

Hermeneutic phenomenology in computing education research:

UKICER 2021 Workshop
Friday 3rd September 2021

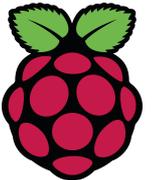
This presentation
includes the slides
used in the
workshop and a
summary of the
feedback from the
12 participants

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Research at the Raspberry Pi Foundation

- Part of the newly formed [Raspberry Pi Computing Education Research Centre, University of Cambridge](https://www.raspberrypi.org/research) - joint initiative
- Our work seeks to increase understanding of what works in teaching and learning computing
- In particular, we focus on young people who come from backgrounds that are traditionally underrepresented in the field of computing or who experience educational disadvantage.
- Find out more at:
 - <http://raspberrypi.org/research>
 - <http://computingeducationresearch.org>



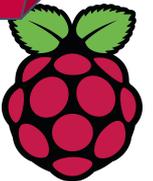
Overview of session

- A: What is hermeneutic phenomenology
- B: Designing a study
- C. Examples from computing education
- D. Wrap up

For each part we will break into small groups for discussion after a short presentation

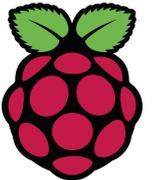
Aims

- (i) to give you an initial introduction to hermeneutic phenomenology as one approach to qualitative research
- (ii) to support you in reviewing papers using this methodology



What is hermeneutic phenomenology?

herm-in-new-tick fin-om-in-knowledge-i



Framing

The physical nature of being human; observing natural similarities and differences between people

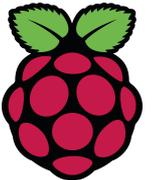


The meaning of being human, informed by temporality (time), culture and personal history (experience)

Reality is factual, measurable and can be proven

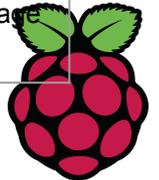


Reality of being is a unique individual perception that cannot be measured or grown



Framing

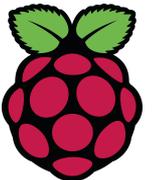
Paradigm	POSITIVIST Scientific; quantitative	MIXED METHODS RESEARCH Quantitative and qualitative	POST-POSITIVIST RESEARCH Naturalistic; qualitative
Methodology	Randomised controlled trials Systematic reviews Cohort studies Intervention study	Interpretative phenomenological analysis Grounded theory Discourse analysis Ethnography	Social constructivism Feminist research Critical social theory Descriptive phenomenology Hermeneutic phenomenology
Methods	Sampling: random, cluster Data collection: physiological measurement, biological substance samples, surveys, structured interviews Data analysis: inferential statistical analysis	As for positivistic research for quantitative components, plus: Sampling: purposive, convenience, theoretical Data collection: surveys, focus groups, semi-structured interviews Data analysis: textual/narrative language analysis	Sampling: purposive, convenience, maximum variation Data collection: focus groups, semi-structured interviews, unstructured interviews, image capture Data analysis: textual or image analysis



Approaches to qualitative research

From Kucartz (2014)

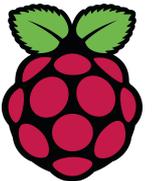
Analysis	Data	
	Qualitative	Quantitative
Qualitative	Interpretive text studies; hermeneutics; grounded theory	Search for and presentation of meaning in results of quantitative processing
Quantitative	Turning words into numbers. Classical content analysis, word counts, free lists, pile sorts etc.	Statistical and mathematical analysis of numerical data



The hermeneutic phenomenology philosophical tradition

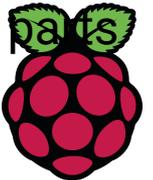
- Phenomenology introduced by Edmund Husserl (1859-1938) - discovering the essence of a phenomenon by bracketing or reductionism. Sometimes called descriptive phenomenology or just phenomenology.
- Martin Heidegger (1889-1976) later introduced interpretivism to phenomenology in the form of hermeneutic phenomenology. The focus is on an understanding of “being human in a situated contextual world” and the ‘lived experience’ of individuals. The researcher’s perspective is part of the understanding, not bracketed out.
- Gadamer (1900 to 2002) is another key theorist who developed the ideas introducing the idea of the “Other” and the way an individual will relate to them. Gadamer focuses on language and conversation as intertwined with understanding.

“In sum, the main objective of interpretive phenomenology is to uncover or disclose a phenomenon by pulling away layers of forgetfulness or hiddenness that are present in our everyday existence.” (Frechette, 2020)



Applying the philosophy to the methodology

- An interpretive approach to research - truth is uncovered in the disclosure and is not absolute
- A focus on “*being-in-the-world*” and what that means to individuals
- The methodology informs the whole research process not just the data analysis phase
- Data collection is usually through in-depth interviews accompanied by memos and journaling from the researcher
- The researcher is “*always-already*” - meaning the researcher has to understand their own pre-understanding of the context and acknowledge and use that in the research.
- Analysis involves a *hermeneutic circle* which means moving from the parts to the whole and back again.



Comparison with generic qualitative research

Table 1. Comparison of Interpretive Phenomenological Research and Generic Qualitative Research.

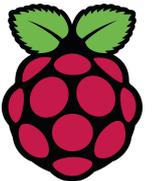
Research Process	Generic Qualitative Study	Interpretive Phenomenological Study
<i>Disciplinary roots</i>	<ul style="list-style-type: none"> • None in particular • Loosely inspired “from other qualitative traditions” 	<ul style="list-style-type: none"> • Interpretive phenomenology—philosophy
<i>Research paradigm</i>	<ul style="list-style-type: none"> • Constructivist 	<ul style="list-style-type: none"> • Constructivist • Unique understanding of <i>being</i>
<i>Researcher's stance</i>	<ul style="list-style-type: none"> • Reflexive • Naturalistic 	<ul style="list-style-type: none"> • Reflexive—of one's <i>horizons of significance</i> and <i>being-in-the-world</i> • Embodiment epistemology
<i>Objective and research question</i>	<ul style="list-style-type: none"> • Oriented toward action—practice and policy 	<ul style="list-style-type: none"> • Oriented toward understanding/uncovering lived experience of individuals in constant <i>being-with-others</i>
<i>Sampling and recruitment</i>	<ul style="list-style-type: none"> • Purposeful sampling—especially maximum variation • Average of 20 participants • Target information-rich cases 	<ul style="list-style-type: none"> • Purposeful sampling—especially maximum variation • Average of 10 participants • Target phenomenon-rich participants
<i>Data collection</i>	<ul style="list-style-type: none"> • Mainly interviews/focus groups • Can have focused observations and document review • Aims to describe who, what, and where 	<ul style="list-style-type: none"> • Primary source = interviews • Complemented by other <i>authentic</i> modes of data collection such as participant observation and art-based methods • Aims to uncover/disclose
<i>Data analysis</i>	<ul style="list-style-type: none"> • Often content and thematic analysis • Low inference—descriptive (data-near) 	<ul style="list-style-type: none"> • Hermeneutic analysis (hermeneutic circle with back-and-forth movement from part to the whole) • Interpretive
<i>References</i>	Polit and Beck (2009, 2012, p. 505) and Sandelowski (2000, 2010)	See references for each section

Frchette, J., Bitzas, V., Aubry, M., Kilpatrick, K., & Lavoie-Tremblay, M. (2020). Capturing Lived Experience: Methodological Considerations for Interpretive Phenomenological Inquiry. *International Journal of Qualitative Methods*, 19,

Activity 1 - 10 minutes

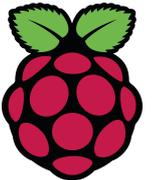
In small groups, using the table from the previous slide (in [this document](#)), discuss the following in small groups:

What might be the advantages or disadvantages to using this interpretative approach?



Feedback from participants

- Validity - is it representative, what about bias? Validity
- Concerned about the interview reliance of the method Validity
- CS relies on quantitative data CS resistance/ tendency/ research
- The phenomenological side of HP is admitting the bias and taking it into account Validity
- Different to ethnography - and not sure how this diversion occurred
- With quantitative - there is an outcome that can be implemented whereas with HP how is this implemented? Impact
- We can use it if we have a good background in the context Researcher expertise/knowledge
- May be useful for gender/ diversity as there is the lived experience of the researcher that can be brought in Research Context
- Because you are using a narrow or small group so it is not representative of the whole population - so may introduce bias (for example about gender and diversity) Validity
- Addressing the issue of validity is therefore really important when writing papers Validity
- Samples may not be representative in qualitative and quantitative Validity
- Interviews and observations can also be used in HP (videos, images etc)



Designing a hermeneutic phenomenology study

With examples from our paper:

Teachers' Perspectives on Talk in the Programming Classroom : Language as a Mediator

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ABSTRACT

Motivation. In education, classroom talk is a vital aspect of a lesson, and programming education is no exception. While the role of language and dialogue has been researched in depth in other school subjects, there has been less research in the programming context. Sociocultural theory highlights the importance of language as a mediator for learning, alongside other tools.

Objectives. Drawing on sociocultural theory and models of dialogic education, the purpose of the study was to investigate the ways in which programming teachers use classroom talk to support learning, and to propose a model to frame our understanding of this element of programming lessons.

Method. The qualitative study used phenomenological methodology to investigate and interpret teachers' lived experiences of classroom talk. Interviews were conducted with 20 primary and secondary computing teachers about the content and effect of classroom talk in programming lessons. The context of the study was FRDM, a lesson structure which highlights the importance of talk around a shared programming artefact.

Results. Analysis of data revealed four main themes: how talk occurs in the classroom setting, how questioning is used to facilitate talk, how students are encouraged to explain, and why teachers feel it is important for students to use correct vocabulary.

Discussion. Building on research into models of dialogue in education and our findings we suggest a model to frame talk in the programming classroom. We discuss the contribution of FRDM to our understanding of talk in programming lessons. More research is needed to validate the proposed model and to investigate the impact of classroom talk on learning outcomes in programming.

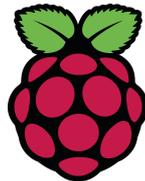
ACM Reference format:

Sue Sentance and Jane Waite. 2021. Teachers' Perspectives on Talk in the Programming Classroom : Language as a Mediator. In *Proceedings of the 2021 ACM Conference on International Computing Education Research (ICER 2021)*, August 4–10, 2021, Virtual Event, USA. ACM, New York, NY, USA, 15 pages. <https://doi.org/10.1145/344673.346750>

1 INTRODUCTION

Many countries are moving to a curriculum that includes more emphasis on algorithms and programming [24, 26, 30, 74], and this is reflected in an increase in programming education for ICT research. Research falls broadly into several camps, for example, tools and environments to support programming, instructional approaches, resource development, diversity, assessment and teacher education. There is little research, however, on specific aspects of programming lessons such as classroom talk, and how they can impact learning [74]. This contrasts with other disciplines, where classroom talk has been studied in more depth (see for example, [17, 43, 53, 54, 62]). In programming lessons, classroom talk will include: the dialogue that students have with each other and their teacher about their progress, the use of technical language, the types of questions teachers and students ask, and how concepts are explained and exemplified. In so much as these impact on students' progress in their acquisition of knowledge and skills, it is important that we understand the relative role of these elements of a lesson.

We owe much to sociocultural theory in enabling us to understand how language can support learning. Through the theoretical lens of the soviet psychologist Vygotsky, language can be seen as a central form of mediation that enables thinking and internalisation of concepts to take place [74]. As Jerome Bruner says of Vygotsky



Designing a hermeneutic study

Implications for each stage

Literature review

Research Question

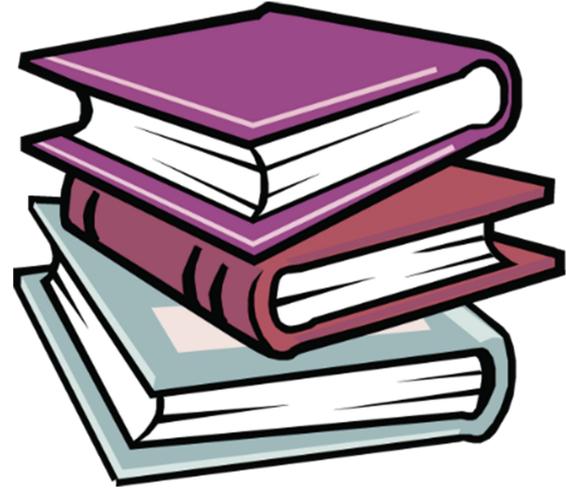
Sampling

Data collection

Validity and reliability

Data analysis

Writing up



Can use SPIDER for establishing the search:

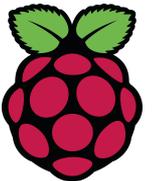
Sample

Phenomenon of Interest

Design

Evaluation

Research approach



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S: programming teachers in school

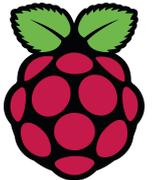
PI: classroom talk

D: interviews

E: lived experience

R: hermeneutic phenomenology

RQ: “*In what ways do teachers develop classroom talk to support the learning of programming?*”



Designing a hermeneutic study

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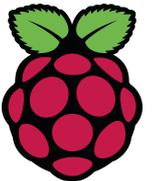
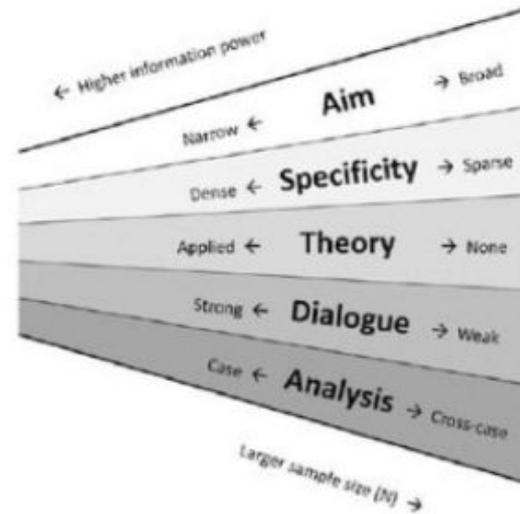
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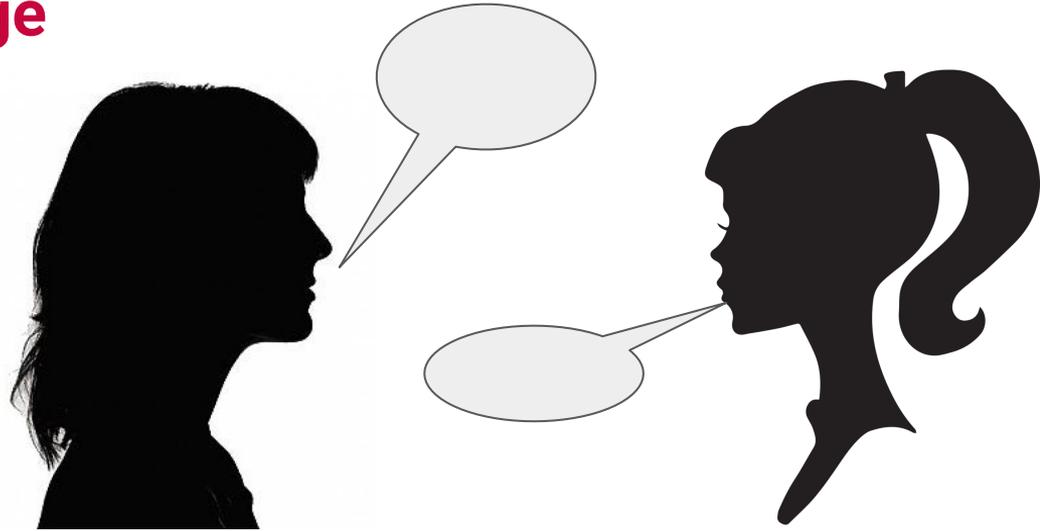
Sampling

Data collection

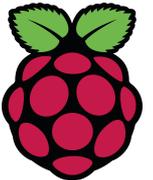
Validity and reliability

Data analysis

Writing up



Focus on “lived experience”
Open interviews
Dialogic



Designing a hermeneutic study

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Validity and reliability

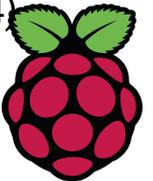
Data analysis

Writing up

Quantitative	Quantitative
Internal validity	Credibility
External validity	Transferability
Reliability	Dependability
Objectivity	Confirmability

From Guba and Lincoln (1985)

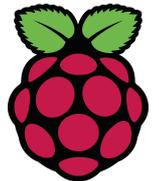
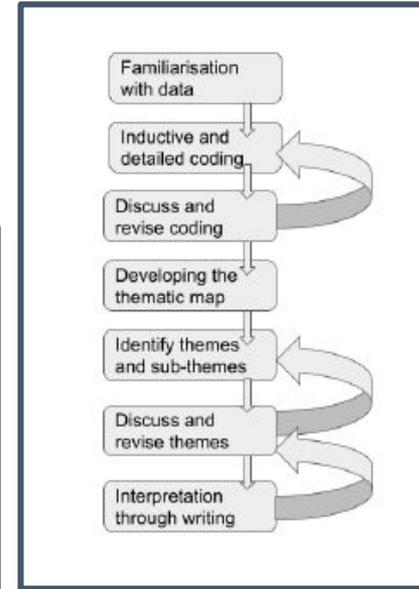
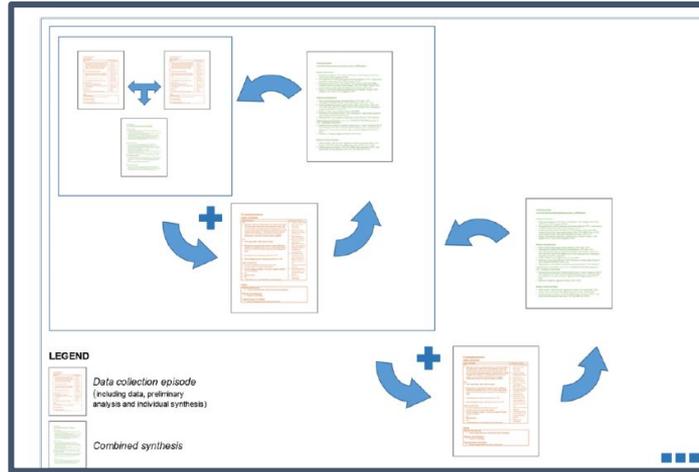
Nicely explicated in Shenton (2004)



Designing a hermeneutic study

Implications for each stage

Literature review
Research Question
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Data collection
Validity and reliability
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Writing up



Designing a hermeneutic study

Implications for each stage

Literature review

Research Question

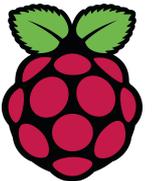
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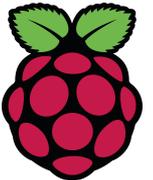
Writing up



Data analysis

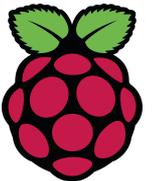
Table 7.1 Enacting interpretation that is nonlinear, circular thinking

- Uncovering preunderstanding in ongoing reflective ways regarding the phenomenon of study
 - Creating and maintaining a hermeneutic stance or attitude toward analysis that is open engagement in thinking and questioning
 - Enacting the interpretation in an iterative way:
 - beginning phase of examining first text
 - writing interpretive summaries and identifying emergent themes
 - continuing on with each transcript, distilling themes and coalescing similarities in common themes and shared practices
 - dwelling in the data
 - reading along with the philosophy to aid thinking and questioning
 - thinking/analysing in a hermeneutic circle, examining the parts and whole of each text, back and forth, with the philosophical underpinnings
 - using meditative thinking regarding stories, questioning and thinking to provide a bubbling up of the patterns and themes that interpret the experience
 - rendering of an interpretation or fusion of horizons (participant and researchers).
-



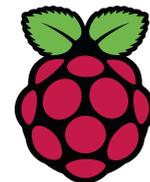
Activity 2 - 8 minutes

In small groups, choose one research study that somebody in the group has been involved in and consider how you might have tackled that using a hermeneutic phenomenological way.

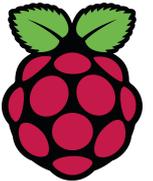


Feedback from participants

- Uncovering hidden meaning - work with focus groups (are they valid in HP?) FG gave people opportunity to reveal their understanding. So are FG ok for HP?
- Pair programming study observation, getting pair to watch it later and to reflect and talk about what was happening.
- Idea of getting participants to think more deeply - but is this HP?
- Warming to it. Interested to try it.
- May give deeper insights.
- Tend to think its about huge numbers.
- Moving to another level of understanding about our subject area.
-

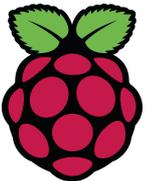


Examples in computing education research



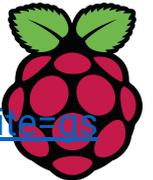
Some examples - studies

1. Arthur Sloan and Brian Bowe. 2015. Experiences of computer science curriculum design: A phenomenological study. *Interchange* 46, 2 (2015), 121–142.
<https://link.springer.com/article/10.1007%2Fs10780-015-9231-0>
2. Petra le Roux, Corné van Staden, and Kirstin Kraus. 2019. Phenomenology: Excavating Contextual Practices from Open Distance Learning Tutoring Experiences.
<https://dl.acm.org/doi/10.1145/3351108.3351112>
3. Christopher Frauenberger, Judith Good, and Wendy Keay-Bright. 2010. Phenomenology, a framework for participatory design. <https://doi.org/10.1145/1900441.1900474>
<https://dl.acm.org/doi/10.1145/1900441.1900474>
4. Sue Sentance and Jane Waite. 2021. Teachers' Perspectives on Talk in the Programming Classroom : Language as a Mediator. <https://doi.org/10.1145/3446871.3469751>



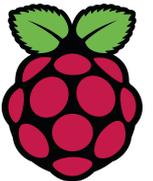
Some examples - PhD/ EdD

1. New horizons in maker education: A phenomenological study of teachers' lived experiences in secondary schools EdD thesis (Garside, in progress) <https://clairegarside.com/>
<https://sway.office.com/nKlpyXSmlLAyZ7fh?ref=email>
2. Leticia Batista. 2019. Exploring Educators' Perceptions of Computer Science Implementation in K-2: A Phenomenological Study. PhD Thesis Lamar University-Beaumont.
<https://www.proquest.com/docview/2293978386>
3. Dropping Out of Computer Science: A Phenomenological Study of Student Lived Experiences in Community College Computer Science PhD Thesis (Gilbert-Valencia, 2014)
https://idea.library.drexel.edu/islandora/object/idea%3A6024/datastream/OBJ/download/Dropping_out_of_computer_science.pdf
4. James M Roy. 2014. Underrepresentation of female computer science graduates in information technology: A phenomenological study. Ph.D. Dissertation. University of Phoenix.
<https://www.proquest.com/openview/e30c19accabeb9f14276fa2a0e27953f/1?pq-origsite=gscholar&cbl=18750>
5. Lourdes Herling. 2011. Hispanic women overcoming deterrents to computer science: A phenomenological study. PhD Thesis University of South Dakota.
<https://www.proquest.com/openview/dbfad0bcac2771c2020469afc0192088/1.pdf?pq-origsite=gscholar&cbl=18750>



Experiences of computer science curriculum design: A phenomenological study (Sloan & Bowe, 2015)

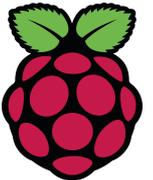
- **Context:** CS course redesign of 12 CS lecturers at 1 university - long journal paper
- **Literature:** Several sections on hermeneutic phenomenology including references e.g. Max van Manen
- **Research questions:** Focus on experience and understanding of lecturers
- **Sampling:** Justification of participant sampling
- **Data Collection:** 12 x hour interviews
- **Data Analysis:** Description of each step including aspects of hermeneutic phenomenology
- **Writing up:**
 - Selected small number of themes to report on
 - Pattern of synthesis and rich/think quotes
 - Many quotes for 1 participant for first theme. Other themes had a spread of participants
- **Interpretivist reflections:** Limited information about the authors and their views
- **Overall:** Because of my lack of experience, I was not confident to say this is a good example of hermeneutic phenomenology in practice. However, there are certainly lots of something called hermeneutic phenomenology



Activity 3 - 10 minutes (if time)

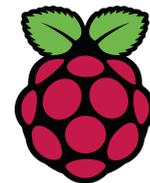
In small groups, imagine you have been asked to review a paper that uses hermeneutic phenomenology.

What might you look for to satisfy yourself that it has been conducted rigorously and that it draws on the methodology? Make a list to feed back to the whole group.



Feedback from participants

- If the paper explains how they did it, then we could review it. But if they just reference it - it would be hard to review.
- There is more trust in the researcher
- I might think more about an agenda - or if they were biased
- I would look for a clear overview of the methodology
- Looking for trustworthiness
- Look for the author to situate themselves and to state their bias
- It will be hard to do all this in a 6 page paper
- The nature of CS Ed conference papers, the papers are not published in other fields. Therefore need to write this in journals. Is there a mismatch between CSEd and this philosophy.
- ICER allows 11,000 words as the longest. Maybe we publish in other fields.
- Maybe we need a special issue of CS Ed on this philosophy/method?
- Participant characteristics are important.
- Maybe we need a new conference?
- Need enough actual data
- I like the idea of returning the analysis to the participants for review
- Would be good to hook up with Education researchers



Recommended reading

- Cooke, A., Smith, D., & Booth, A. (2012). Beyond PICO: The SPIDER Tool for Qualitative Evidence Synthesis. *Qualitative Health Research*, 22(10), 1435–1443. <https://doi.org/10.1177/1049732312452938>
- Dibley, L., Dickerson, S., Duffy, M., & Vandermause, R. (2020). *Doing hermeneutic phenomenological research: a practical guide*. Sage.
- Frechette, J., Bitzas, V., Aubry, M., Kilpatrick, K., & Lavoie-Tremblay, M. (2020). Capturing Lived Experience: Methodological Considerations for Interpretive Phenomenological Inquiry. *International Journal of Qualitative Methods*, 19, 1609406920907254. <https://doi.org/10.1177/1609406920907254>
- Guba, E. G., & Lincoln, Y. S. (1982). Epistemological and methodological bases of naturalistic inquiry. *ECTJ*, 30(4), 233–252. <https://doi.org/10.1007/BF02765185>
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