MEASURING LEARNING EFFECTIVENESS

A METHODOLOGY FOR EVALUATING LEARNING

PEN LISTER MSC MA MBCS FHEA

Background: Ph.D. thesis

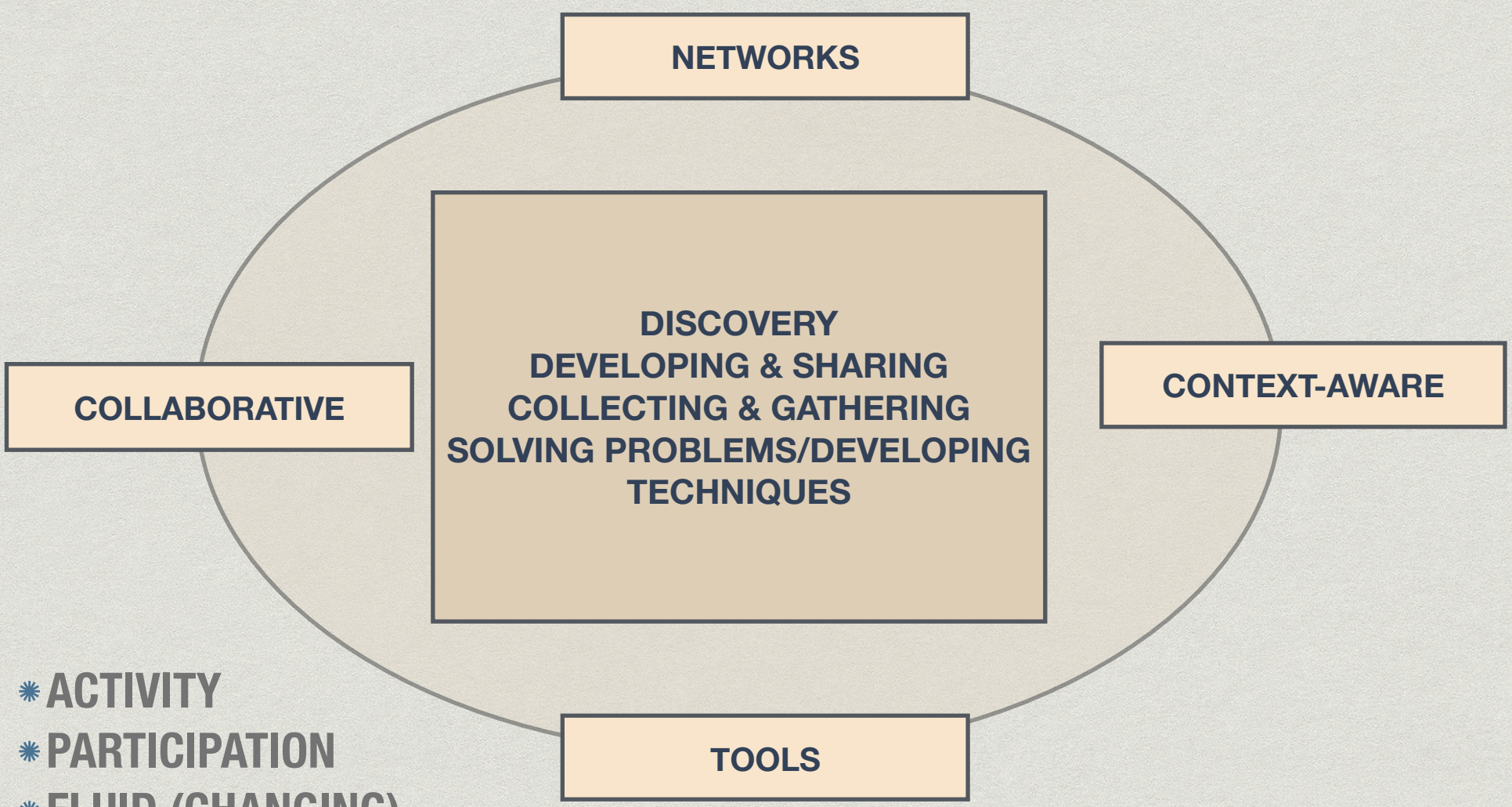
PROVISIONAL TITLE: "DESIGNING EFFECTIVE SMART CITY LEARNING"

- Formulating a pedagogy for ***effective smart city learning***
  - Technology supported learning
    - Location-based
    - Networked
    - Mobile
    - Community

Challenges

- Different kinds of learners
- Different learning approaches
- Different learning contexts
  - *technology impact*
  - *location impact*
  - *network(s) impact*

‘Smart city’ learning activities



- ACTIVITY
- PARTICIPATION
- FLUID (CHANGING)
- HYBRID (MIXED)

CONTEXT-AWARE, CONNECTIVIST INSPIRED LEARNING ACTIVITIES (DEVELOPED FROM BEETHAM & SHARPE, 2012:41).

Learning interactions in activities

- ***Comments:*** Community discussions and sharing
- ***Content:*** images, video or audio uploads
- ***Digital tools:*** human computer interaction

'Digital learning residue'

Measuring learning

- ***Effectiveness***
  - Factors for evaluation (value criteria)
- ***Methodology***
  - Methods for measuring (metrics criteria)

Methodology: *Phenomenography*

- ***Phenomenography***: measuring learning *experiences : a second order perspective*
- Variation of learning approaches for surface and deep learning
- The experience ***of*** learning (the content) and ***for*** learning (the process)

Phenomenography

To differentiate between two types of (research) question about learning:

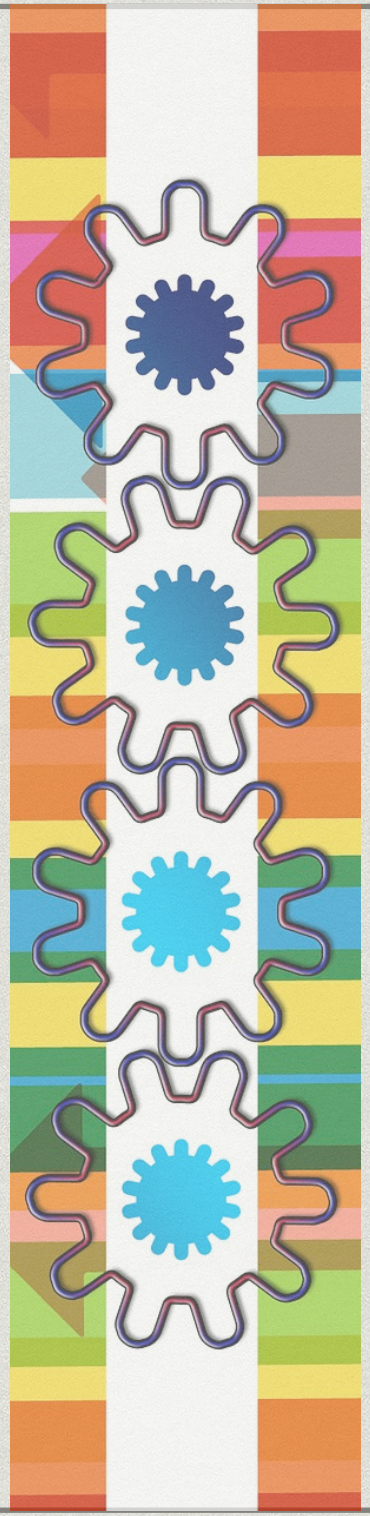
1. "Why do some children succeed better than others in school?"
2. "What do people think about why some children succeed better than others in school?"

"Phenomenography is focused on the ways of experiencing different phenomena, ways of seeing them, knowing about them [….] The aim is, however, not to find the singular essence, but the variation and the architecture of this variation […] that define the phenomena"
(Marton & Booth, 1997:117)

"…ways of formulating questions represent two different perspectives. In the first […] we orient ourselves towards the world and make statements about it. In the second perspective we orient ourselves towards people's ideas about the world […] and we make statements about people's ideas about the world (or about their experience of it)."***(Marton, 1981:2)***

Methods & approach

- Interviews - *'the learner transcripts'*
  - Discussing and reviewing the actions, choices and digital learning 'residue' with each learner
- Digital content - *'the viewed content'*
  - Analysing all learner digital residues *independent* of the learners



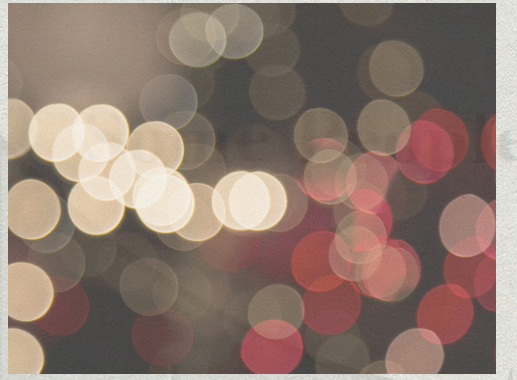
Variations of experience

AREAS OF FOCUS (VALUE CRITERIA):

- Knowledge Construction
- Identity & Role
- Digital & Information Literacy
- Overall Engagement

Categories of variation

- Inductive and iterative process of analysis
  - Ways of experiencing an area of focus
  - Deep and surface learning *(a natural hierarchy)*
- Metrics to ‘measure’ experience
  - Blooms or SOLO taxonomy to allocate ‘marks’ to each category (O’Riordan et al, 2016)



Outcome Space Analysis

Knowledge Construction, looking for:

CONTENT

- Organisation
- Interpretation
- Argument
- Viewpoint
- Arrangement
- Use of evidence

MARTON & BOOTH

COMMENTS

- Meaning Making
- Concept sharing
- Dialogic space expansion

WEGERIF

OUTCOME SPACE: KNOWLEDGE CONSTRUCTION (DIALOGIC SPACE EXPANSION)	
VARIATION CATEGORY 1	
KNOWLEDGE CONTRIBUTIONS AND EXPLANATIONS, FURTHER SOURCES, DEEPER APPROACH, MORE COMPLEX QUESTIONS	6 LEARNERS IN THIS CATEGORY
VARIATION CATEGORY 2	
FURTHER DETAIL AND SOME COMPLEXITY TO QUESTIONS OR ANSWERS EVIDENT, DEEPER ENGAGEMENT AND APPROACH	7 LEARNERS IN THIS CATEGORY
VARIATION CATEGORY 3	
SEVERAL FACTS STATED, REPEATED, LOW EVIDENCE FOR DEEPER UNDERSTANDING	4 LEARNERS IN THIS CATEGORY
VARIATION CATEGORY 4	
NOT MANY FACTS STATED, VAGUE REFERENCE TO TOPIC, SURFACE APPROACH	2 LEARNERS IN THIS CATEGORY
VARIATION CATEGORY 5	
CONFUSION, LOW ENGAGEMENT, IRRELEVANT STATEMENTS	1 LEARNER IN THIS CATEGORY

Deep & Surface Learning

For a single activity, overall results might end up with a table like this:

Variation categories	VIEWED CONTENT		LEARNER TRANSCRIPTS		
	INTERACTIONS ANALYTICS: *Statistics*	LEARNER GENERATED CONTENT: *KC; Id; D&I L; OE*	ACTIVITY: *KC; Id; D&I L; OE*	LEARNER GENERATED CONTENT: *KC; Id; D&I L; OE*	HCI: *Heuristics*
V1	Deep interaction level for interfaces and functionality	Deep learning KC; Id; D&I L; OE highest scores *OVERALL*	Deep learning KC; Id; D&I L; OE highest scores *OVERALL*	Deep learning KC; Id; D&I L; OE highest scores *OVERALL*	Highest Effic.; Effect.; Satis. Values
V2	↕	↕	↕	↕	↕
V3	↕	↕	↕	↕	↕
V4	↕	↕	↕	↕	↕
V5	Surface interaction level for interfaces and functionality	Surface learning KC; Id; D&I L; OE lowest scores *OVERALL*	Surface learning KC; Id; D&I L; OE lowest scores *OVERALL*	Surface learning KC; Id; D&I L; OE lowest scores *OVERALL*	Lowest Effic.; Effect.; Satis. Values

KC = Knowledge Construction **D&IL = Digital & Information Literacy**
Id = Identity and role **OE = Overall Engagement**

An effective pedagogy

A FRAMEWORK THAT SHOWS:

- The level of effectiveness for types of learning activity
- The relationship between pedagogical factors and learning activities
- The theoretical underpinning of activities through their relationship to pedagogical factors

- Aveling, E., Gillespie, A., & Cornish, F. (2014). 'A qualitative method for analysing multivoicedness', Qualitative Research 1-18, 2014. Available from: Sage Publications DOI: 10.1177/1468794114557991 [3 March 2016]
- Beetham, H., & Sharpe, R. (2012). Rethinking Pedagogy for a Digital Age: Designing for 21st Century Learning (2nd Ed). Routledge. Taylor & Francis. New York and London.
- Mamaghani, N, Mostowfi, S & Khorram, M, 2015, 'Using DAST-C and Phenomenography as a Tool for Evaluating Children's Experience', American Journal of Educational Research, Vol. 3, No. 11, 2015, pp 1337-1345
- Marton, F. (1981). Phenomenography - Describing Conceptions of the World Around Us. Instructional Science 10 (1981) 177-200 Elsevier
- Marton, F., & Booth, S. (1997). Learning and Awareness. Mahwah, NJ: Lawrence Erlbaum Associates
- O'Riordan, T., Millard, D.E. & Schulz, J. (2016). How should we measure online learning activity?. Research in Learning Technology, Vol. 24, 2016
- Wegerif, R., & Yang, Y. (2011). 'Technology and Dialogic Space: Lessons from History and from the 'Argunaut' and 'Metafora' Projects', 9th International Computer-Supported Collaborative Learning Conference July 4-8, 2011, Hong Kong, China, Vol 2, Short Papers & Posters, p312. Available from: https://www.isls.org/conferences/cscl [3 October 2016]

BIBLIOGRAPHY: "MEASURING LEARNING EFFECTIVENESS"

PEN LISTER. MSC MA MBCS FHEA.