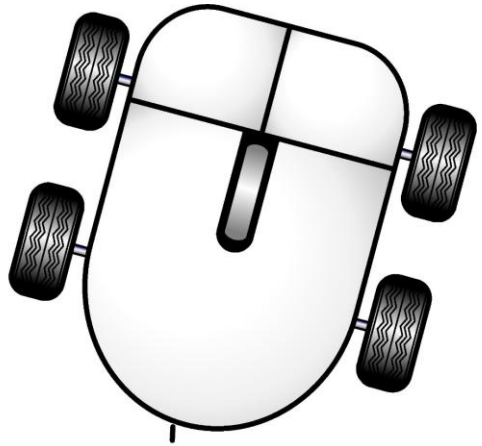
Exploring Visual Depictions:

As Enablers to Improving Student Learning in Higher Education



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Stadio School of Education

Background Context

- **Multidisciplinary Collaborative Research Project**
- **PGCE DL**

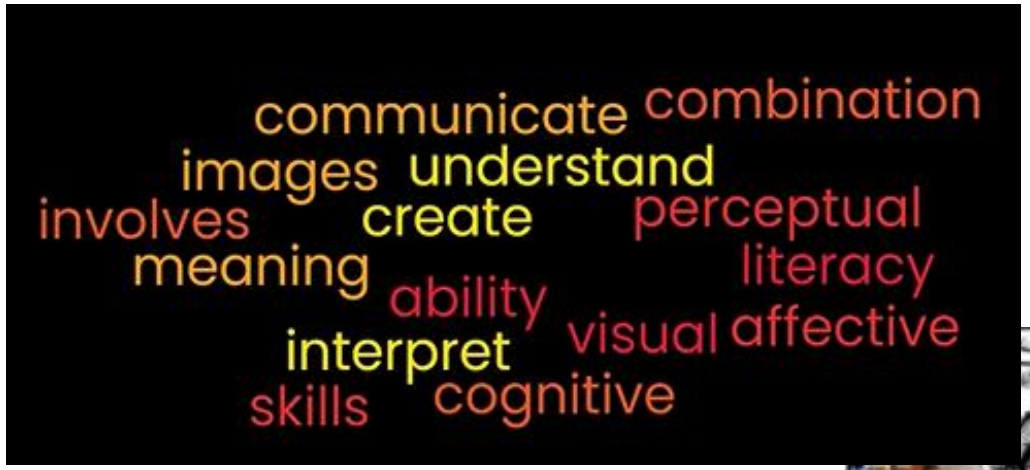
- **Tony: Information Technology (MUS)**
- **Leighandri: Technology (MUS)**
- **Rowan: Engineering Graphics and Design (CEN)**
- **Jen :Visual Arts and Creative Arts (CEN/Gqeberha)**

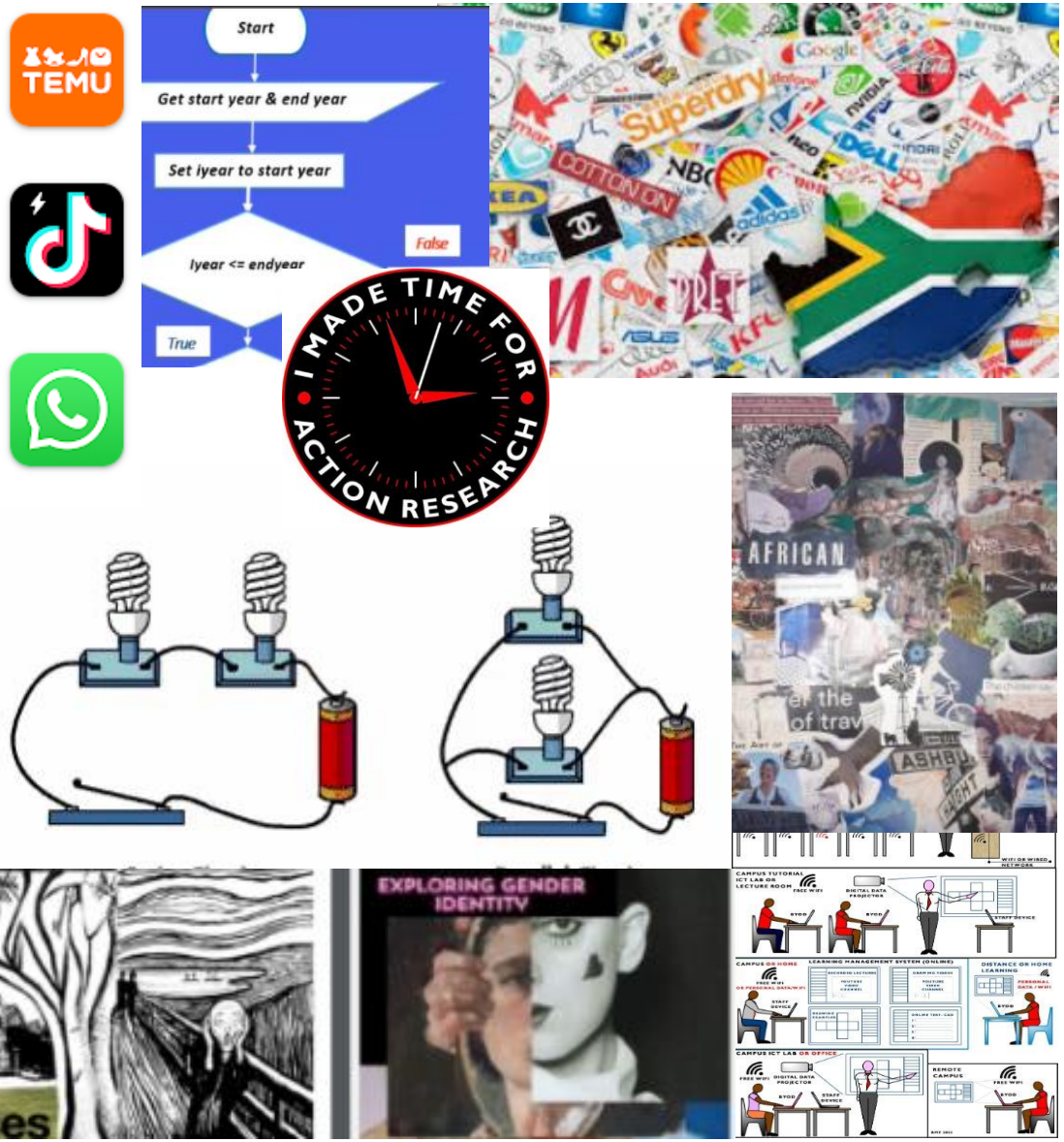
Background Context

- **What are Visual Depictions?**

Visual depictions refer to the representation of information or ideas through visual images such as photographs, paintings, or graphics.

- **What is Visual Literacy?**



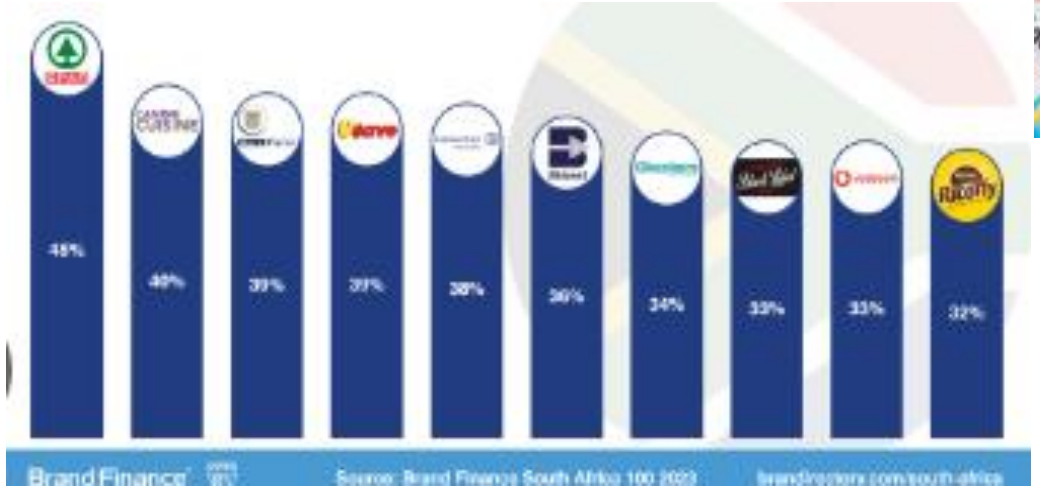


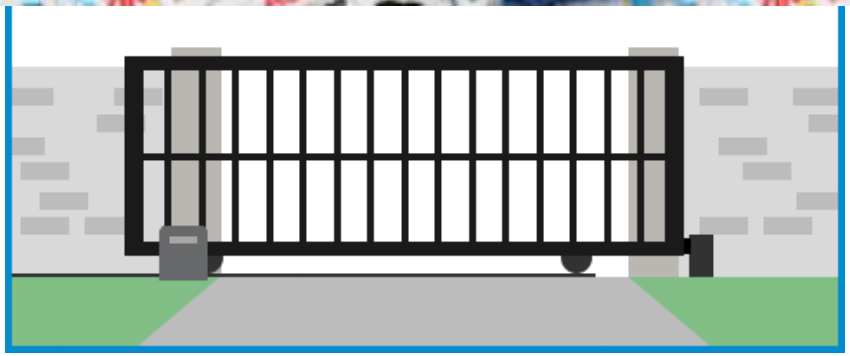
Background Context

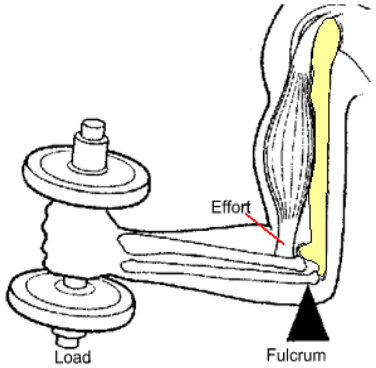
Why is Visual Literacy Important?

Franklin and Harrington (2019:1) state that:

"Students need to be proficient in utilising skills associated with higher levels of thinking that will empower them with the ability to identify, analyse and evaluate the infinite volume of information available."







Research Question and Objectives

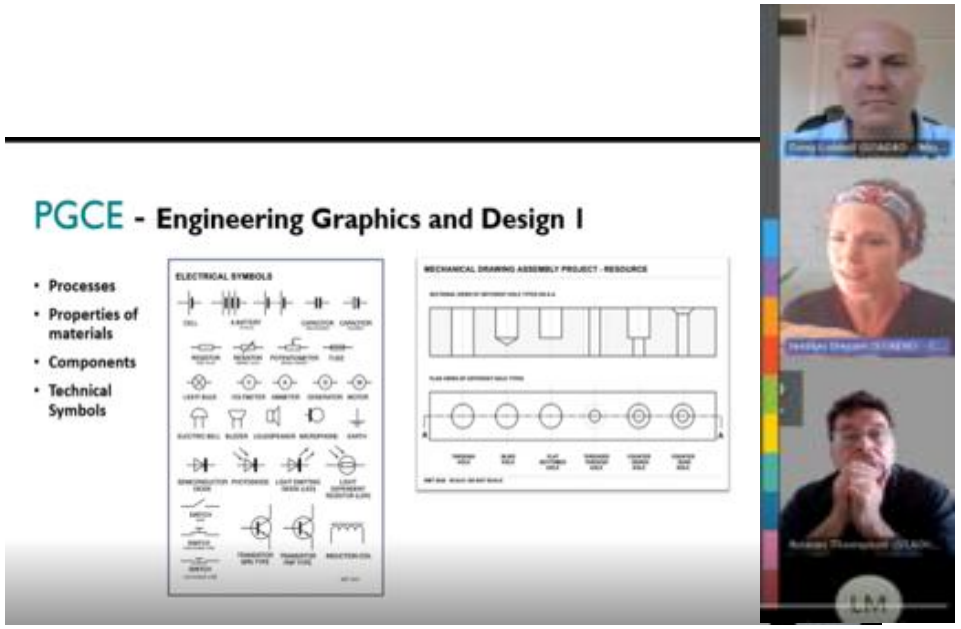
Research Questions

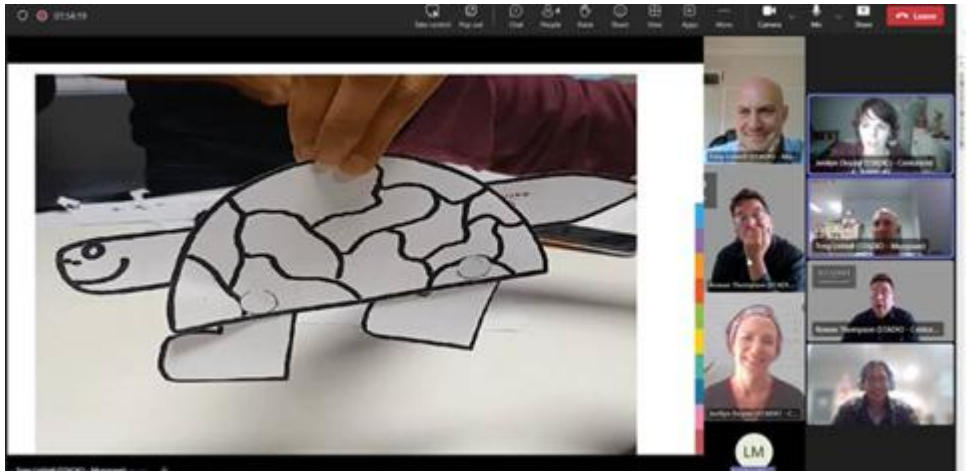
How do we teach practical subjects in online and offline spaces using visual depictions to augment learning?

(Online and offline to include student reporting of teaching in teaching practice or online in school LMS environments)

Objectives:

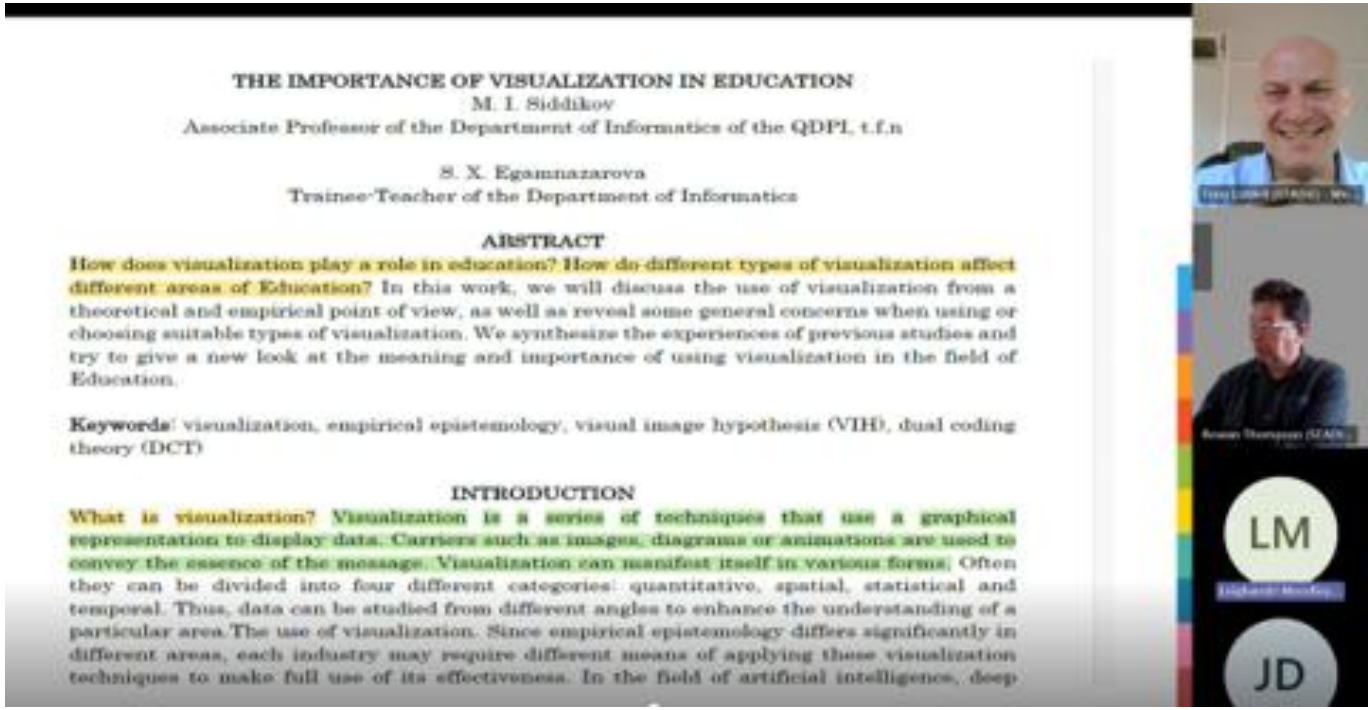
1. Share and discuss lecturers' examples of personal practice using visual depiction to augment PGCE teaching. [Students may also do so for TPR]
2. Critically analyse PGCE lecturers' visual depictions examples and descriptions of their work in an online 'gallery walk' to establish how these are being applied in lecturing and teaching practice spaces.
3. Draw on lecturer feedback of application of visual depictions to enhance teaching and learning.





Literature Review

- **Scoping Review** filed using MS Forms
- Online sharing **Literature Focus Group** to filter and identify key texts identified in separate individual literature searches.
- **Limited academic published material** on use of visual depictions in Higher Education Post-graduate teacher education. [Research Gap]
- Good Journal sourced: **Journal of Visual Literacy**
- **Some statements from literature:**



THE IMPORTANCE OF VISUALIZATION IN EDUCATION

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ABSTRACT

How does visualization play a role in education? How do different types of visualization affect different areas of Education? In this work, we will discuss the use of visualization from a theoretical and empirical point of view, as well as reveal some general concerns when using or choosing suitable types of visualization. We synthesize the experiences of previous studies and try to give a new look at the meaning and importance of using visualization in the field of Education.

Keywords: visualization, empirical epistemology, visual image hypothesis (VIH), dual coding theory (DCT)

INTRODUCTION

What is visualization? Visualization is a series of techniques that use a graphical representation to display data. Carriers such as images, diagrams or animations are used to convey the essence of the message. Visualization can manifest itself in various forms. Often they can be divided into four different categories: quantitative, spatial, statistical and temporal. Thus, data can be studied from different angles to enhance the understanding of a particular area.The use of visualization. Since empirical epistemology differs significantly in different areas, each industry may require different means of applying these visualization techniques to make full use of its effectiveness. In the field of artificial intelligence, deep

"Carriers such as images, diagrams or animations are used to convey the essence of the message." (Siddikov & Egamnazarova, 2024)

"Students should actively do something in the learning process instead of relying on seeing something" (Naps et al, 2003)

"The educational impact of visualization depends not only on how well students learn when they use it, but also on how widely it is used by instructors" (Naps et al, 2003)

""Visualization tools helps students to better understand abstract concepts; however, overuse, on the contrary, neutralizes this positive effect" (Presmeg, 2006)

Theoretical Framework

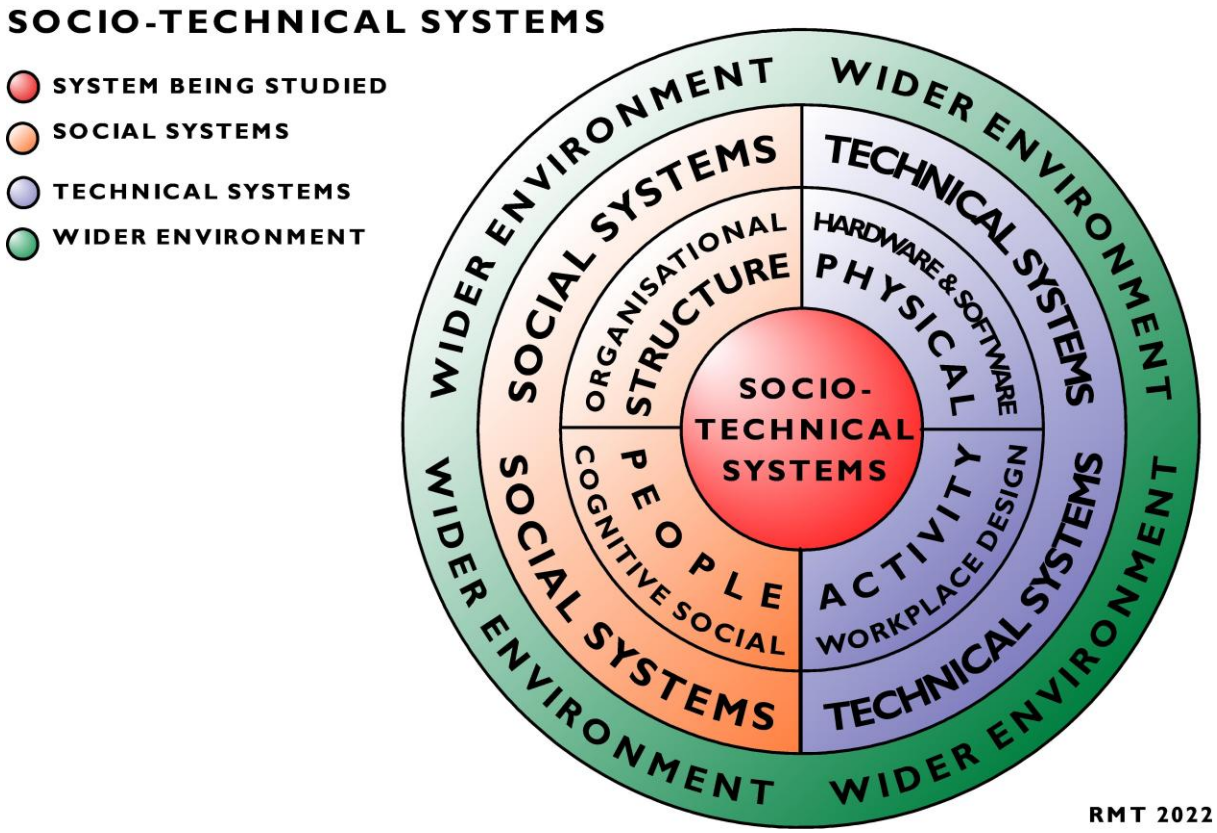
Socio-Technical Systems Theory

Critically appraising practice and systems to understand how organisational structures, institutional, physical and technical elements impact on human agency in the workplace.

Phenomenology

Phenomenology (philosophy) - Wikipedia:

"Phenomenology is the philosophical study of objectivity and reality (more generally) as subjectively lived and experienced. It seeks to investigate the universal features of consciousness while avoiding assumptions about the external world, aiming to describe phenomena as they appear to the subject, and to explore the meaning and significance of the lived experiences.[1]"



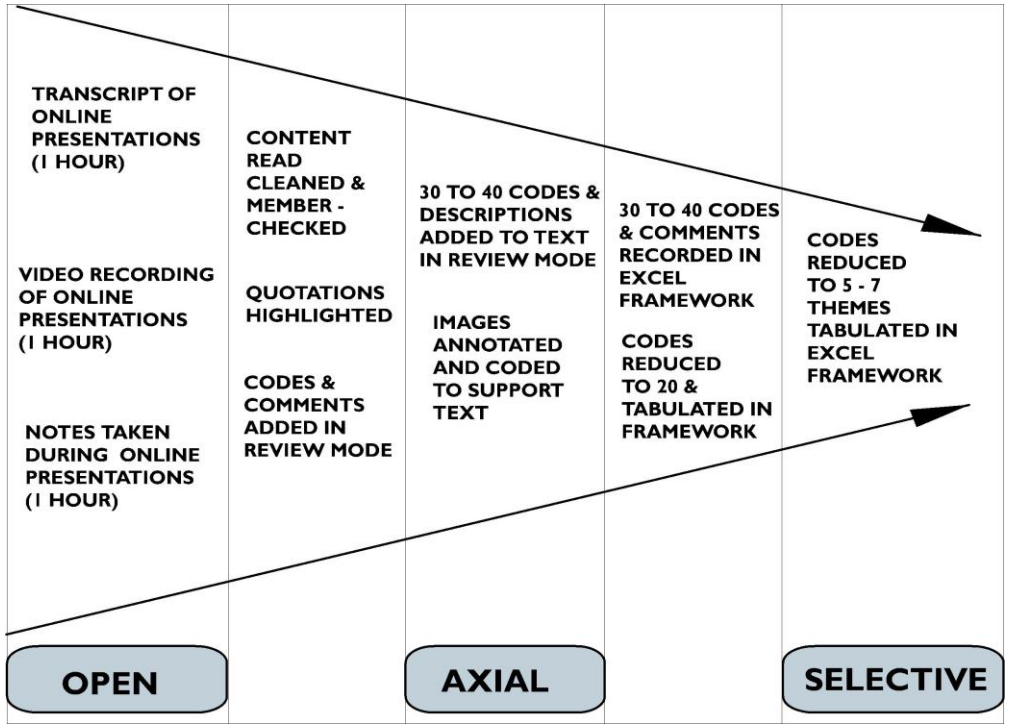
Methodology [Data Collection]

Research Design

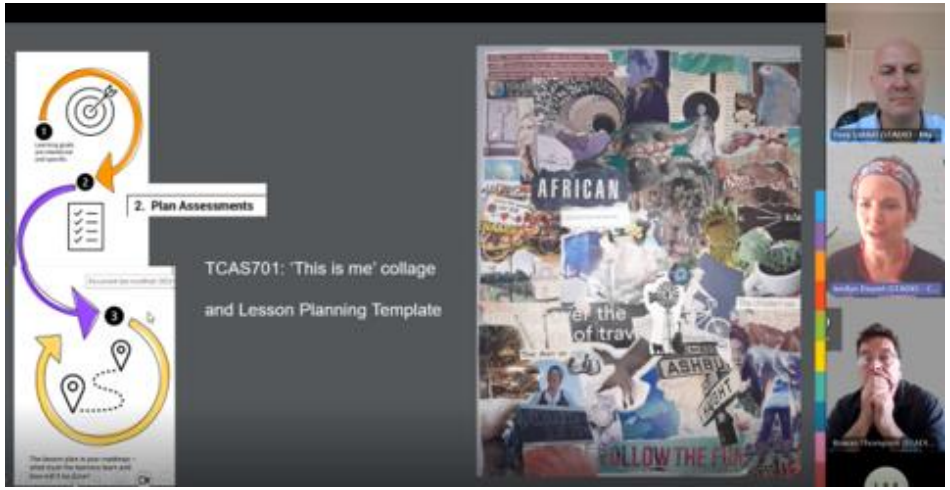
- Collaborative and participatory using online participatory methods.
- Present current practice to share experience and open dialogue about how to address problems and questions relating to teaching using visual depictions.

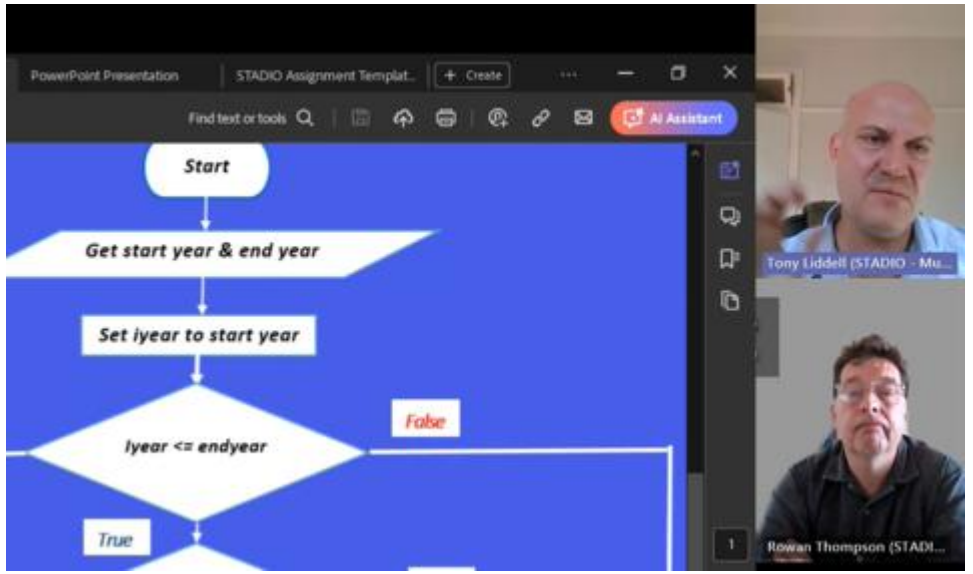
Data collection

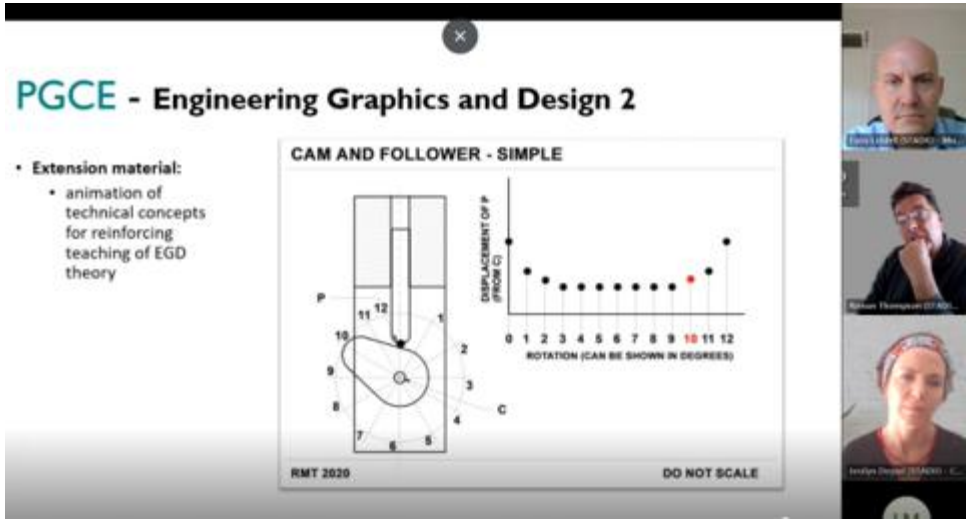
- Dialogue among the four co-researchers was automatically transcribed using the online video conferencing tool Microsoft Teams.
- Data was then member-checked in focus group meetings over the course of two weeks. Transcriptions were cleaned and corrected using the video recording of the original meeting. Co-researchers effectively peer-reviewed and validated each individual presentation and subsequent group discussion.
- Visual presentations given by each member were filed for reference and analysed using transcriptions.

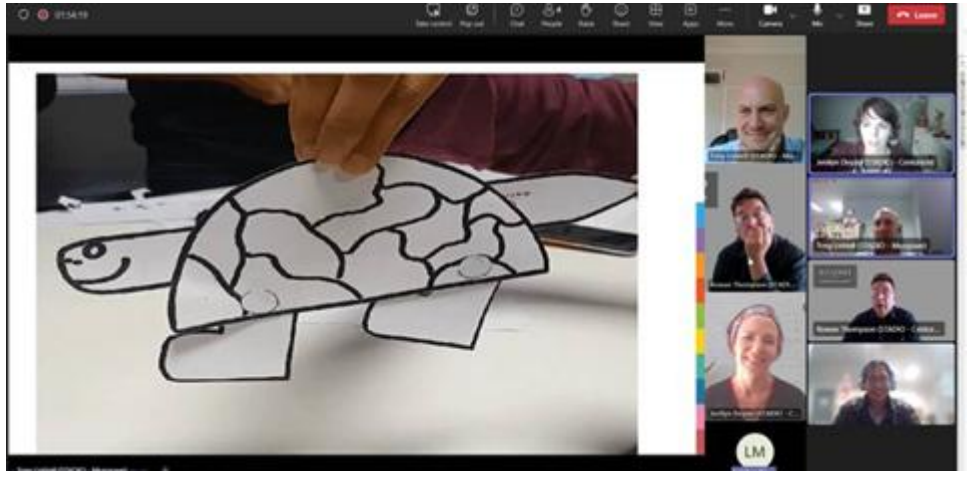


Methodology [4 presentations]





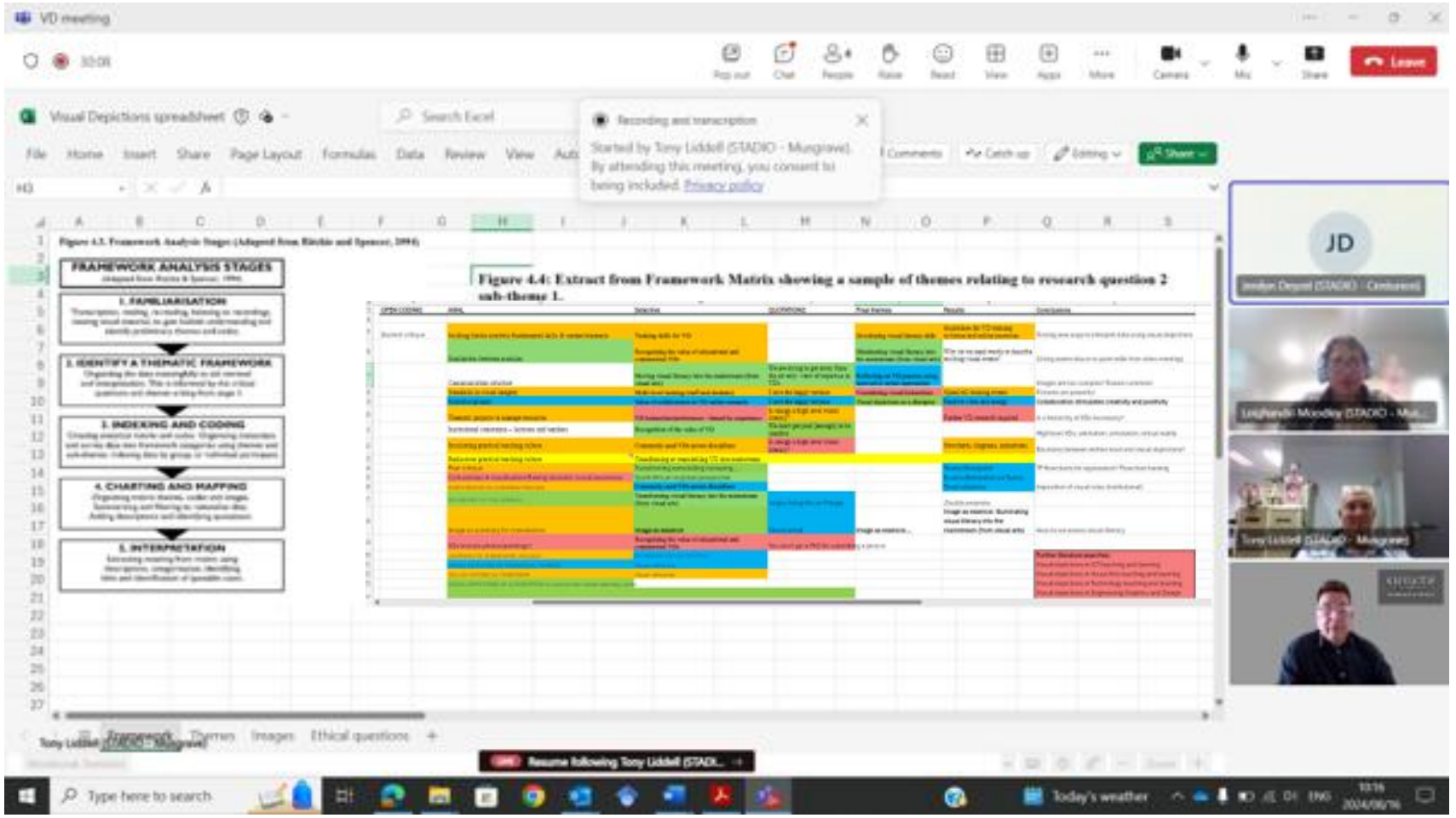




Methodology [Dialogue]

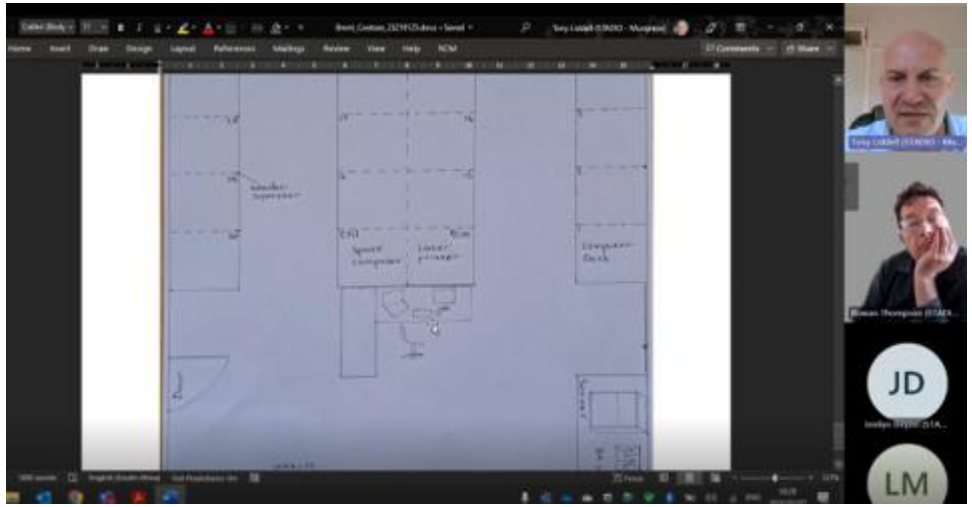
Data Analysis Techniques:

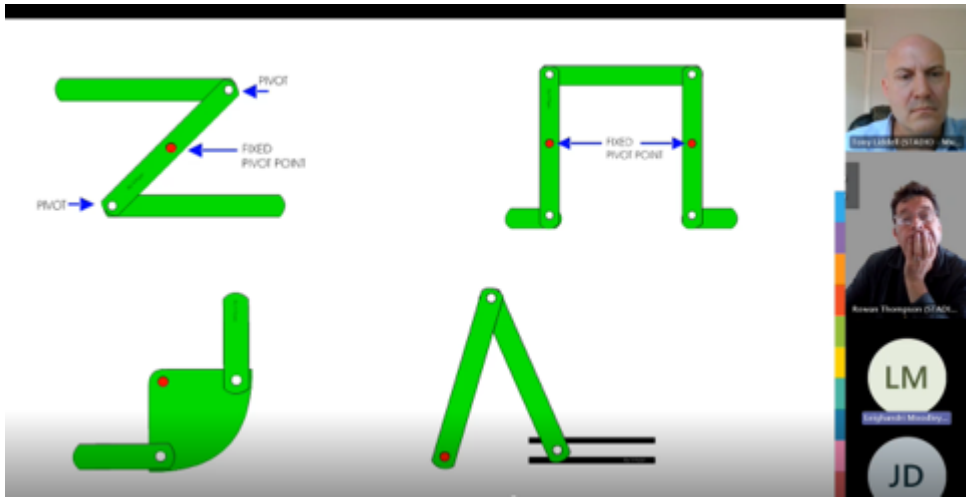
- **Thematic analysis (Framework analysis):** Identifying and analysing patterns or themes that emerge from the data.
- **Hermeneutic interpretation:** Interpreting the data through a process of online dialogue and shared understanding.
- **Member checking:** Validating the findings with the participants to ensure accuracy and trustworthiness.

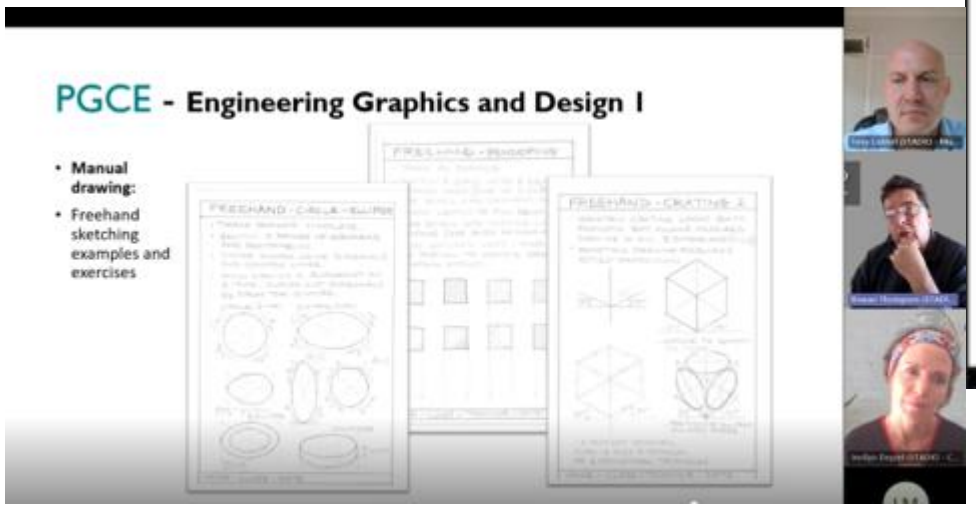


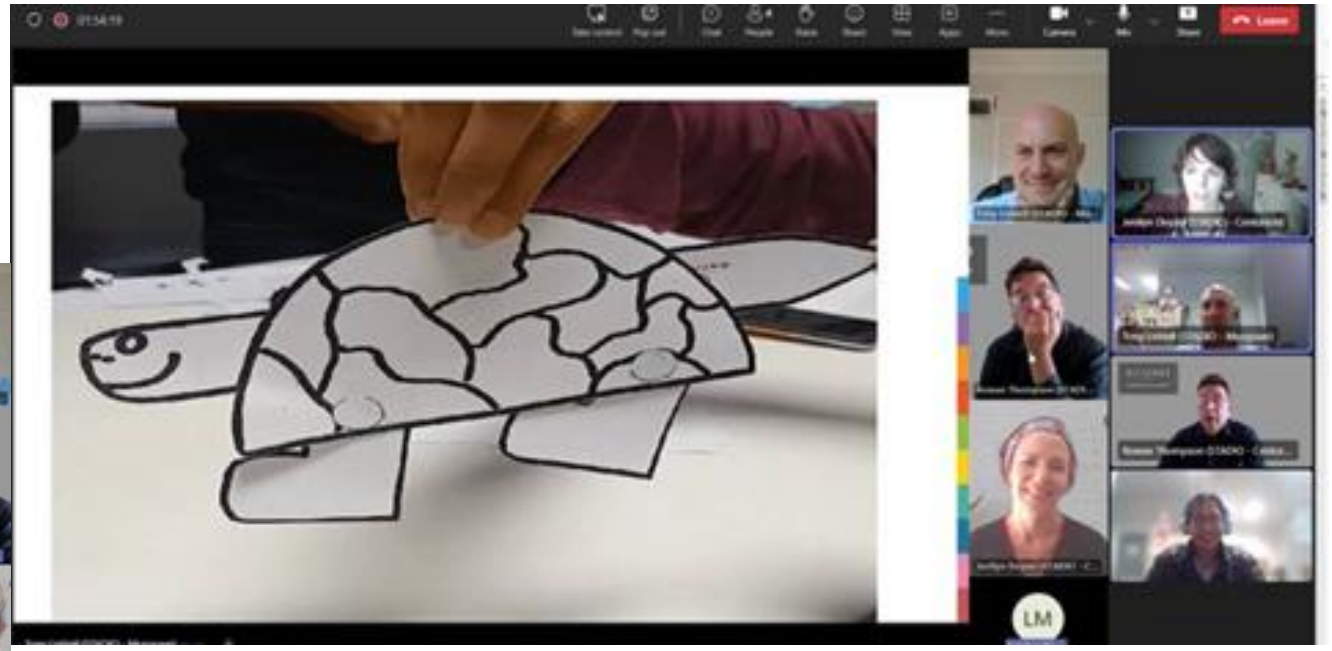
Methodology [Images]

Teams discussion of use of images and video









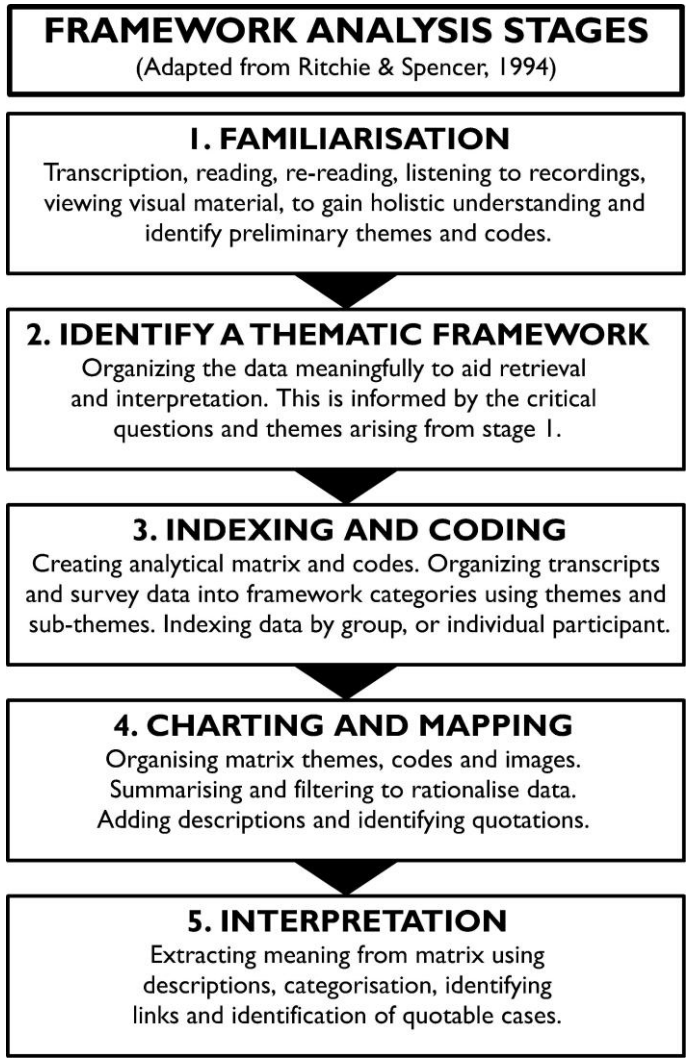
Methodology [Framework analysis]

We used **framework analysis** (Ritchie and Spencer, 1994) as a structured approach to organise and analyse data together as we created the data together in weekly online focus groups over a period of three months. It was used to analyse qualitative data by developing a thematic framework to categorize and interpret the data.
Below are the six stages involved in framework analysis when applied to a qualitative phenomenological analysis:

1. **Familiarisation**
2. **Identifying a Framework**
3. **Indexing**
4. **Charting**
5. **Interpretation**
6. **Validation (Continuous and recorded in online Teams interactions)**

Key considerations in applying framework analysis to a phenomenological analysis:

Bracketing: Researchers must be mindful of their own preconceptions and biases to ensure an objective analysis. (This was discussed openly in dialogues during focus group sessions).
Empathy: They should strive to understand the participants' experiences from their perspective. (Discussed openly in dialogues and a common denominator as we are all lecturers)
Interconnectedness: They should consider the interconnectedness between themes and the broader context of the participants' lives.
Flexibility: The framework should be flexible and adaptable to accommodate new insights or unexpected findings. (in a state of continuous development/redevelopment in shared online meetings – Excel's shared document feature heightened this)



Findings [RQ]

Tony
"I don't think I'm teaching students how to use visual depictions. I am simply using them to assist students' learning of content in ICT visually."

Leighandri
"I think I am doing both. I am showing students visual depictions to clarify concepts and improve their understanding. Meanwhile, I am encouraging students to use the same in their classroom practice."

Rowan
"I think I am modelling students' use of visual depictions using sketching, drawing and video to demonstrate worked examples. I have observed Art lecturers doing this effectively too."

Jenilyn
"I emphasise the use of visual depictions to aid learning in Creative Arts disciplines and for aspiring teachers to utilise in their own teaching environments."

Tony
"We need to understand that visual depictions bridge language divides but there are also some who are excluded . For example, visually impaired."

Findings [RQ]

Leighandri
I think Jenilyn is modelling good teaching behaviour.

Tony
“I don't think I'm teaching students how to use visual depictions. I am simply using them to assist students' learning of content in ICT visually.”

Jenilyn
“Enables learning through participation and being actively involved in the learning process.
Visual depictions also open debate about personal interpretation and appropriate context.”

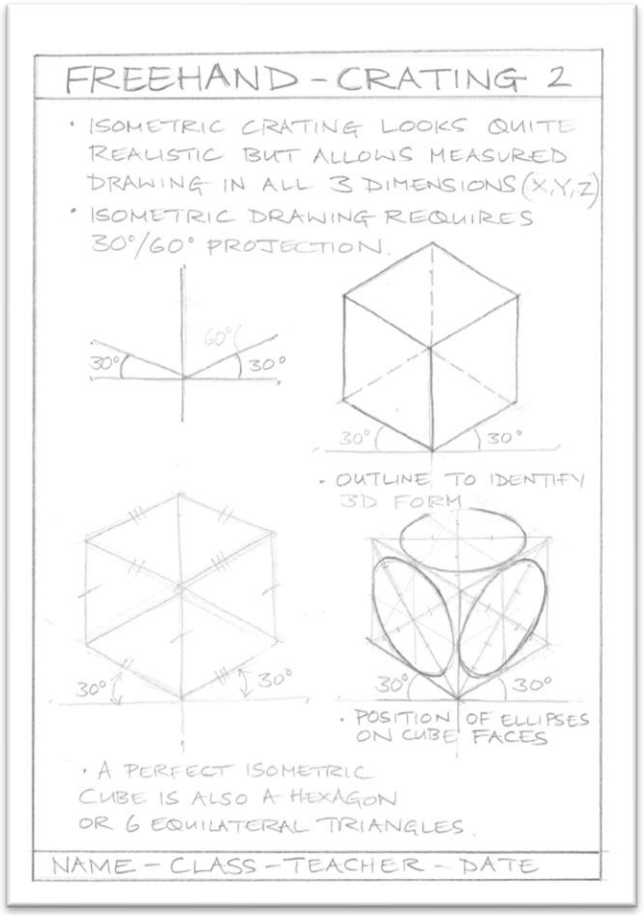
Rowan
“Visual depictions have a role to play in triggering memories and this can be a powerful tool in understanding history and context.”

Jenilyn
""I emphasise the use of visual depictions to aid learning in all creative arts disciplines. I teach this so that will transfer this to their teaching.”

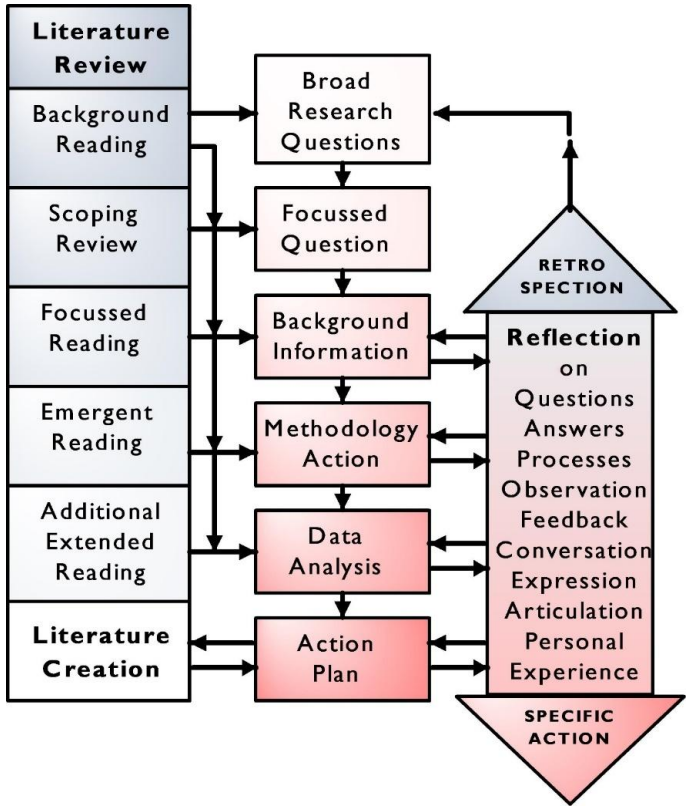
Rowan
"We are teaching students to visualise situations, concepts, ideas, and products in their mind. We need to teach students how to envision things in their mind as well as the tools to communicate their ideas."

Findings [Images – Common practice]

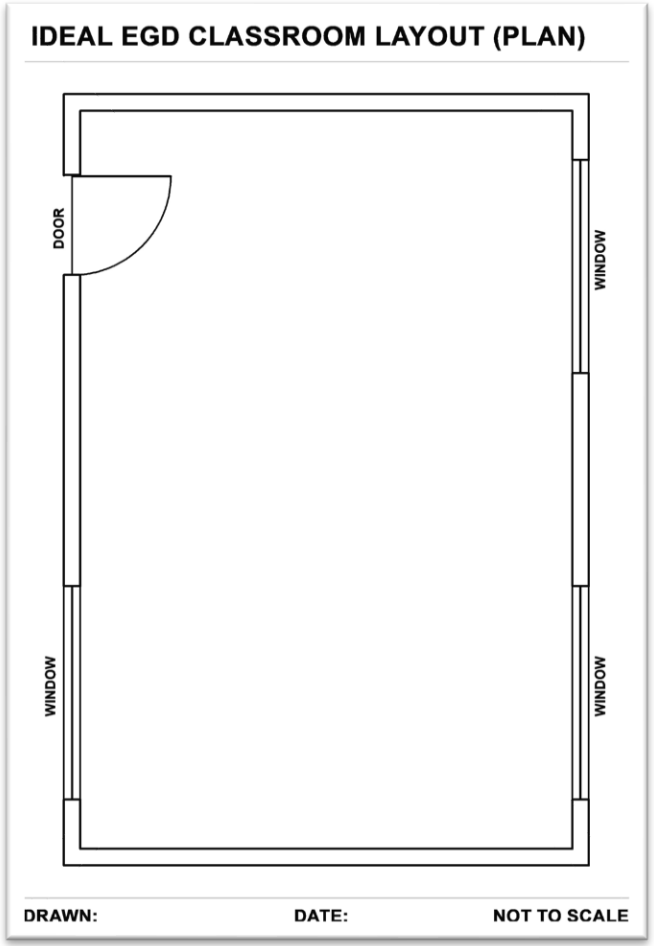
- Freehand sketching to develop ideas



- Flowcharts



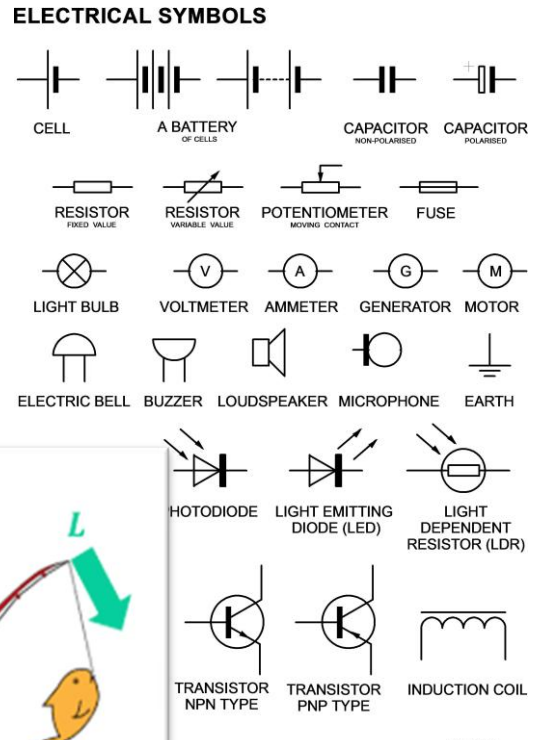
- Ideal/Future classroom

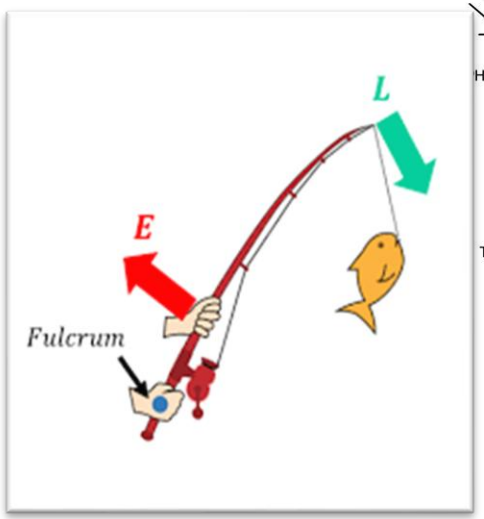


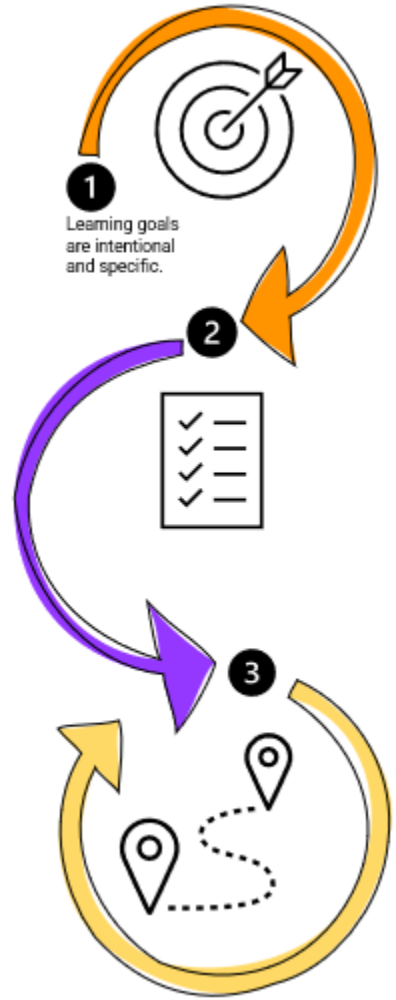
Findings [Images – Common practice]

- Photomontage/Collage

- Infographics







Findings [RQ]

Conclusions
Finding new ways to interpret data using visual depictions
(Using watercolours to paint stills from video meeting)
Images are too complex? Rowan comment
Pictures are powerful
Collaboration stimulates creativity and positivity
Is a hierarchy of VDs necessary?
High level VDs: animation; simulation; virtual reality
Boundary between written word and visual depictions?
TP flowcharts for explanation? Flowchart training
Imposition of visual rules (institutional)
How do we assess visual literacy

What we learned
We have not been training formally in use of visual depictions in Higher Education.
Excel live editing!
Enjoyed collaborative research as a form of peer motivation
Technical, organisational, and analytical abilities of team members and the impact on efficiency.
Diversity of research group allowed multiple perspectives
Light-hearted moments made project more enjoyable - importance of humour

Recommendations and Conclusions

We are teaching students to visualise situations, concepts, ideas, and products. We need to teach students how to envision things in their minds as well as teaching then to use tools to communicate their ideas and model good teaching behaviours.

Limitations

Sample size - four

Geographical separation forcing online collaboration. Online work is convenient for emote collaborations and saves money for institutions but acts as a substitute for real human interactions.

Timeframes – Administrative workload vs Research time

Further Research

Visual depictions in ICT

Visual depictions in Visual Arts

Visual depictions in Technology

Visual depictions in Engineering Graphics and Design

Visual depictions in teaching and learning in other HE specialisms

Theory

- To form meaningful theory relating to visual depictions will require a wider study which incorporates student voice.

Methodology

- Online focus group approach were effective for sharing, discussing and critiquing visual examples.
- Online research tools are not 100% reliable when connectivity is poor.
- We learned online skills e.g. framework analysis and applied research skills collaboratively and spontaneously.

Recommendations and Conclusions

Tony

"I should be explicitly training student teachers in how to instruct learners to use and understand visual depictions. I did a BA including Education Studies. I received no graphical training. Jenilyn has made a case for including visual depiction studies in teacher training."

Jenilyn

"I want to teach students to use visual depictions to aid their own learning. This can then be used communicate difficult human topics and understand societies. They should be able replace words with pictures. Students need to be empowered to pass this on to learners."

Leighandri

"I made content easier to understand using advanced tools such as animation. I think I should share location of such resources more with students."

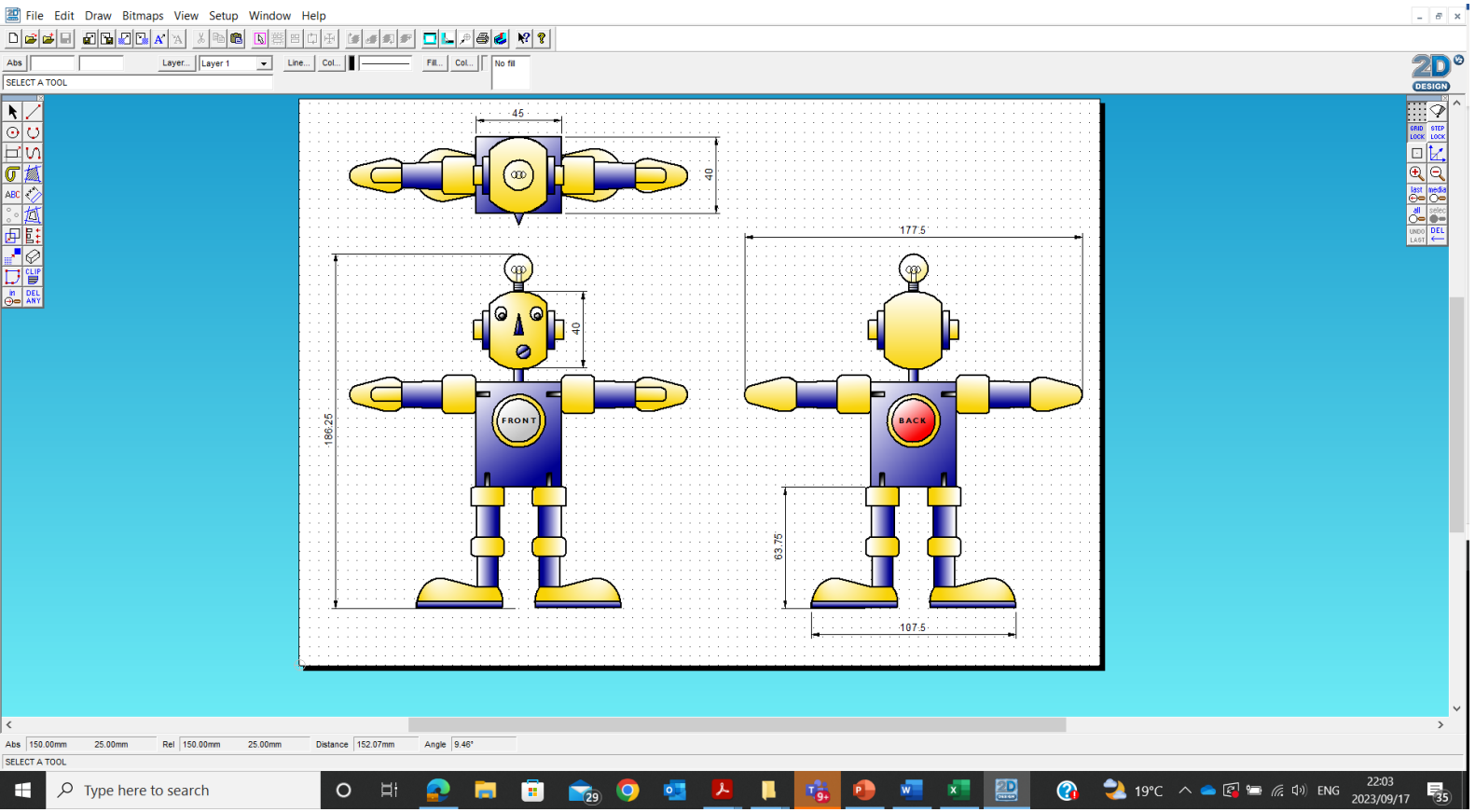
Rowan

"I think we first need to teach students and learners to understand visual depictions in context. I want to teach students more about how to teach visual awareness and visualisation through sketching. I also believe that a modern progression from flat 2D images is to convert these into animations."

General

- **We have different teaching aims and utilise visual depictions to meet different objectives.**
- **We all use visual depictions differently, depending on the context, and use a range of different tools to do so.**
- **We use a range of manual and computer-based tools but have not been taught formally.**
- **Lecturers will use visual depictions more if trained effectively.**

Future Studies



- **We all need more training in this area.**
- More research is needed in empowering lecturers and students to utilise visual depictions effectively and efficiently.
- How to use pictures more effectively to aid learning and improve understanding.
- We need to share more of our practice so that we learn efficiently and celebrate our similarities and differences.
- We need to explore all the senses as teaching tools.

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