approval

It is vital that:

- Participants will be/have been advised **that they may withdraw at any stage** if they so wish

- Issues of **confidentiality** and arrangements for the storage and security of material during and after the project and for the disposal of material have been considered

- Issues of confidentiality have been considered in relation to the writing up of results e.g. **anonymising participant and company names if necessary**

- Arrangements for providing subjects with research results if they wish to have them have been considered

Choosing a Research Topic

When choosing a research topic you need to consider a variety of factors:

- The extent to which the topic is **relevant to your programme**
- The extent to which the **topic attracts your interest**
- The **availability of materials and equipment**
- If anything is **happening in that topic area**
- The access you have to **organisations and people** from whom you would need to gather data

Choosing a Research Topic

- The **techniques and skills** you will have to master
- The extent to which the topic might be of **interest to others**
- Your understanding of the **concepts and theoretical approaches** available to support such work
- Any **ethical considerations** that might make the topic inappropriate

Choosing a Research Topic

In terms of what type of research project you might identify:

- **Computer Games Development**, **Computer Games Technology**, **Web & Mobile Development** students much choose projects areas that are of a developmental nature – involve the development of some kind of prototype (e.g. game, app etc)
- **Computing Science** and **Computer Networking** students must choose a project areas with a significant technical component to it
- **Business Technology** and **Information Technology** students can choose a project area involving investigative research and/or an area with a technical component or development of a prototype

Choosing a Research Topic

See the handout with examples of possible research topics

Make sure your chosen topic is appropriate to your programme – your tutor will be able to advise you

Choosing a Research Topic

- For the Research Methods in Computing module **you don't actually develop the prototype or undertake the primary research**

- You produce the '**lead up' work**, i.e.
  - **Literature/technical review** of the area
  - Coverage of relevant **research** and/or **design/development** approaches deemed relevant to the area

Choosing a Research Topic

- Developing a prototype – game, app etc is still research – but the actual prototype itself is a **means to an end** and not an end in itself
- Think about what the underlying **concepts**, **issues, 'theories'** or **thinking** are that you will be investigating through the development of the prototype
- If your prototype is to help better understand 'X' – then think about what 'X' is and why it is important – look for evidence in the literature to support this

Choosing a Research Topic

- The research idea will **probably build on previous work** that has been documented in the literature or is important to your area
- Good project ideas can **build upon and relate to earlier documented work**
- Your contribution **isn’t necessarily going to be unique** but will offer insight and a better understanding of some aspect of the area
- You are not trying to change the world of invent something completely new

Choosing a Research Topic

- It might provide an **example of some concept or idea in action**
- Or **developing and evaluating a prototype or simulation around certain concepts/theories**

Choosing a Research Topic

- Think of a **working title** (something to get the ball rolling)
- Main **theme** (a description of the general area)
- Possible **research questions/issues** that might need to be explored
- Outline **argument or position** (what is the case for doing this work)
- **Justification of interest** to others

Choosing a Research Topic

- Links to **other modules** on your programme
- **5 key words or phrases** for use in a online search
- See the list of example project ideas

References

Cornford, T. and Smithson, S. (2006) Project Research in Information Systems: A Student's Guide. Basingstoke: Palgrave Macmillan

Oates, B.J. (2012) Researching Information Systems and Computing. London: Sage