



# RESEARCH DESIGN AND DATA ANALYSIS APPROACH: EXPLORING VR IN PROGRAMMING EDUCATION

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# Question 1: What is your research design?

My research adopts a qualitative, interpretivist research design using a phenomenological approach (Husserl, 1984; Du Plooy-Cilliers, Davis and Bezuidenhout, 2020). The focus is on exploring the lived experiences of third-year computer science students who previously engaged with Virtual Reality (VR) tools in academic settings. By using semi-structured interviews, the study captures deep insights into how students perceive VR's influence on their engagement, motivation, and understanding of programming (Smith, Flowers and Larkin, 2021). The research is exploratory in nature and follows a cross-sectional design, collecting data at one point in time from a purposive sample (Creswell and Poth, 2018; Patton, 2015).



# What data analysis method is best suited? Why?

The most suitable method is thematic analysis, following the six-step model by Braun and Clarke (2013). This method is ideal because it aligns with my phenomenological and interpretivist approach, allowing patterns, themes, and meanings to emerge organically from the participants' narratives (Villegas, 2024). The analysis incorporates inductive coding and is enhanced by triangulation, including observational notes and post-interview reflections (Noble and Heale, 2019). Additionally, AI tools like Leximancer (2025) and DeepSeek AI (2025) support theme identification and data validation, reinforcing analytical rigour.

# Question 3: What principles of data analysis do you need to keep in mind?

Key principles to uphold during analysis include:

- Credibility: Ensuring accuracy and trust in the findings through member checking and triangulation (Lincoln and Guba, 1985; Noble and Heale, 2019).
- Dependability: Maintaining a clear audit trail of coding and theme development (Lincoln and Guba, 1985).
- Confirmability: Avoiding personal bias by reflecting on my role as a researcher through a reflexive journal (Du Plooy-Cilliers, Davis and Bezuidenhout, 2020).
- Transferability: Providing thick descriptions to enable other researchers to assess relevance in similar contexts (Creswell and Poth, 2018).

These principles help produce trustworthy and academically sound results in qualitative research.



# Question 4: What is the process involved using this particular method?

The six-step thematic analysis process includes:

1. Familiarisation: Transcribing interviews, reading transcripts, and reviewing observational notes (Braun and Clarke, 2013).
2. Generating Initial Codes: Coding significant quotes and behaviours using a colour-coded system (Braun and Clarke, 2013; Villegas, 2024).
3. Searching for Themes: Grouping codes into potential themes based on shared meaning.
4. Reviewing Themes: Refining and validating themes using the full dataset and visual thematic maps, supported by tools like Leximancer (2025) and DeepSeek AI (2025).
5. Defining and Naming Themes: Creating distinct, meaningful theme labels based on the underlying data (Braun and Clarke, 2013).
6. Producing the Report: Writing the final analysis with participant quotes, supported by AI-assisted validation and aligned with the research questions and objectives.

This process ensures both human insight and analytical rigour (Braun and Clarke, 2013; Noble and Heale, 2019).

# Question 5: How can your analysis answer your research question?

The analysis allows me to directly address my main research question, understanding the factors limiting the integration of VR in programming classrooms, by identifying recurring patterns in student experiences. It also answers secondary questions about educational benefits, challenges, and student receptiveness to VR. Thematic analysis enables me to isolate themes like “engagement,” “cognitive load,” or “accessibility,” and relate them back to educational theories such as Flow Theory (Csikszentmihalyi, 1990) and Learning by Doing (Dewey, 1986), ensuring findings are both empirically grounded and theoretically sound (Braun and Clarke, 2013).



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