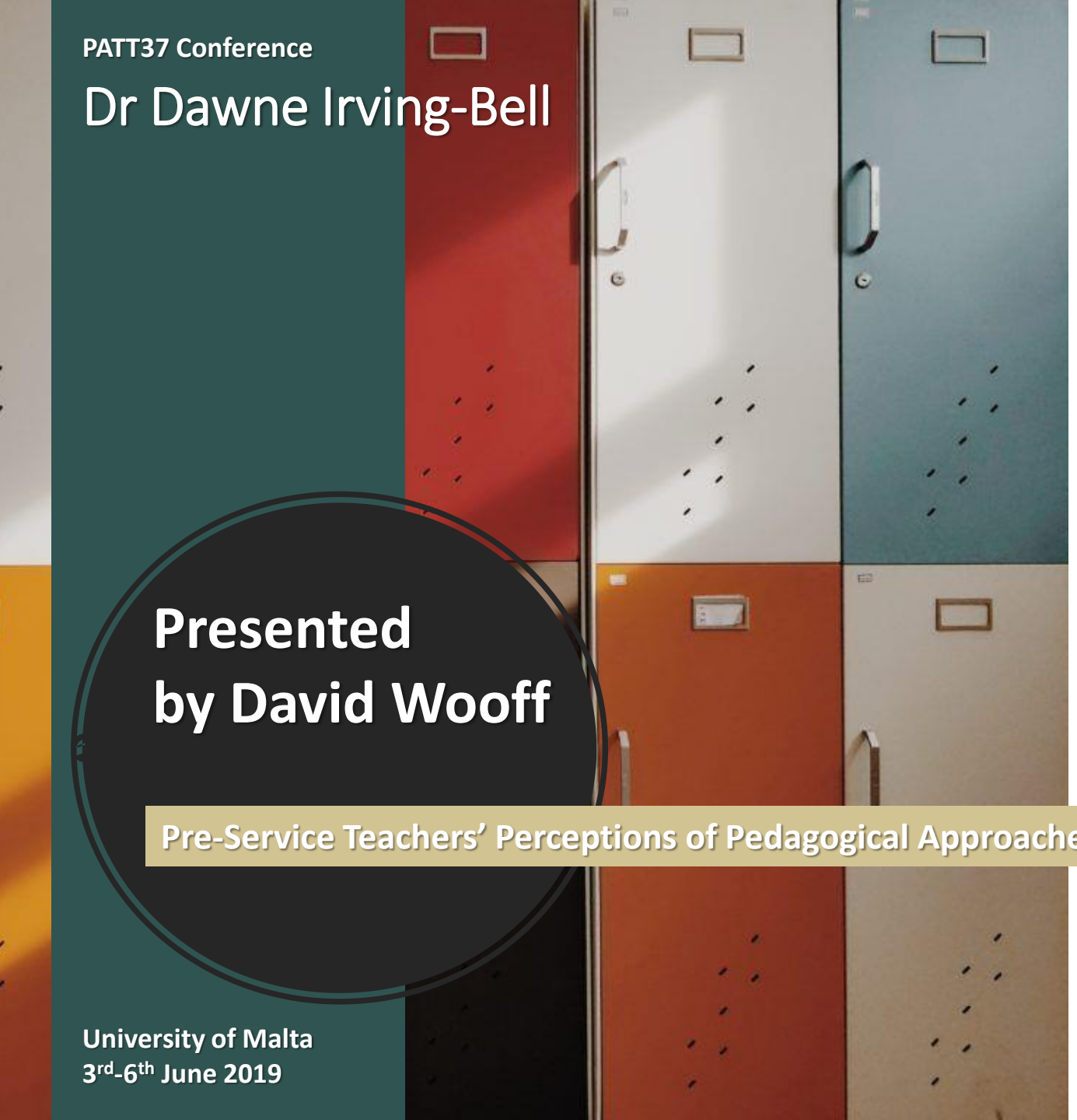


PATT37 Conference

Dr Dawne Irving-Bell

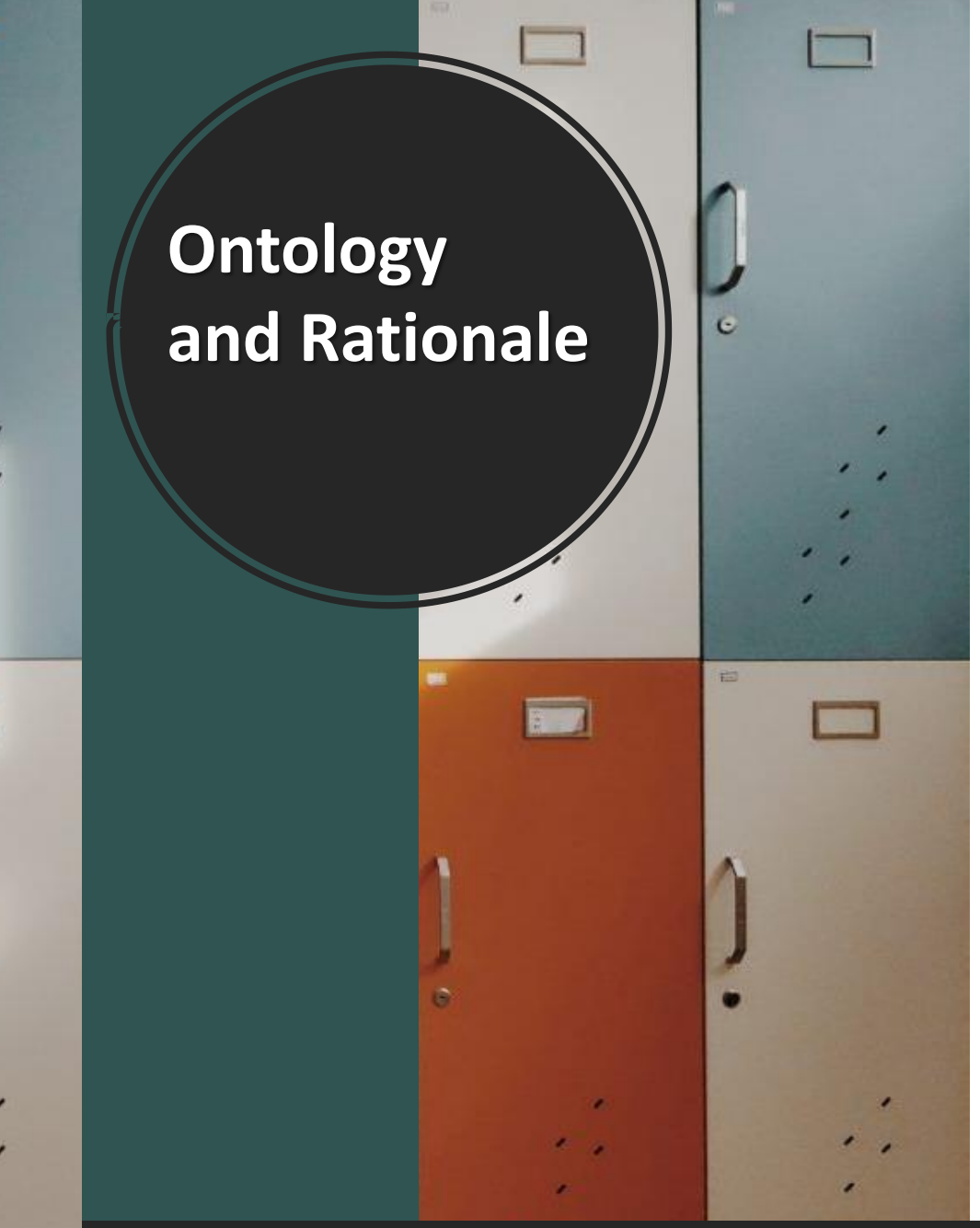
Presented by David Wooff

Pre-Service Teachers' Perceptions of Pedagogical Approaches to STEM Education; Design and Technology

University of Malta
3rd-6th June 2019

Introduction

The purpose of this research study is to gain a better understanding of the impact that personal narratives have in influencing the construction of pre-service design and technology teachers' professional identities.



Ontology and Rationale

This paper adopts the stance that within the curriculum some subjects are perceived to be of more value than others.

This is particularly prevalent within the STEM disciplines, where compared to science and mathematics, design and technology is very much the poor relation.

The Literature

How pre-service teachers construct their identity is a topic largely unexplored and a review of the literature revealed few studies that explore the relationship between beliefs and teaching behaviours.

Hence, amid my concerns for the subject, and within the context of the challenges faced, stemming from my personal curiosity in wanting to understand what it is that, despite these difficulties, drives those who seek to become teachers of Design and Technology my research question arose.

A brief review of the Literature

Within the context of the literature reviewed for this study identity was posited as a central theme, with other areas under exploration including self-efficacy, learning and teaching, and subject knowledge.

The Research Question

How pre-service teachers construct their identity is still a topic largely unexplored and a review of the literature revealed few studies that explore the relationship between beliefs and teaching behaviours. Hence, amid my concerns for the subject, and within the context of the challenges faced, stemming from my personal curiosity in wanting to understand what it is that, despite these difficulties, drives those who seek to become teachers of Design and Technology my research question arose:

What influence do the meanings assigned to previous learning experiences, including personal perceptions of subject knowledge, have on the formation of design and technology pre-service teacher professional identity?

Methodology

Drawing upon the philosophical field of symbolic interactionism work was underpinned by an interpretivist ontology, using an approach informed by constructivist grounded theory (Charmaz, 2014).

Participants

Nine participants each training to become secondary age phase design and technology teachers. Four female and five male participants, training to teach the full range of design and technology subject disciplines.

“Teachers with weaker subject knowledge are more inclined to deliver lessons which are procedural and reliant on pupils following rules which ignore conceptual understanding.”

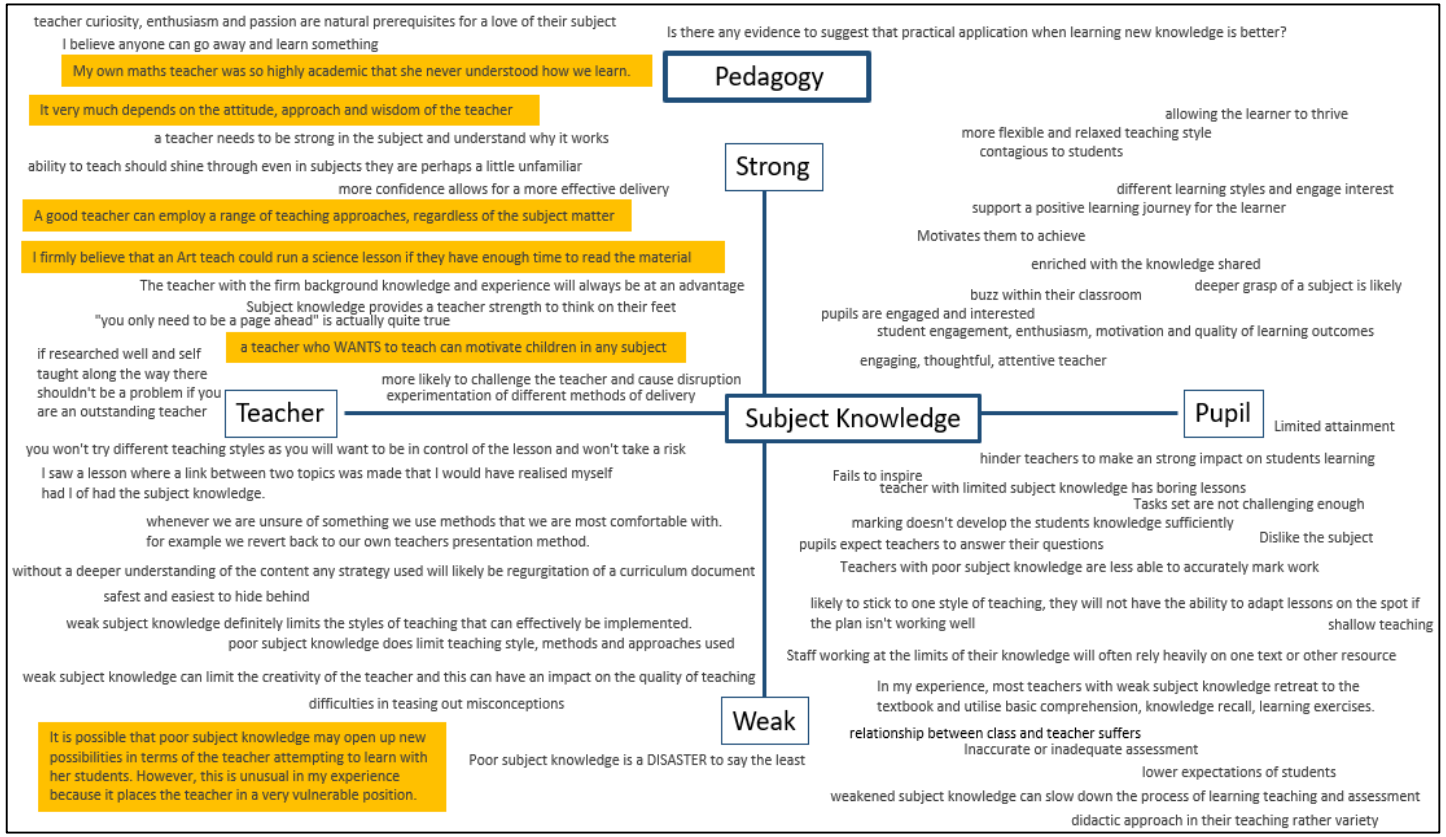
“…weak subject knowledge undermines you, erodes your confidence and can really have a detrimental impact on your own self-esteem.”

Presentation and Analysis of Data

Interview quotations

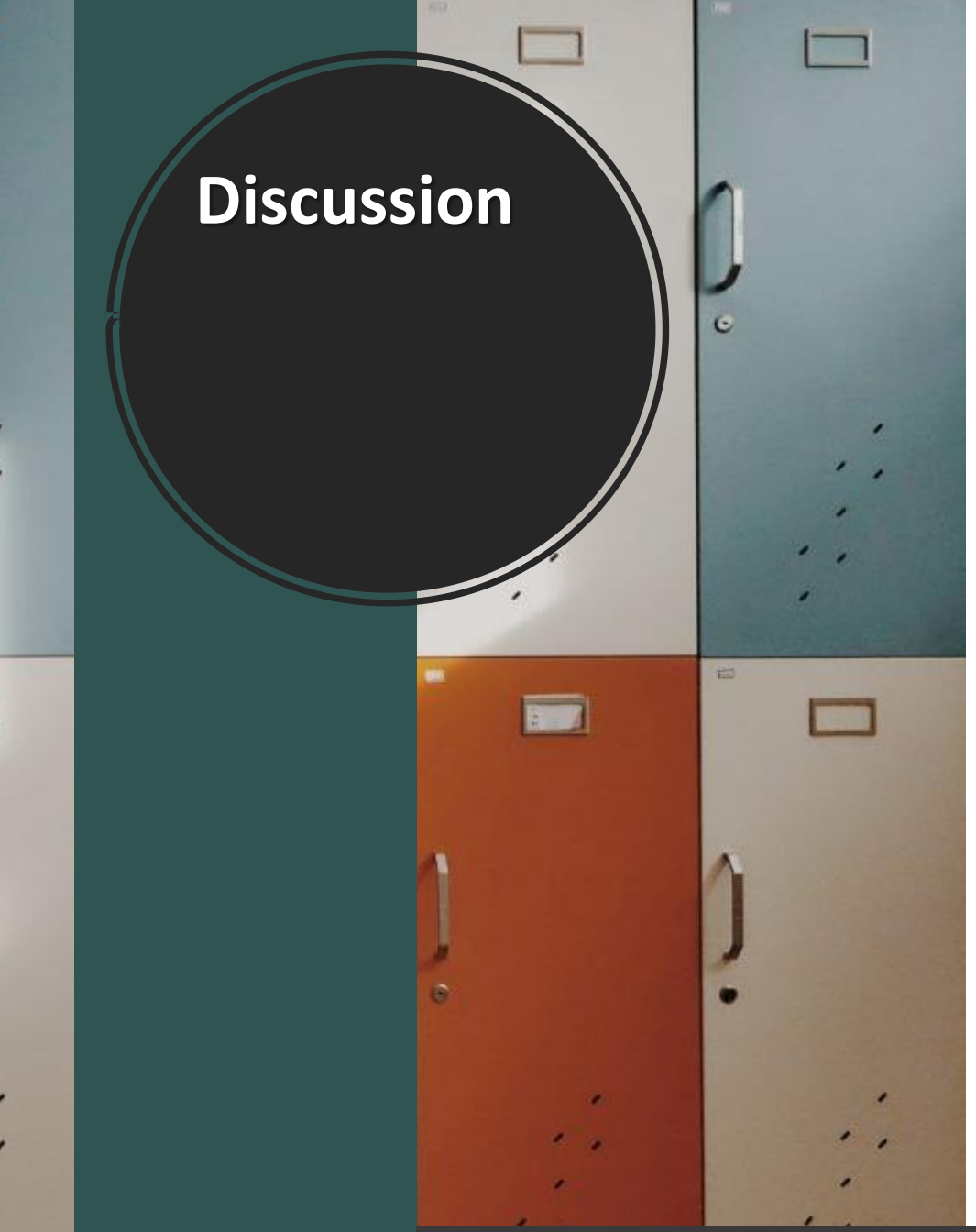
Irrespective of their age, gender, or discipline in recalling memories (pleasant or unpleasant) subject knowledge was constantly integral to participant responses.

Presentation and Analysis of Data



Visual analysis of data iteration around the central axis of subject knowledge: The cross-correlation of pre-service teacher's perceptions.

(Irving-Bell, 2018)



Discussion

According to Shulman (1986) there is *'a growth in knowledge of teaching'* specific to the process of converting subject matter for the purposes of teaching. Pedagogical Content Knowledge is the process where the teacher transforms specialist knowledge of their subject discipline into content suitable for effective pedagogical dissemination.

But what if, during the process of training, the pre-service teacher perceives that their knowledge is limited, and they do not have enough specialist subject knowledge to transform?

Findings

	Pedagogy (Approaches to teaching)	Disciplinary Subject Knowledge	The Self (Pre-service teacher)
Perceived as Weak	Likely to stay within established or inherited ideas, to stick within traditional and established pedagogies Subject matter as the delivery of information Play it safe / fear of doing anything new	A perceived or actual lack of subject knowledge Knowledge as the transmission of information A special kind of anxiety	Limited agency An inability to challenge oneself leading to feelings of professional inadequacy, vulnerability Low Self Regulation
Perceived as Strong	Teacher transfers subject matter for understanding Ability to adapt Likely to explore a range of pedagogies An inventory of styles	Pedagogy is different depending upon the subject Knowledge becomes accessible, knowledge becomes invisible	Ability to manage and compromise ones own beliefs Ability to shape ones own identity Self-efficacy High self regulation More likely to explore a range of pedagogy

The Subject Knowledge Gap: Impact on Pedagogy and Identity (Irving-Bell, 2018)

Summary of Findings

- Personal narratives, the meanings assigned to past experiences play a key role in the formation of professional teacher identities
- Beliefs are shaped by a combination of individual sociocultural background, memories, life and work experiences and in turn identities are re-shaped in response to new experiences which are encountered during the process of training to teach.
- Weakness in subject knowledge (perceived or real) has been shown to limit an individual's pedagogical development

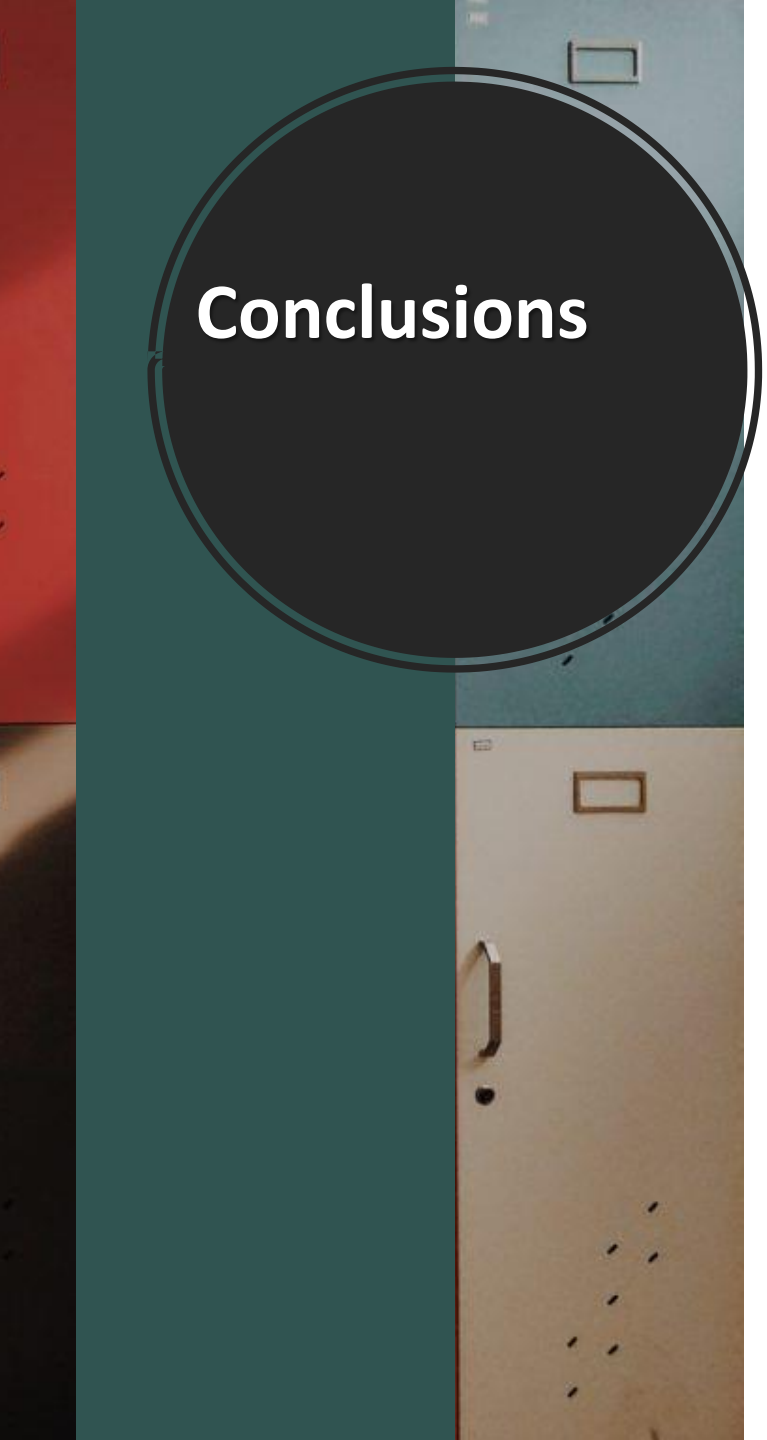
Summary of Findings

- **Where an individual perceives they have a gap in their subject knowledge their ability to develop fully their own professional identity is restricted**

- **As a result they are unable to move beyond *'survival' (*Le Maistre & Paré, 2010) and fewer risks are taken as pre-service teachers seek to stay within their 'pedagogical safe space' (Irving-Bell, 2018).**

- **Consequently rather than utilising innovative pedagogy and student-centred approaches, individuals are more likely to adopt teacher-focused teaching methods.**

- **In these instances teaching is more likely to be reduced to the delivery or transmission of knowledge, which according to Trigwell *et al.* (1999) is more likely to result in the learner's adoption of surface approaches to their own learning.**



Conclusions

This is significant because once set shifting identity is a difficult process (Beauchamp and Thomas, 2009:185) and when encountering difficulties in the classroom, pre-service teachers tend to *"fall back on their traditional memories of how to teach"* (Hargreaves, 2010:146).

Within the context of design and technology teacher education because of the challenges arising from external factors (curriculum marginalisation, teacher attrition and limited opportunities for subject knowledge enhancement and more teachers being required to deliver lessons beyond their areas of expertise).

Hence in order to help ensure that new teachers are equipped with sufficient pedagogical competence and confidence to enable them to cope effectively with the constant challenges and changes a career in design and technology teaching will inevitably bring it is desirable that during the early stages of their development pre-service teachers are able to establish a strong sense of self.

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Thank you for listening

Questions?

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