

**WHAT ARE THE FACTORS INFLUENCING PRE-SERVICE TEACHERS' THEORY
OF ACTION ABOUT STRATEGIES FOR MOTIVATING STUDENTS TO LEARN
SCIENCE?**

by

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CERTIFICATE OF ORIGINAL AUTHORSHIP

I, Davis Leonard Kevin Jean-Baptiste, declare that this thesis is submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the School of International Studies and Education, Faculty of Arts and Social Sciences at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise referenced or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis. This document has not been submitted for qualifications at any other academic institution.

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Signature:

Date: February 9th, 2022

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DEDICATION

This doctoral degree is dedicated to:

The community of Lamaze, located in Choiseul, Saint Lucia. May all residents (past and present) be more motivated to seek higher education and remember the fundamental principle:

“Ee pah ki kotae ou sorti nonplis sa ou ni, mais ee say un maatyer de ki loine ou vlay wayvay et allea kotae ou wayvay, et aussi ki saa ou fae epi timietla ou ni” (In French Kewyol)

“It is not where you come from and what you have, but it is a matter of how far you have dared to and follow a dream as well as what you do with whatever little you have.”

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Table of Contents

Topic	Page
Acknowledgements.....	i
Dedication.....	ii
Table of Contents	iii
List of Appendices.....	xiii
List of Figures.....	xiv
List of Tables.....	xv
Glossary of Terms.....	xvi
Abstract.....	xviii
Chapter 1: Introduction.....	1
1.1. The Impetuses for this Study.....	1
1.2. Purpose of the Study and Research Questions	4
1.3. Background	5
1.4. Conceptualisation of Theory of Action.....	11
1.4.1. Theory of Action.....	12
1.4.1.1. Espoused Theory.....	14
1.4.1.2. Theory-In-Use.....	15
1.5. Significance of the Research.....	16
1.6. Delimitations of the Study	17
1.7. Chapter Summary.....	18
Chapter 2: Theoretical Framework	20
2.1 Social Cognitive Theory.....	21
2.1.1. Personal (Cognitive) Factors	23
2.1.1.1. Self-Efficacy Beliefs.....	23
2.1.1.2. Observational Learning	24
2.1.1.2.1. Attention	25
2.1.1.2.2. Retention.....	26
2.1.1.2.3. Production.....	26
2.1.1.2.4. Motivation.....	27
2.1.1.2.4.1. Scaffolding.....	28
2.1.2. Environmental Factors	32
2.1.3. Behaviour.....	33
2.2 Principles of Motivation.....	33
2.2.1. Developing Students' Academic Competency.....	35
2.2.1.1. Providing Feedback to Students.....	36

Table of Contents

2.2.1.2. Helping Students Reflect on What they Do and Do not Understand and Why...	38
2.2.1.3. Scaffolding to Develop Students Academic Competency.....	39
2.2.2. Fostering Belongingness in the Classroom	39
2.2.2.1. Cooperative/ Collaborative Group Work and Peer Tutoring.....	40
2.2.2.2. Caring for Students.....	42
2.2.2.3. Engaging Students in Storytelling.....	42
2.2.3. Giving Students Autonomy in the Classroom.....	43
2.2.4. Making Learning Meaningful.....	45
2.2.4.1. Making Learning Relevant to Students' Lives	46
2.2.4.2. Knowing Students and How They Learn.....	47
2.2.4.3. Having Discussions and Conversations with the Students During Instruction...	48
2.3 Chapter Summary.....	49
Chapter 3: Literature Review	52
3.1 Teachers' Beliefs about Learning and Teaching	53
3.1.1. Origin and Conceptualisation of Teachers' Beliefs	53
3.1.2. Development of Teachers' Beliefs	56
3.1.3. Teachers' Beliefs About Science Pedagogy for Motivating Students.....	59
3.1.4. Teachers' Beliefs About the Nature of Science Teaching and Learning.....	61
3.1.5. Teachers' Changing Beliefs About Teaching and Learning.....	63
3.2. Student Motivation for Learning Science.....	66
3.3. The Link Between Student Interest and Motivation to Learn Science	68
3.4. Teacher's Beliefs about Motivation.....	68
3.5. Effective Pedagogies for Motivating Secondary School Science Students	70
3.6. The Role of Initial Teacher Education in Secondary Science.....	72
3.6.1 How Initial teacher Education Coursework can Influence Pre-Service teachers' Teaching.....	73
3.7. Chapter Summary.....	74
Chapter 4: Research Methodology.....	75
4.1 Rationale for Choosing the Methodology.....	76
4.2 Research Design.....	78
4.3 Methods and Procedures	79
4.3.1 Research Sites and Context	79
4.3.1.1. Case Context for Paula	81
4.3.1.2. Case Context for Elsa	82
4.3.1.3. Case Context for Terry	84
4.3.2. Access to The Research Sites.....	86
4.3.3. Data Gathering Procedures.....	87

Table of Contents

4.3.3.1. Phase One of The Data Collection: Web-Based Survey.....	91
4.3.3.1.1. Recruitment of the Participants for Phase One	95
4.3.3.2. Phase Two Data Collection	97
4.3.3.2.1. Interview.....	98
4.3.3.2.1.1. Recruitment of Participants for The Interviews	101
4.3.3.2.2. Lesson Observation.	102
4.3.3.2.2.1. Recruitment of Participants for The Lesson Observations.....	103
4.3.3.2.3. Documentation.....	104
4.3.4. Analysis Procedures.....	105
4.4. Establishment of Validity of the Instruments.....	106
4.5. Establishing Reliability of the Study.....	107
4.5.1. Dependability.....	108
4.5.2. Credibility.....	108
4.5.3. Transferability	108
4.6. Ethical Considerations and Methodological Challenges.....	109
4.6.1. Anonymity and Confidentiality	110
4.7. Conclusion of Chapter Four.....	111
Chapter 5: Phase One Findings and Discussion	113
5.1 The Pre-Service Teachers' Espoused Theories.....	114
5.1.1. Developing Students' Academic Competency.....	116
5.1.1.1. Providing Feedback to Students.....	116
5.1.2. Fostering Belongingness in the Classroom	119
5.1.2.1. Engaging Students in Collaborative/Cooperative Group Work.....	119
5.1.3. Giving Students Autonomy	123
5.1.4. Making Learning Meaningful to Students	124
5.1.4.1. Having Discussions and Conversations with Students About the Concepts Being Taught.....	125
5.1.4.2. Making Learning Relevant to Students	126
5.1.5. Summary of the Web-Based Survey Participants' Espoused Theories.....	130
5.2. The Pre-service Teachers' Theories-in-Use for Motivating Students to Learn Science	130
5.2.1. Contemporary Strategies Enacted to Motivate Science Students	130
5.2.1.1. Using Demonstrations as a Strategy to Motivate Students for Learning Science	131
5.2.1.2. Relating Science Concepts to Real Life.....	133
5.3. Factors Influencing Pre-Service Teachers' Theory of Action About Their Choice of Strategies for Motivating Students to Learn Science.....	134
5.3.1. Personal Factors.....	135
5.3.1.1. Pre-service Teachers' Secondary School Experiences.....	136

Table of Contents

5.3.1.2. Know Students and How They Learn	138
5.3.2. Environmental Factors.....	139
5.3.2.1. Pre-service Teachers’ Vicarious Learning Experiences	141
5.3.2.2. Time Available for Science Lesson Preparation and Lesson Instruction.....	146
5.3.2.3. Resources Available for Instruction.....	150
5.3.2.3.1 Using Demonstration as a Strategy to Motivate Students for Learning	152
Science.....	
5.3.2.3.1 Using Group Work as a Strategy to Motivate Students for Learning	154
Science.....	
5.3.2.4. Pre-service Teachers’ Experiences at Their Current University.....	155
5.4 Summary of Phase One Findings.....	156
Chapter 6: Phase Two Findings and Discussion	158
6.1 The Pre-Service Teachers’ Theory of Action About Strategies for Motivating Students	159
6.1.1 Developing Students’ Academic Competency to Learn Science.....	159
6.1.1.1. How Paula Helped Develop Students’ Academic Competency in Science.....	160
6.1.1.2. How Elsa Helped Develop Students’ Academic Competency in Science.....	162
6.1.1.3. How Terry Helped Develop Students’ Academic Competency in Science.....	165
6.1.2. Fostering Belongingness in the Classroom.....	167
6.1.2.1. How Paula Fostered Belongingness in her Science Lessons	167
6.1.2.2. How Elsa Helped Fostered Belongingness in her Science Lessons	171
6.1.2.3. How Terry Fostered Belongingness in his Science Lessons	173
6.1.3. Giving Students Autonomy for Learning Science.....	176
6.1.3.1. How Paula Helped Develop Students’ Autonomy for Learning Science.....	176
6.1.3.2. How Elsa Helped Develop Students’ Autonomy for Learning Science.....	178
6.1.3.3. How Terry Helped Develop Students’ Autonomy for Learning Science.....	180
6.1.4. Making Science Learning Meaningful to the Students.....	182
6.1.4.1. How Paula Made Science Learning Meaningful to the Students.....	182
6.1.4.2. How Elsa Made Science Learning Meaningful to the Students.....	185
6.1.4.3. How Terry Made Science Learning Meaningful to the Students.....	188
6.2. Factors Influencing Pre-service Teachers’ Theory of Action.....	190
6.2.1. Personal Factors that Influenced the Pre-Service Teachers’ Theory of Action.....	190
6.2.1.1. Pre-Service Teachers’ Secondary School Learning Experiences	191
6.2.1.2. Pre-Service Teachers’ Self Efficacy.....	192
6.2.1.3. Pre-Service Teachers’ Career Experiences.....	194
6.2.2. Environmental Factors That Influenced the Pre-service Teachers Theory of Action...	196
6.2.2.1. Pre-service Teachers’ Vicarious Learning Experiences	196
6.2.2.1.1. Paula’s Vicarious Learning Experiences	196

Table of Contents

6.2.2.1.2. Elsa’s Vicarious Learning Experiences	198
6.2.2.1.3. Terry’s Vicarious Learning Experiences	199
6.2.2.1.4. Summary of Pre-service Teachers’ Vicarious Learning Experiences.....	202
6.2.2.2. Pre-service Teachers’ Initial Teacher Education Courses	200
6.2.2.2.1. Paula’s University ITE Program Experience.	201
6.2.2.2.2. Elsa’s University ITE Program Experience.	202
6.2.2.2.3. Terry’s University ITE Program Experience.	203
6.2.2.2.4. Summary of the ITE Program Experience Factor.....	203
6.2.2.3. Time.....	203
6.2.2.2.1. Time Available for Instruction.....	204
6.2.2.2.2. Time of Day.....	206
6.2.2.2.3. Time of Year.....	207
6.2.2.2.4. Summary of the Time Factor.....	208
6.2.2.4. Students’ Year Groups and Students’ Interests.....	209
6.3 Overview of the Three Pre-Service Teachers’ Theory of Action.....	211
6.3.1. Paula’s Case.....	211
6.3.2. Elsa’s Case.....	212
6.3.3. Terry’s Case.....	213
6.4 Changes in the Pre-service Teachers’ Theory of Action.....	214
6.4.1. How Paula’s Theory of Action Changed During her Placement.....	214
6.4.2. How Elsa’s Theory of Action Changed During her Placement	217
6.4.3. How Terry’s Theory of Action Changed During his Placement	219
6.4.4. Summary of the Changes in the Pre-Service teachers’ Theory of Action.....	221
Chapter 7: Conclusions	223
7.1. Summary of the Findings of This Study	224
7.1.1. Comparing Pre-service Teachers’ Theory of Action From Phases One and Two...	225
7.1.2. Comparing the Factors That Influenced the Pre-Service Teachers’ Theory of Action.....	228
7.2. Significance of the Findings.....	232
7.3. Limitations.....	235
7.4. Recommendations for Future Research.....	236
7.5. Implications of the Study.....	237
7.5.1. Implications for Science Teacher Educators.....	237
7.5.2. Implications for Supervising Teachers	240
7.5.3 Implications for Academic Tertiary Advisors	241
7.5.4 Implications for Resource and Software Developers	241
7.5.5. Implications for Initial Teacher Education Curriculum Developers.....	242
7.5.6. Theoretical Implications.....	242

Table of Contents

7.6 Conclusion.....	245
List of References.....	247
Appendices.....	293

List of Appendices

Appendix	Title	Page
A	Email to the Science Education Subject Course Coordinator....	294
B	Participation Information Sheet: Pre-Service Teachers.....	295
C	Letter to the Principal.....	301
D	Participation information Sheet: Supervising Teachers.....	304
E	Web-based Survey.....	310
F	Pre-service teacher Semi- Structured Interview.....	325
G	Supervising Teacher Interview.....	329
H	Information sheet for Parents/Guardians.....	331
I	Ethics approval from UTS.....	332
J	Ethics approval from NSW State Education Research Application Process.....	334
K	Ethics approval from the Participating University.....	341
L	Survey Data	347
M	Examples of Coding for the Pre-Service Teachers.....	432
N	Collated Interview transcripts for all participants.....	457

List of Figures

Figure	Title	Page
2.1	Triadic Reciprocity Model of the Social Cognitive Theory.....	22
5.1	Making Learning Meaningful to Students.....	124
5.2	Contemporary Strategies used for Motivating Students to Learn Science.....	131
5.3	Factors Influencing PSTs’ Theory of Action (Phase One).	135
5.4	Environmental Factors Influencing Pre-Service Teachers’ Theory of Action	140
5.5	Frequency of Use of Specific Strategies in Science Lesson Selected by Survey Respondents.....	147
6.1	Factors Influencing PSTs’ Theory of Action (Phase Two Participants)	190
7.1	Main Factors Influencing the Pre-Service Teachers’ Theory of Action (Phases One and Two)	229

List of Tables

Table	Title	Page
4.1	Overview of the Three Science Lessons Observed for Paula.....	82
4.2	Overview of the Three Science Lessons Observed for Elsa	84
4.3	Overview of the Three Science Lessons Observed for Terry.....	85
4.4	Table Showing the Methods, the Research Questions they Addressed and the Participants.....	91
4.5	Web-based Survey Demographic Data.....	97
5.1	Subcategories Making up the Vicarious Learning Experiences Category.....	141
5.2	Items Making up the Availability of Resources for Instruction Category.....	151
7.1	Main Strategies for Motivating Science Students: From Phase One and Two.....	226

Glossary of Terms

In this Section, the researcher presents a definition of the main frequently referenced terms used throughout the thesis.

- i. **Motivation:** “Motivation involves the process that energises, direct, and sustain behaviour” (p. 424, Santrock, 2018)
- ii. **Initial Teacher Education [ITE]:** this refers to a set of programs and courses designed to train beginning teachers in specific academic disciplines in preparation for teaching students at either the primary school level, secondary school level or tertiary level.
- iii. **Pre-service Teacher [PST]:** An individual pursuing an ITE program/ course of study.
- iv. **Theory of Action:** Argyris & Schön (1974) defines the theory of action as a broad concept consisting of three elements theory-in-use, espoused theory, and congruence/incongruence between the two main aspects of the theory of action.
- v. **Espoused Theory:** Espoused theory can be defined as those ideas, theories that an individual claims to follow in directing his action (Argyris, Putnam & Smith, 1985). An individual may have many espoused theories about a phenomenon.
- vi. **Theory-In-Use:** Argyris & Schön (1974) states that the term theory-in-use is one element of the theory of action model that focuses on people’s behaviours. This element of the model is normally inferred and not generally known to persons. An individual may have many theories-in-use.
- vii. **Beliefs:** This construct is defined by Richardson (1996) as “Psychologically held understandings, premises, or propositions about the world that are felt to be true.” (p. 103)
- viii. **Perception:** This refers to an individual’s view of an event/phenomena based on his/her experiences (vicarious or personal) and his/her ontological assumptions.

- ix. **Contemporary beliefs** about strategies for motivating students include widely accepted; by science educators, modern teaching strategies used by teachers in the classroom. Such strategies are generally student centred in nature.
- x. **Traditional beliefs** about strategies for motivating students include didactic methods of teaching, where there is a strong teacher-centred learning environment.

Abstract

Previous research has documented the decline in motivation for learning science among school students, particularly at the lower secondary level. The Australian Professional Standards for Teachers (AITSL, 2011) indicate that teachers need to *know students and how they learn*; this includes designing engaging learning experiences to motivate students. As established in previous studies, pre-service teachers' beliefs and professional identities are particularly open to change. However, there has been limited research to date that has investigated factors that influence pre-service teachers' theory of action about strategies for motivating lower secondary students to learn science. Furthermore, this aspect has not been examined in Australia.

This research was conducted in two phases over four months. Phase one of the study was conducted from August 2019 to early October 2019. Phase two data collection was done from October 2019 to December 2019. In phase one of the study, I used a web-based survey to gather data about pre-service teachers' beliefs about effective strategies for motivating science students and how they used those strategies during professional experience placements. Data about the factors that influenced the pre-service teachers' choice of strategies to motivate students to learn science were also gathered.

In Phase Two of this study, case studies were conducted with three secondary science pre-service teachers enrolled in their initial teacher education: secondary science program in regional New South Wales and their supervising teachers. Case studies were conducted to gain a deeper understanding of the factors influencing pre-service teachers' theory of action about strategies for motivating students to learn science during their professional experience placement. Moreover, the case studies provided me with an avenue to understand better how

factors influence pre-service teachers' choice of strategies for motivating students to learn science. In phase two, data gathering methods included semi-structured interviews with three pre-service teachers and their respective supervising teachers. Additionally, there was the use of documentation of the pre-service teachers' science lesson plans and science lesson observations to gather data about the secondary science pre-service teachers' espoused theory and how they planned on enacting their espoused beliefs during their science lessons.

Those research findings highlight the incongruity between what secondary science pre-service teachers believe about motivating students for learning science at the lower secondary school level and how they enact those beliefs during their professional experience placement. Moreover, this incongruity is further exacerbated by the difference between what pre-service teachers learn during their ITE program and their school practice. This finding of incongruity is critical as it is not only relevant to science education but to initial teacher education in general, and as such, this research contributes directly to the body of knowledge in this area.

Moreover, the findings of this research suggest that the participating pre-service teachers' beliefs about motivating students to learn science mainly originated from their own school experiences and from observing other teachers teach. Moreover, although most pre-service teachers' theory of action could have been categorised as contemporary/ modern approaches concerning motivating students to learn science, some pre-service teachers gave responses that deviated from widely accepted contemporary approaches to teaching science.