PhD Supervision: Concept Mapping Understanding Across Disciplines

Dr. Camille B. Kandiko, Dr. Ian M. Kinchin & Dr. David B. Hay

Postgraduate Supervision Conference 2009
Research and Practice

27 - 30 April 2009, Stellenbosch, South Africa
Outline of presentation

• Background and framework
• Research questions
• Current findings of three sets of student-supervisor maps in hard science (A, B, C)
• Current findings of two sets of student-supervisor maps in humanities (D, E)
• Conclusions
Overview of the study

This project uses concept mapping and interview techniques to track changes in knowledge and understanding among students and their supervisors in various disciplines in the course of full-time research towards a PhD.

This on-going work measures both cognitive change in the specific subjects that are the topic for research and in the understanding of the process of PhD level research and supervision.
Background

- PhD is gateway qualification
- Evidence of original and innovative contributions to knowledge
- Economic significance
- High drop-out rates a concern for universities and governments
Background

- General neglect for the support and development of research skills (Roberts Report, HM Treasury, 2002)
- Lack of a research-led pedagogy for dissertation supervision
- Importance of change and the support for change in the course of research (Salmon, 1992)
- Questioning efficacy of university-wide policies for PhD supervision
Framework of the study

- Concept mapping
  - Tool for identifying knowledge and understanding
- Use concept mapping in the development of university teaching practice
- Measuring the quality of cognitive change through mapping
- Use concept mapping to track cognitive change in time
- Use concept mapping to describe processes of supervision and learning
- Study maps in various disciplines and fields of study
Concept mapping to identify knowledge and understanding

Three basic knowledge structures
• Chain ~ Rote learning
• Spoke ~ The emergence of ‘learning readiness’
• Network ~ Expertise (Hay & Kinchin, 2006)
Research questions

• Ask students and supervisors (separately) to create maps of the two following areas:
  • Topic – looking at the academic area under investigation within the PhD
  • Process – looking at the conceptions held of the research process and of the PhD as an entity
Cognitive change

- Measuring change of knowledge and understanding over time (Hay, 2007)
Supervisor Map A

Foundation

Endothelial Dysfunction

Cellular Emphasis

Focus

Preeclampsia Vascular Dysfunction

FOCUS

Normal pregnancy

Raising calcium (2 min action)

Activating kinases (2 min action)

Enzymatic peNOS
(2-5 min)
(Western blotting)
(8A)

Products (NO) (30 sec to 15 min)
(qRT-PCR)
(learning)

Sources of reactive O species
(5-30 min)
(lucigenin)
(learning)

Mitochondria
(mitoSOX)
(cytochrome culture) (8B)

Effects of different O₂ levels
(glove technique)
(8C)

Protein levels
(8-24 hours)
(Western blotting) (8A)

mRNA levels
(2-6 hours)
(qRT-PCR) (learning)

4A

Pre-term pregnancy

compare

4

looking at

4B

Raising calcium

looking at

Cell culture

Factors

Isolated and cultured

To introduce

5

Cord

looking at

to ‘rescue’ dysfunctional

6

Foetal endothelial cells

7

eNOS ‘NO’

by

measure by

by

can influence

8

Can influence

Effects of different O₂ levels
(8C)

Trained others (8D)

Translational Research
(clinical end point)

Possible
Student Map A

- HUVEC (foetal)
  - Normal
  - Preeclampsia
    - looking at eNOS Regulation (acute)
      - NO Production
      - Cofactors/Substrates: L-arginine transport, BH4, DDAH, ADMA
      - Regulatory Proteins: HSP90 (done), Kinases: Akt, ERK1/2 (working on)
      - Interactions between NO (done) and ROS (mitoSOX) (working on)

- How influence of
Current Findings A

• In topic maps (A), student and supervisor differ on scope of PhD
  • Supervisor sees lab studies as way to answer larger questions
  • Student focuses on lab techniques and methodologies
Supervisor Map B

This relationship is central (B1)

Supervisor working with PhD Student towards Thesis

B2
- Literature

B3
- “Transferable skills”

B4
- Monitoring/Checking

A1
- Competent

A2
- Academically qualified

A3
- Enthusiasm

A4
- Communication skills

C1
- Teamwork

C2
- Teaching

D1
- ‘Final’

D2
- Publications

D3
- Career advice

3-3.5 years

www.kcl.ac.uk
Student Map B

Supervisor
- To give direction (initially)
- Integrate projects and research interests
- Act as mentor, and assess strengths and weaknesses (of student)
- Provide group with “bigger picture”
- Feedback on progress

What a PhD is?
- Independent project integrated into the research group I am in. To enable my development as an independent research scientist
- Assess strengths and weaknesses (of student)
- Two-way

ME (Student)
- To give direction (eventually)
- Setting up methods/ knowing how to put together good experiments
- Teaching others
- Understanding the literature
- Independent thinking
- Transferable skills- for what I do next
- Learning how to

Since 9 month upgrade:
- Balancing workload
- Assess strengths and weaknesses
- More focused
- Learn to write for audience
- Give more structured time to plan PhD
- Schedule time to work with supervisor
Current Findings B

• Supervisor
  • focuses on relationship between student and supervisor with a focus on the end goal (thesis)
  • highlights characteristics of student

• Student
  • notes actions for both self and supervisor
  • mentions dynamic nature of the student-supervisor relationship
Current Findings C

- The supervisor map (C) concentrates on acts of doing and being, whereas the student map (C) focuses on learning and acquiring traits and characteristics

  - The supervisor’s map details the scientific process of discovery (through hypothesis testing)

  - The student’s map centres on publishing, the eventual outcome, but does not indicate the exact path to get there
Conclusions: Hard Science

• Pair A: Differentiation of scope between student and supervisor

• Pair B:
  • Supervisor sees a) characteristics, b) relationship, c) actions, d) output
  • Student highlights a dynamic process

• Pair C: Process versus outcomes
Supervisor Map D

Method

1. Early modern texts in a new context
   - not just the author
   - not just in relation to other authors
   - not just text

In relation to X stationers’ outputs (How fit into Wise’s overall output)

   Analyse output and archival evidence
   - Stationers’ personal qualities
   - Political and religious orientations
   -(context)

Survey of this area

Shakespeare’s Stationers

Extent of relationship/collaboration

Stationers working with Early Modern drama (manuscript to print)

Stationers working with Early Modern literary texts (manuscript to print)

Stationers working with Early Modern non-literary materials

Time frame: 1590-1640 (possibly up to 1709)

Drama

- Ben Jonson/Stansby
- Thomas Heywood/Okes

Poetry

- Daniel/Waterson

Sermons, pamphlets

Method

1. Early modern texts in a new context
   - not just the author
   - not just in relation to other authors
   - not just text

In relation to X stationers’ outputs (How fit into Wise’s overall output)

   Analyse output and archival evidence
   - Stationers’ personal qualities
   - Political and religious orientations
   -(context)
Relationship between Stationers and Authors (1570s to 1640s)
Writing and Publication: Agents of Authority

How do these relationships (author-stationer pairs) explain the production of texts, type, form…

Will provide context of time period
Will provide context as well as specifically to Shakespeare and early modern drama

Methods include
- literary
- historical
- archival
- bibliographical

Drama

Johnson
- W. Stansby
- W. Burre
Current Findings D

- Supervisor sees traditional scientific process at work
- Student focusing on broadening the main question
- Supervisor already has narrowed the question; student still quite broad in approach
Supervisor Map E

- Topic (from initial proposal)
  - Topic 1 (renegotiated with supervisor)
    - Literature from the field (justifies topic of choice)
  - Methodology and primary evidence
    - Planning of project
    - Overall structure and aims and objectives
- First draft
  - Upgrade
- Supervision
  - More drafts
  - Writing up
  - Presentation

 cycle
What is a PhD?

- Original stuff (research)
- Show knowledge of foundations in the field
- Ability to assess and judge own work
- Learn to research effectively
- Organise

Need PhD to get desired job

- Move beyond being graded
- Need to work with less feedback

- Time
  - Details of work
  - Expectations
Current Findings E

• Similar to Maps A-C, supervisor focuses on the process and the student on the outcomes
• Student indicated only having ‘knowledge of which she had been told’ as to the path through the PhD
• Role and frequency of supervision in humanities differs from that in hard science, particularly lab-based settings
Conclusions: Supervision

• This unique approach to assessing PhD supervision may allow for analysis of the role of ‘expert’ and ‘novice’ status in cognitive change
  • Role of expert and novice may change
• Act of mapping appears to surface underlying thoughts about PhD process and supervision
• Mapping and interview techniques surface the highly unique and personal nature of the student-supervisor relationship
• On-going studies in biological health sciences, dentistry, psychiatry, English, and physics
Conclusions: Policies

• Nature of PhD supervision should determine policy

  • Students and supervisors meet daily/weekly in lab groups in many hard sciences
  • In humanities, regular meetings may only be scheduled every 6 months or so; more frequent interactions may be accidental or circumstantial
Conclusions

• Nature and purpose of PhD may differ across disciplines
• Institutional procedures for PhD supervision may hinder or retard student-supervisor relationship if incorrectly applied
• Institution-broad policies may not be the most effective for the end goals
References


Questions?

Contact information:
Camille B. Kandiko
King’s Learning Institute
King’s College London, UK
camille.kandiko@kcl.ac.uk

Thank you!