

2017

Development of the MEAL framework: A multiliteracies approach to engaging adolescents in nutrition education

Samantha Lee Baker
Edith Cowan University

Follow this and additional works at: <https://ro.ecu.edu.au/theses>



Part of the [Nutrition Commons](#), and the [Public Health Commons](#)

Recommended Citation

Baker, S. L. (2017). *Development of the MEAL framework: A multiliteracies approach to engaging adolescents in nutrition education*. Edith Cowan University. Retrieved from <https://ro.ecu.edu.au/theses/1967>

This Thesis is posted at Research Online.
<https://ro.ecu.edu.au/theses/1967>

Edith Cowan University

Copyright Warning

You may print or download ONE copy of this document for the purpose of your own research or study.

The University does not authorize you to copy, communicate or otherwise make available electronically to any other person any copyright material contained on this site.

You are reminded of the following:

- Copyright owners are entitled to take legal action against persons who infringe their copyright.
- A reproduction of material that is protected by copyright may be a copyright infringement. Where the reproduction of such material is done without attribution of authorship, with false attribution of authorship or the authorship is treated in a derogatory manner, this may be a breach of the author's moral rights contained in Part IX of the Copyright Act 1968 (Cth).
- Courts have the power to impose a wide range of civil and criminal sanctions for infringement of copyright, infringement of moral rights and other offences under the Copyright Act 1968 (Cth). Higher penalties may apply, and higher damages may be awarded, for offences and infringements involving the conversion of material into digital or electronic form.

Development of the MEAL framework: A multiliteracies approach to engaging adolescents in nutrition education

This thesis is presented in partial fulfilment of the degree of

Master of Public Health

Samantha Lee Baker

RN, Post Grad Dip (Health Promotion)

Edith Cowan University

School of Medical and Health Sciences

April 2017

ABSTRACT

Establishing and maintaining a healthy diet is integral in promoting optimal health, growth and development. Moreover, the food choices we make and dietary behaviours we adopt are a reflection of the multiple personal, interpersonal and environmental factors to which we are exposed. Consequently, changing food habits and dietary behaviour is complex and requires the implementation of multifaceted public health strategies. Comprehensive nutrition education provided to adolescents during their school years is one such approach.

Adolescence is a period of rapid psychological and physiological changes. At a socio-emotional level, there is a decreased level of dependence on parents and a greater influence from peers and the environment. As a consequence, adolescents tend to be exposed to a plethora of well-marketed and advertised unhealthy foods. These changes can lead to the development of unhealthy dietary behaviours. At a cognitive level, however, adolescence is also marked as a time when the brain is malleable and the ability to process information and reason accelerates. During this period, adolescents develop the capability of thinking in abstract terms and simultaneously consider different perspectives towards an idea. Therefore, this stage of life provides a unique opportunity for learning and skill development relating to food and nutrition. Further, delivering nutrition education within the school setting is one of the most effective environments to educate and promote healthy food habits and behaviours.

The aim of this study was to develop a framework demonstrating the interaction between student engagement and effective pedagogy, and how these constructs can be utilised in an adolescent nutrition education context. This framework will enable teachers, curriculum writers and academics to develop food and nutrition lessons for year 7-8 students, which acknowledge student engagement and effective pedagogy as a key focal point.

A generic qualitative research approach was employed and comprised of three sequential phases. The first phase involved an extensive literature review, establishment of a project reference group and qualitative protocol development. The

second phase included a series of student focus groups and teacher interviews across six Western Australian non-government schools. Using thematic data analysis, focus group and interview transcripts were analysed which resulted in the development of ten key themes. These data analyses, coupled with literature review findings, informed phase three; the development of a framework that is relevant and practical to an Australian nutrition education context. This framework was then reviewed and refined by the project reference group and led to the finalised **Multiliteracies** approach, **Engagement** focused, **Adolescent** specific **Lesson** planning (MEAL) framework.

The MEAL framework and its accompanying guidelines and resources provide a valuable addition to the adolescent nutrition education resources available to Australian teachers. It is anticipated the uptake and use of this framework, will provide teachers with the confidence in knowing their planned lessons have been guided by education and public health research. Moreover, through the implementation of the MEAL framework, teachers have the capacity to contribute towards a positive change in how nutrition education is planned and delivered in the schooling environment and contribute to the overall health outcomes of Australian adolescents.

DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

- (i) Incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education;
- (ii) Contain any material previously published or written by another person except where due reference is made in the text of this thesis; or
- (iii) Contain any defamatory material.

Signed:

A solid black rectangular box used to redact the signature of the author.

Date: 19.4.2017

ACKNOWLEDGMENTS

I would like to sincerely thank my Principal Supervisor, Amanda Devine and Associate Supervisors, Margaret Miller and Julie Dare. Without your ongoing encouragement, support and expertise, this thesis would not have been possible. My thanks also extends to my past and present work colleagues. Thank you for teaching me so much about child health promotion research over the last five years. The knowledge and experience I have gained over this time has been invaluable throughout my Masters journey. Many thanks also to Healthway for providing me with the funds to complete this research through the Healthway Health Promotion Research Training Scholarship. Tim, thank you for coming into my life at the perfect time. Thank you for simply being there for me, for keeping me sane, listening to my rants and reminding me that sometimes a little work-life balance is needed.

Lastly, I would like to thank my family particularly my parents, this thesis is dedicated to you. I cannot express in words how thankful I am for the continuous love, support and encouragement you have provided me throughout all my life. Among many values, you have taught me the importance of inner strength, determination and having a solid work ethic; all of which have played a major role in being able to strive for and achieve my goals including getting to the finish line with this thesis. I couldn't have done any of it without you.

Table of contents

ABSTRACT.....	II
DECLARATION.....	IV
ACKNOWLEDGMENTS.....	V
TABLE OF CONTENTS.....	VI
LIST OF FIGURES.....	X
LIST OF TABLES.....	XI
1 INTRODUCTION.....	1
1.1 Statement of the problem.....	1
1.2 Why is adolescent school nutrition education important?.....	2
1.3 Significance and rationale for current study.....	3
1.4 Thesis structure.....	4
1.5 Definition of terms.....	5
2 LITERATURE REVIEW.....	7
2.1 Introduction.....	7
2.2 Adolescent dietary behaviours and eating habits.....	7
2.3 Adolescent developmental milestones.....	9
2.4 Adolescent school-based nutrition education.....	10
2.4.1 Existing adolescent school-based nutrition education interventions.....	10
2.4.2 Effectiveness of school-based nutrition education.....	12
2.5 Frameworks and models for lesson planning.....	14
2.5.1 Backward design process.....	14
2.5.2 Instructional design models.....	16
2.6 Understanding student engagement.....	18
2.6.1 The importance of student engagement.....	18
2.6.2 Factors influencing adolescent student engagement.....	18
2.6.3 Existing student engagement frameworks.....	20
2.7 Existing Australian pedagogical frameworks.....	24
2.8 A multiliteracy approach.....	28
2.8.1 Towards a future of multiliteracies.....	28
2.8.2 Pedagogy of multiliteracies frameworks.....	28
2.8.3 The i.Plan pedagogical model.....	31
2.9 The Western Australian curriculum.....	33
2.10 Summary.....	33
2.11 Aim of the study.....	34
2.12 Research questions.....	35
3 METHODS.....	36
3.1 Introduction.....	36
3.2 Research paradigm and philosophical framework.....	36
3.2.1 Qualitative research.....	36
3.2.2 Generic qualitative approach.....	37
3.2.3 Implications for research project.....	38
3.3 Research design.....	38
3.4 Phase 1: Developmental phase.....	41
3.4.1 Literature review.....	41

3.4.2	Establishment of project reference group	42
3.4.3	Qualitative protocol development.....	42
3.4.4	Pilot study	44
3.4.4.1	Pilot teacher interviews.....	44
3.4.4.2	Pilot student focus group	45
3.4.4.3	Project reference group feedback.....	46
	49	
3.5	Phase 2: Data collection and analysis	50
3.5.1	School selection and recruitment	50
3.5.2	Teacher participants	51
3.5.3	Student participants.....	51
3.5.4	Data collection	52
3.5.5	Data analysis	52
3.6	Phase 3: Framework development	55
3.6.1	Developing the draft frameworks	55
3.6.2	Project reference group consultation process	55
3.6.3	Developing the MEAL framework	56
3.6.4	MEAL framework in action development and validation	57
3.7	Quality of qualitative research	57
3.7.1	Confirmability.....	58
3.7.2	Dependability	58
3.7.3	Credibility	59
3.7.4	Transferability	59
3.8	Ethics.....	59
3.9	Summary	60
4	RESULTS	62
4.1	Introduction.....	62
4.2	Summary of qualitative sample	62
4.3	Summary of NVivo codes.....	64
4.4	Research question one.....	66
4.4.1	Skills and safety in the kitchen	67
4.4.2	The ‘truth’ to being healthy	69
4.4.3	Influences on food choices.....	71
4.5	Research question two	73
4.5.1	A combination of theory and practice.....	73
4.5.2	Using technology	74
4.5.3	Understanding knowledge	75
4.5.4	Perceived relevance	76
4.6	Research question three	77
4.6.1	Reflection.....	78
4.6.2	Collaborating and networking.....	79
4.6.3	Disciplined implementation	80
4.7	Data analysis summary	80
4.8	Draft frameworks	81
4.9	Project reference group consultation	86
4.10	Final framework development	93
4.11	The MEAL framework	95
4.12	Description of the MEAL framework elements.....	98
4.12.1	Curriculum, assessment and reporting.....	98

4.12.2	Student relevance	98
4.12.3	Health orientated focus	98
4.12.4	Kitchen skills and safety	98
4.12.5	Adapting the i.Plan model.....	99
4.12.5.1	i.Link.....	99
4.12.5.2	i.Think.....	99
4.12.5.3	i.Know.....	99
4.12.5.4	i.Show	100
4.12.5.5	i.Reflect.....	100
4.13	Description of the MEAL framework guidelines	100
4.13.1	Guideline 1	100
4.13.2	Guideline 2	100
4.13.3	Guideline 3	101
4.14	The MEAL framework in action.....	101
4.14.1	Providing teachers with an example	101
4.14.2	Providing teachers with a planning template	107
4.15	Summary	109
5	DISCUSSION, RECOMMENDATIONS AND CONCLUSIONS	111
5.1	Introduction.....	111
5.2	Aim of study	111
5.3	Summary of results	112
5.3.1	Research question one.....	112
5.3.1.1	Skills and safety in the kitchen	113
5.3.1.2	The ‘truth’ to being healthy	115
5.3.1.3	Influences on food choices.....	116
5.3.2	Research question two	117
5.3.2.1	Perceived relevance and understanding knowledge	118
5.3.2.2	Using a combination of theory and practice	119
5.3.2.3	Using technology	120
5.3.3	Research question three	121
5.3.3.1	Reflection.....	122
5.3.3.2	Collaborating, networking and disciplined implementation.....	122
5.4	The integration and influence of the curriculum.....	123
5.5	Tangential MEAL framework components	124
5.6	Implications of study findings	125
5.7	Study strengths.....	126
5.7.1	Involvement of students.....	126
5.7.2	Involvement of teachers and stakeholders	127
5.8	Study limitations	129
5.8.1	Sample selection bias	129
5.8.2	Study design constraints	130
5.8.3	Analysis bias	131
5.9	Recommendations for future research	131
5.9.1	Involving the government sector	131
5.9.2	Pilot testing the MEAL framework.....	132
5.9.3	Whole of school approach	132
5.10	Research impact and significance.....	134
5.10.1	The Impact Management Planning and Evaluation Ladder.....	134
5.10.2	Application of the IMPEL model	136

5.10.2.1	Change for team members	136
5.10.2.2	Immediate students	136
5.10.2.3	Spreading the word	136
5.10.2.4	Narrow opportunistic adoption	138
5.10.2.5	Narrow systemic adoption	138
5.10.2.6	Broad opportunistic adoption.....	138
5.10.2.7	Broad systemic adoption.....	139
5.11	Conclusion	139
6	REFERENCES.....	142
7	APPENDICES.....	157
	Appendix A: Project Timeline	158
	Appendix B: Protocol Review Questions	160
	Appendix C: Finalised Teacher Interview Protocol	164
	Appendix D: Finalised Focus Group Protocol.....	168
	Appendix E: Focus Group Nutrition Topic Cards	172
	Appendix F: Principal Information And Consent Letter	175
	Appendix G: Teacher Information And Consent Letter	179
	Appendix H: Parent/Caregiver Information Pack.....	183
	Appendix I: Project Reference Group Information	189

List of Figures

Figure 1. The Backward Design Process	15
Figure 2. The ADDIE model	16
Figure 3. Factors that influence student engagement in the middle school years.....	19
Figure 4. Engagement subtypes, indicators and outcomes	21
Figure 5. The MeE framework.....	23
Figure 6. Overview of methodological process	40
Figure 7. Food literacy components.....	54
Figure 8. Focus group and interview word cloud	68
Figure 9. Draft framework 1	83
Figure 10. Draft framework 2	84
Figure 11. Draft framework 3	85
Figure 12. Alternative framework designs.....	89
Figure 13. Framework designs presented by graphic designer.....	94
Figure 14. The MEAL framework	96
Figure 15. The relationship between research question one, data analyses themes and associated MEAL framework components	113
Figure 16. The relationship between research question two, data analyses themes and associated MEAL framework components	118
Figure 17. The relationship between research question three, data analyses themes and associated MEAL framework components	121
Figure 18. The Health Promoting Schools Framework	133
Figure 19. The IMPEL ladder	135
Figure 20. Poster presented at the Society for Nutrition Education and Behavior Conference 2016	137

List of Tables

Table 1. Characteristics of successful school-based nutrition education programs.....	13
Table 2. Dimensions and elements of Productive Pedagogies and NSW Model of Pedagogy	25
Table 3. Australian pedagogical framework elements.....	26
Table 4. A pedagogy of multiliteracies and Learning by Design components.....	30
Table 5. The four phases of the i.Plan model	31
Table 6. Strategies for the four phases of the i.Plan model	32
Table 7. Teacher interview and student focus group protocol readability scores.....	44
Table 8. Recommended revisions to interview and focus group protocols	47
Table 9. Determining school SES area classification	50
Table 10. Phases of thematic analysis.....	53
Table 11. Project reference group phone interview questions	56
Table 12. Overview of recruited schools	62
Table 13. Focus group characteristic	63
Table 14. Teacher characteristics.....	64
Table 15. Summary of NVivo codes and research question associated themes	64
Table 16. Feedback received from workshop activity one	87
Table 17. Summary of points justifying framework format	91
Table 18. Exploring Dairy lesson plan exemplar using the MEAL framework	102

1 Introduction

1.1 Statement of the problem

Food is a fundamental part of human life and a powerful reflection of both culture and social identity (Dixey et al., 1999). A healthy, balanced diet has been identified as integral to promoting optimal health, growth and development and in preventing overweight and obesity (National Health and Medical Research Council, 2013; O'Connor, 2011). Despite this knowledge, in the last two generations there has been a significant cultural shift in Australia in regards to how we eat, what we eat, where we eat, where our food comes from and how we learn about food (Vidgen, 2015). The growth in Australia's prevalence of overweight and obesity reflects this change and the Australian Bureau of Statistics (ABS) report 25.7% of Australian children and adolescents aged 5-17 years old were either overweight or obese in 2011 - 2012, an increase of 4.8% since 1995 (ABS, 2013).

This high prevalence in overweight and obesity has been strongly associated to psychological health comorbidities, particularly among children and adolescents, with several studies reporting childhood obesity is linked with lower health related quality of life scores (Sanders, Han, Baker, & Copley, 2015), stress, body image discontent and lower self-esteem (Kalra, De Sousa, Sonavane, & Shah, 2012; Latzer & Stein, 2013). Further, a study by Bell et al., (2011) reported overweight and obese children between 6-13 years old were four to eight times more likely to be teased and bullied than their peers and to report higher levels of depression.

A plethora of literature has also detailed the association between overweight and obesity and medical comorbidities such as asthma, obstructive sleep apnea, dental health concerns, cardiovascular disease, type 2 diabetes and some cancers (Daniels, 2009; National Health and Medical Research Council, 2013; Pulgarón, 2013; Reilly et al., 2003). Moreover, a diet reflecting an insufficient intake of macronutrients and/or micronutrients can lead to linear growth retardation (stunting), organ and tissue dysfunction, altered metabolic processes (de

Onis & Blossner, 2003; Prentice, Schoenmakers, Laskey, Bono, Ginty & Goldberg, 2006) and negatively impacted brain and cognitive development (Bryan et al., 2004). These health concerns impose a burden of disease on individuals, families, communities, national health systems and economic growth (Preventative Health Taskforce, 2009; Verstraeten et al., 2014). Therefore, addressing this public health concern is a challenging and significant national priority.

Reducing Australia's obesity epidemic and changing food-related behaviours involves a complex interplay between biological, personal knowledge, behaviour and obesogenic environmental factors (Contento, 2008a). Consequently, public health strategies targeting food habits and dietary behaviour need to adopt multifaceted approaches in a socio-ecological manner (Contento, 2008b). Comprehensive nutrition education provided to adolescents during their school years is one such critical approach (Contento, 2008a).

1.2 Why is adolescent school nutrition education important?

Evidence suggests children acquire and learn their eating habits as they grow and develop and these have the potential to follow them through into their adult years (Perez-Rodrigo & Aranceta, 2003; Van Cauwenberghe et al., 2010). During the adolescent years, these eating habits are influenced by a range of enablers and barriers. According to Spear (2002), adolescents identify the biggest barrier to healthy eating as a lack of time and being too busy to worry about food, nutrition, meal planning and healthy eating. Fitzgerald, Heary, Nixon and Kelly (2010) support this finding within their qualitative study on 29 individuals (9-18 years old) whereby adolescents reported time constraints and convenience as key barriers to healthy eating. In addition, adolescents often perceive doing 'fun activities' (i.e. being with their friends) as being associated with eating junk food, whereas 'boring activities' (i.e. being at home, with their parents) were associated with eating healthy foods (Spear, 2002). These influences coupled with developmental changes indicate the adolescent years are a pivotal time to focus in on nutrition education.

Adolescence is a period characterised by many significant changes and challenges (Eccles et al., 1993; Ryan, 2008; Spear, 2000). Not only is this a period of rapid physical

maturation (Slee, 2002) but at a socio-emotional level, adolescence represents a period of profound self-awareness and self-concept development (Burnett, Thompson, Bird, & Blakemore, 2011; Sebastian, Burnett, & Blakemore, 2008). Further, during this stage, there is a decreased level of dependence on parents, and conversely, increased influence from peers and the environment (Bech-Larsen & Kazbare, 2014). As a consequence, adolescents tend to be targeted and exposed to a plethora of well-marketed and advertised unhealthy foods which are portrayed as appealing and easily available (Scully et al., 2012), leading to unhealthy dietary behaviours such as a high consumption of added sugars (Australian Bureau of Statistics, 2016; Frary, Johnson, & Wang, 2004).

Cognitively, adolescence is also marked as a time when the brain is malleable and the ability to process information and reason accelerates (Anthony, Williams, & LeCroy, 2014; Watson & Gable, 2013). During this period, adolescents develop the capability of thinking in abstract terms and simultaneously consider different perspectives towards an idea (Slee, 2002). Therefore, this stage of life provides an important opportunity for learning and skills development.

The school setting offers a unique social environment for adolescents, and provides one of the most effective environments to educate and promote healthy food habits and behaviours amongst students (Ardzejewska, Tadros, & Baxter, 2013; Melo, de Moura, Aires, & Cunha, 2013; Perez-Rodrigo & Aranceta, 2003). Further, both the formal and informal curriculum within a school can provide powerful vehicles to influence student eating behaviours and improve food literacy (Kupolati, Gericke, & MacIntyre, 2015).

1.3 Significance and rationale for current study

Given the undeniable evidence which indicates changing food habits and dietary behaviours requires a multifaceted approach, of which education is a key component, it is critical that nutrition education lessons targeting adolescents are developed to be engaging, appropriate and relevant. However, while current research literature provides substantial evidence of existing adolescent school nutrition education programs, there is a paucity of data about how core facets such as adolescent development, student engagement and

effective pedagogy have been integrated during development of lesson plans or nutrition education programs.

The purpose of this study was to seek the thoughts, views and opinions of year 7-8 students and teachers, regarding nutrition education content which they think is important to learn at school, and how this content can be taught in an engaging manner and encompass effective pedagogical approaches. This information was then used to guide the construction of an adolescent specific nutrition education lesson planning framework. Through employing a generic qualitative research approach, core constructs and principles relating to student engagement and effective pedagogy were able to be integrated into the developed framework.

The paucity of existing frameworks similar to those proposed in this study, means this research will provide a valuable contribution to the education arena and specifically it will add to the resources available to Australian teachers to plan and deliver research informed adolescent nutrition education lessons.

1.4 Thesis structure

This thesis is organised into the following chapters:

Chapter 1: Introduction - This chapter identifies the problem and explains the significance of focusing on adolescent nutrition education. It also discusses the purpose of the study, thesis organisation and provides definitions of key terms used throughout this thesis.

Chapter 2: Literature review - This chapter presents an overview of literature found relevant to this study. Specifically, it focuses on providing an overview of the complex nature of adolescent dietary behaviours and how developmental milestones characterising this age group play a role in shaping delivered nutrition education. Existing adolescent school-based nutrition education programs and interventions are then reviewed and critiqued. Given the scarcity of information on nutrition specific lesson planning

frameworks underpinning these programs and interventions, the literature search was broadened to consider generic lesson planning frameworks. Further, as a key focus of this project was on integration of student engagement and effective pedagogical approaches relevant to this age group, student engagement factors and pre-existing pedagogical frameworks were identified and considered in relation to this project's intended purpose.

Chapter 3: Methods - This chapter describes the three key phases of the study and the qualitative methods employed to collect, analyse and interpret these data.

Chapter 4: Results – This chapter presents data gathered from teachers and students, in relation to the research questions. An overview of the draft frameworks is outlined and outcomes of the project reference group workshop and telephone interviews are also discussed. These findings led to the development of the **Multiliteracies** approach, **Engagement** focused, **Adolescent** specific **Lesson** planning (MEAL) framework. A detailed description of the framework's elements and accompanying guidelines has been provided in this chapter, along with an example of how the framework can be applied in practice.

Chapter 5: Discussion, recommendations and conclusion – This chapter brings together the key findings from the study, and discusses how they informed the development of the finalised framework, in light of existing literature. Study strengths, limitations and implications of this study are also discussed, along with study's impact and future research directions.

Appendices – The appendices include copies of all administrative forms used in this study including recruitment letters and consent forms. The teacher interview and student focus group protocol review questions and protocols used are also included, along with images of the focus group nutrition topic cards used.

1.5 Definition of terms

Adolescents: In this study, adolescents refers to children in year 7 or year 8 and aged 11,12, or 13 years old, also referred to as early adolescents.

Food literacy: “Is the scaffolding that empowers individuals, households, communities or nations to protect diet quality through change and strengthen dietary resilience over time. It is composed of a collection of inter-related knowledge, skills and behaviours required to plan, manage, select, prepare and eat food to meet needs and determine intake” (Vidgen & Gallegos, 2014, p. 54).

Multiliteracies: First conceived in 1996 by the New London Group (NLG), multiliteracies refers to a “type of pedagogy that acknowledges the need for a broad view of literacy” (Henderson, 2016, p. 22). Multiliteracies pedagogy considers a wide range of text types, including multimodals and hybrid texts.

Nutrition education: Has been defined as “any combination of educational strategies, accompanied by environment, supports, designed to facilitate voluntary adoption of food choices and other food and nutrition-related behaviors conducive to health and well-being; nutrition education is delivered through multiple venues and involves activities at the individual, community and policy levels” (Contento, 2008a, pp. 176-177).

Pedagogy: The term pedagogy is complex, ambiguous and changing (Mortimore, 1999; Murphy & Gipps, 2005). However, for the purposes of this study, pedagogy has been defined as “the art, and science of teaching. It is more about how teaching is done rather than what is taught, although the two are inter-connected. Pedagogy is about the teaching and learning activities teachers use and how they assess their students’ progress” (NSW Department of Education and Training, 2003, p. 1).

Student engagement (in education): “Meeting student’s developmental needs through tasks which are motivating, challenging and invite affiliation” (Dowson, 2005).

2 Literature review

2.1 Introduction

This chapter contains a literature review of eight areas pivotal to the study. These areas include: adolescent dietary behaviours and eating habits; adolescent developmental milestones; adolescent school-based nutrition education; lesson planning frameworks; understanding student engagement; Australian pedagogical frameworks; the concept of multiliteracies and; an overview of the Western Australian Curriculum. These areas were selected either due to their capacity to justify the need for the proposed adolescent specific nutrition education framework (section 2.2-2.3) or due to their capacity to inform the development of the proposed framework (section 2.3 – 2.9).

2.2 Adolescent dietary behaviours and eating habits

Dietary behaviours and eating habits play a critical role in influencing adolescents' health and wellbeing and their future health as they enter adulthood (Neumark-Sztainer, Story, Perry, & Casey, 1999; Savage, Crawford, Worsley, & Ball, 2007; Viner & Barker, 2005). Whilst some evidence suggests dietary behaviours and eating habits are established during the early years (Birch & Fisher, 1998), these behaviours and habits may substantially change during the adolescent transition period (Bech-Larsen & Kazbare, 2014; Jasik & Lustig, 2008; Savage, Crawford, et al., 2007). Adolescence is characterised by physical growth changes along with prominent psycho-social changes, resulting in adolescents seeking to test their autonomy and independence from parents and other figures of authority, while at the same time conforming to the social pressures exerted by their peers (Bech-Larsen & Kazbare, 2014; Jasik & Lustig, 2008). Such changes can lead to adolescents engaging in risk-taking behaviours and adopting unhealthy eating habits including the consumption of energy dense and nutrient poor foods (Jasik & Lustig, 2008; Neumark-Sztainer et al., 1999; Savage, Crawford, et al., 2007; Smith, Straker, Kerr, & Smith, 2015).

According to the ABS (2016), close to three-quarters of children and adolescents aged 9-18 years exceed the World Health Organization's (WHO) recommendation to consume no more than 10 percent of their daily energy needs from free sugars (sucrose, glucose, fructose, dextrose and lactose added during manufacturing and naturally present sugars in food and drinks such as honey, fruit juices) (WHO, 2015). The highest intakes are evident amongst 9-13 year old females and 14-18 year old males who consume approximately 17 teaspoons and 22 teaspoons each day, respectively (ABS, 2016; Smith et al., 2015). Soft drinks, sports and energy drinks were the leading sources of these consumed free sugars (ABS, 2016). Additionally, the consumption of foods high in fat and salt, such as pizza and fries, tend to increase during this period, and snacking and portion sizes also increase (Piernas & Popkin, 2011; Savidge, MacFarlane, Ball, Worsley, & Crawford, 2007). As a result of unhealthy dietary behaviours and eating habits such as these, adolescents are at risk of becoming overweight, obese and developing associated co-morbidities.

The growth in national prevalence of overweight and obesity is well documented, with the ABS indicating 25.7% of children and adolescents aged 5-17 years old were either overweight or obese in 2011 - 2012, an increase of 4.8% since 1995 (ABS, 2013). This rising prevalence has been strongly linked to adolescent medical complications, including but not limited to, hypertension, obstructive sleep apnea, dental problems and lifelong health concerns such as cardiovascular disease, type 2 diabetes and some cancers (Daniels, 2009; National Health and Medical Research Council, 2013; Pulgarón, 2013; Reilly et al., 2003). Additionally, the rise in adolescent overweight and obesity has been associated with a trend in earlier pubertal onset including earlier thelarche (breast development) and menarche (Jasik & Lustig, 2008). Moreover, an extensive body of literature has also detailed the association between overweight and obesity and psychological health co-morbidities. In particular, studies have reported childhood obesity is linked with lower health related quality of life scores, stress, body image discontent, lower self-esteem and higher rates of being teased and bullied (Bell et al., 2011; Kalra et al., 2012; Latzer & Stein, 2013; Sanders et al., 2015). Beyond the complications associated with overweight and obesity, poor dietary behaviours can also result in other nutrition related issues such as

stunting, deficiencies in cartilage and bone production, skeletal abnormalities and impaired blood clotting (Prentice et al., 2006).

Changing adolescent dietary behaviours and reducing the prevalence of overweight, obesity and associated health complications involves a complex interplay between multiple factors (Contento, 2008a). Consequently, food and nutrition related public health strategies need to be varied and extensive. Developing and delivering nutrition education appropriate to adolescents is one such key strategy. To effectively guide the direction of future adolescent nutrition education, however, a thorough understanding of adolescent development, pre-existing adolescent nutrition education, engagement principles and pedagogy is required.

2.3 Adolescent developmental milestones

There are few life phases characterised by as many changes and challenges as the adolescent developmental period (Bech-Larsen & Kazbare, 2014; Eccles et al., 1993; Ryan, 2008; Spear, 2000). Physically, adolescence is a period of rapid maturation with the development of primary and secondary sex characteristics, thelarche, menarche and the pubertal growth spurt (Christie & Viner, 2005; Marshall & Tanner, 1969, 1970). Such physical changes can have a profound impact on adolescent psychological development including their self-esteem, body image and self-concept development (Burnett et al., 2011; Gatti, Ionio, Traficante, & Confalonieri, 2014; O'Dea, 2004; Sebastian et al., 2008; Van Cauwenberghe et al., 2010). At a socio-emotional level, Erikson (1963) describes the adolescent period as a time whereby individuals experience an identity versus role confusion crisis. Exploring alternative beliefs, values and behaviours becomes evident during these years and cultural and social influences can be instrumental in shaping how an individual develops their sense of identity (Bech-Larsen & Kazbare, 2014; Jasik & Lustig, 2008; Woolfolk & Perry, 2012)

Whilst developing a sense of identity plays a role within all phases of childhood development, it becomes a focal point during adolescence. According to Piaget, during adolescence, children develop formal operations, resulting in children being able to 'think about thinking' (metacognition), reason, think in abstract terms and consider multiple

perspectives towards a concept (Slee, 2002). As a consequence, adolescents are capable of questioning who they are, and what they want to be (Woolfolk & Perry, 2012). However, it has been debated that the rate at which adolescents experience this cognitive growth is also influenced by physiological changes in the brain and by a variety of contextual factors which support or scaffold cognitive development and learning (Woolfolk & Perry, 2012). Scaffolded learning is a key element of Vygotsky's theories. Vygotsky believed knowledge is constructed through the interplay between a learner and their interaction with others and the environment (Sanders & Welk, 2005). At the core of Vygotsky's theories is the concept of the Zone of Proximal Development (ZPD) (Vygotsky, 1997). The ZPD can be defined as "a child's actual development level as determined by independent problem solving and their higher level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" Vygotsky cited in Daniels (2005, p. 5). In an education setting therefore, educators have the capacity to influence and support student learning and cognitive development.

This understanding of adolescent development, coupled with the strong body of evidence indicating adolescents are susceptible to adopting unhealthy eating habits (ABS, 2016; Frary et al., 2004), means the adolescent years offers a unique opportunity for fostering learning and skill development relating to nutrition education.

2.4 Adolescent school-based nutrition education

2.4.1 Existing adolescent school-based nutrition education interventions

With increasing recognition of the pivotal role of nutrition education during the adolescent years and the valuable setting the school environment provides (Melo et al., 2013; Peralta, Dudley, & Cotton, 2016; Van Cauwenberghe et al., 2010), a number of school-based nutrition education interventions have been established both nationally and internationally.

Thirteen UK school-based healthy eating interventions specific to adolescents were detailed in a review by Van Cauwenberghe et al. (2010). These highlighted interventions significantly varied in duration from 1 week to 2 years and many required the support and

knowledge of the research team along with teachers and other school staff. Dominant nutrition topics integrated into these interventions included increasing food and vegetable consumption (Gratton, Povey, & Clark-Carter, 2007; Martens, Van Assema, Paulussen, Van Breukelen, & Brug, 2008), reducing dietary fat intake especially in snacks (Haerens, Deforche, et al., 2007; Martens et al., 2008), promoting healthy food choices and physical activity (Haerens, De Bourdeaudhuij, et al., 2007; Passmore & Harris, 2005), and encouraging breakfasts (Martens et al., 2008). Most of these studies (n=12) delivered this content through classroom-based activities; however, five studies also focused on environmental modifications including improving accessibility and availability of healthy foods in the school environment. Despite the strong orientation towards classroom-based activities, a lack of explicit detail was provided in these studies on the planning processes involved in developing and delivering the classroom-based activities.

Brooks and Begley (2014) provided a comprehensive review of adolescent food literacy programs. At the time of publication, this paper highlighted 23 adolescent food literacy programs which had published details regarding their development, implementation and/or evaluation phases. Seventeen of these programs were in the USA, three in the UK, two in Australia and one in Canada. Programs were tailored towards the 13-17 year old age group and topics addressed included meal preparation, cooking skills, nutrition knowledge, food safety, food preferences and healthy food selection. Again, whilst the literature was rich in describing program characteristics such as program duration, topics covered, evaluation methods and program outcomes, there was a dearth of information describing how the curriculum writers, educators or classroom teachers planned the lessons.

A number of other Australian adolescent nutrition education interventions have been developed and implemented over the years. The Body Basics program, for example, was designed with the intention of providing adolescents with information on nutrition, physical activity and positive attitudes towards weight management and body image (O'Dea, 2002). These resources consisted of a number of fact sheets and 27 lesson plans, which delivered content based on a comprehensive needs assessment undertaken in the early stages of the project. Similarly, Refresh.ED provides kindergarten to year 10 teachers with a series of

online teaching resources which align with the National Australian Curriculum (Baker, Miller, & Devine, 2014). Content within the Refresh.ED program were developed from an evidence-based food and nutrition scope and sequence (Baker & Miller, 2014; Baker et al., 2014), and addresses four focus areas: food and drink source, food and drink choice, food and drink experience and food and drink health. Within the high school years, Refresh.ED consists of nine curriculum material units, 10 teacher information sheets and various nutrition fun facts to support teachers in the delivery of their nutrition education lessons (Refresh.ED, 2014).

The author of this study has been involved in the Refresh.ED project since its onset in 2013, and has been an active team member in each phase of the Refresh.ED project including the development, promotion and evaluation of the resources. In particular, the author of this study was responsible for writing many of the high school units. It became apparent to the author early in her work that adolescent nutrition education needed to encompass innovative and creative teaching strategies, which were specifically tailored towards the needs of students in this age group. This Masters project therefore emerged based on these conclusions and it is intended the finalised framework developed from this research will complement and extend the original Refresh.ED work.

2.4.2 Effectiveness of school-based nutrition education

As evident, much of the current published literature relating to adolescent nutrition education discusses intervention or program characteristics. In addition, a substantial body of literature has also been dedicated towards examining the effectiveness of school-based nutrition education. According to Perez-Rodrigo and Aranceta (2003), a defining list of attributes underpin successful school-based nutrition education interventions and programs, Table 1.

Table 1. Characteristics of successful school-based nutrition education programs

Behavioural focus
Theory-driven strategies
Adequate time and intensity
Family involvement
Multicomponent strategies
Developmentally appropriate
Considers needs of students, teachers and school
Self-assessment elements (older children)
Self-efficacy. Strengthen skills, influence attitudes, behavioural capability.
Adequate teaching methods
Modify school environment: access to healthy food; school food policies, school meals
Teacher training opportunities
Cultural relevance
Evaluation

(Perez-Rodrigo et al., 2003, p.S83)

A behavioural focus and theory driven strategies are a priority on the list as it is well described in the nutrition education literature that behaviour focused programs tend to be more effective than knowledge-based programs. Furthermore, “theory driven interventions emphasise specific, desired behaviours as well as the motivators and behavioural skills necessary to engage in these behaviours” (Hoelscher, Evans, Parcel, & Kelder, 2002, p. S53). The value of these attributes are evident in numerous nutrition education interventions, as many programs are underpinned by behaviour change theories. The theory of planned behaviour (Ajzen, 1985, 2011), for example, was highlighted in nutrition education interventions described by Gratton et al., (2007), Haerens, De Bourhdeauhuij et al., (2007) and Tsorbatzoudis (2005). The social cognitive theory (Bandura, 1986) was also found to be a commonly integrated and underpinning theory within nutrition education programs and interventions, such as those described by Chesson, Hey, Nicolson & McDermott, (2009) and Condrasky, Quinn and Cason, (2008).

Such theories are useful and promote effective nutrition education (Hoelscher et al., 2002), however, they provide little practical guidance for teachers, educators or curriculum writers regarding how to plan and deliver nutrition education lessons suitable for an adolescent audience.

2.5 Frameworks and models for lesson planning

2.5.1 *Backward design process*

Wiggins and McTighe (2005) devised an innovative model to assist educators with planning units of work. This model, known as the Backward Design Process, advocates for a logical sequence to the planning process (Figure 1). The process commences with identifying the desired results. In this first stage, teachers are to consider the goals they want students to achieve, examine content standards and review the expectations set out in the State or National curriculum. Given the plethora of possible content which would become evident during this phase, Wiggins and McTighe propose three underpinning steps to choose the most suitable content. These include: (1) identifying knowledge which students consider important to know; (2) identifying knowledge and skills which are critical for students to achieve key performances and; (3) selecting the “enduring understandings”, or the key ideas students can take away and retain from the unit of work.

The second stage of the Backward Design Process refers to determining acceptable evidence. In other words, during this stage the teacher considers how they will know if a student has achieved the desired results. This stage prompts teachers to consider assessment in the early stages of curriculum design rather than at the end, similar to traditional curriculum designs. Finally, the third stage is whereby the teacher plans learning experiences and instruction. This logical sequence of the Backward Design Process promotes greater synergy between desired results, performance indicators and the delivered teaching and learning experiences and hence, facilitates greater student performance (Wiggins & McTighe, 2005).

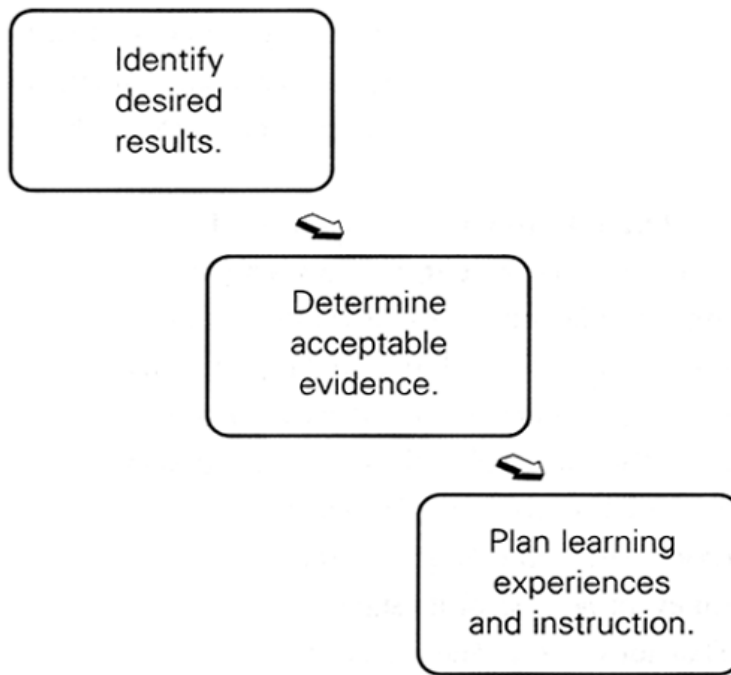


Figure 1. The Backward Design Process

Three sequential stages are encompassed in the Backend Design Process.

(Wiggins & McTighe, 2005, p. 18)

As discussed by Jones, Vermette and Jones (2009), one of the pitfalls of the Backward Design Process is that it ceases at the creation of a unit of work, rather than continuing to consider the development of individual lessons. To overcome this, Jones et al., (2009) proposed the synthesis of the Backward Design Process with the Two Step Model for lesson planning (Flynn, Mesibov, Vermette, & Smith, 2004). Similar to the Backward Design Process, the Two Step Model commences with identifying a ‘learning target’ or goal for the lesson. The teacher must then consider “what do students need to have accomplished by the end of the lesson?” (discovery phase) and “what scaffolds are required for students to reach that end?” (exploratory phase) (Jones et al., 2009, p. 357). Jones et al., (2009) demonstrate how the Backward Design Process and Two Step Model can be used in conjunction with one another, through presenting a year seven mathematics class example. However, a lack of detail is provided describing if these models have been pilot tested together and if so, how successful this process was.

2.5.2 Instructional design models

The literature is rich when it comes to describing instructional design models. Instructional design models, in an education context, can be described as models which assist educators to understand learning theory and apply it in a real life context. There are numerous instructional design models, many of which have similar principles and elements (Instructional Design Central, 2016).

The Analysis, Design, Development, Implementation, Evaluation (ADDIE) model (Figure 2) uses a systematic behavioural approach to designing and developing learning experiences (Khalil & Elkhider, 2016). The ADDIE model consists of five key phases, with the outcome of each phase informing the next (Khalil & Elkhider, 2016). During the analysis phase, the problem, context, learning environment, goals and objectives are identified and established. During the design phase the learning objectives which guide the content outlines, assessments and instructional strategies are selected. The development phase therefore focuses on creating the instructional contents, such as the lesson plans and assessment instruments. The implementation phase describes the delivery of the content and finally, the evaluation phase includes formative and summative evaluation (Instructional Design Central, 2016; Khalil & Elkhider, 2016).

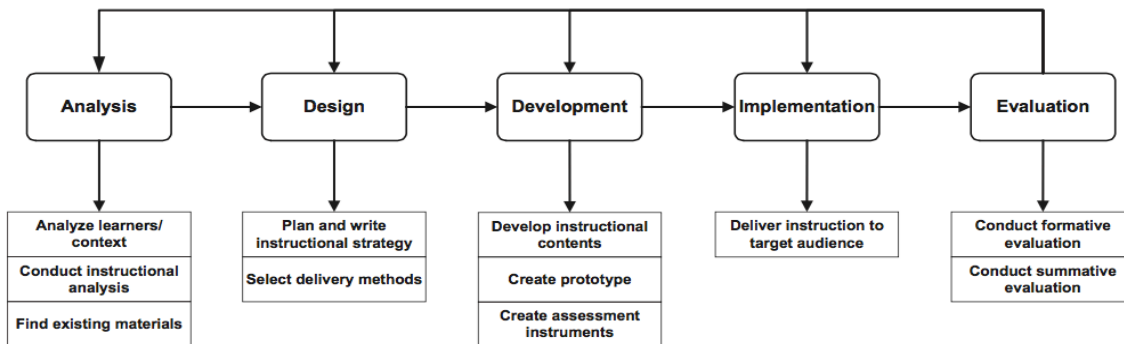


Figure 2. The ADDIE model

Presents five stages to developing and designing learning experiences.

(Khalil & Elkhider, 2016, p.150)

Similarly, the Dick and Carey model of instructional design (Dick, Carey, & Carey, 2005) consists of similar elements; however, it is broken up into nine different stages which focus around the teacher, learning, instructional materials and the learning environment (Khalil & Elkhider, 2016). These nine stages include: identify instructional goals; conduct instructional analysis; identify entry behaviors and learner characteristics; write performance objectives; develop criterion-referenced test items; develop instructional strategy; develop and select instructional materials; develop and conduct formative evaluation; and develop and conduct summative evaluation. The step-by-step and detailed approach of the Dick and Carey model makes it a useful and easy-to-use process for novice instructional design users (Khalil & Elkhider, 2016).

Although this chapter limits its discussion on instructional design to the ADDIE and Dick and Carey models, a variety of others exist, including the Kemp instructional design model and the Successive Approximation Model (Instructional Design Central, 2016). Irrespective of the selected model, instructional design aims to provide structure to achieve efficient teaching and learning outcomes, across various disciplines. Whilst some literature details how these models can be applied in areas such as nursing education (Obizoba, 2015), a paucity exists when it comes to adolescent nutrition education.

Whilst models such as the Backward Design Process or the highlighted instructional design models have the potential to provide clear guidance to teachers on how to plan nutrition education lessons, they lack a recognition of student engagement principles and effective pedagogical approaches. Given it is well described in the literature that the success of student learning and nutrition education is related to crucial elements to motivate student interest and enthusiasm for making healthy eating choices (Contento, 2008a), it is imperative that an understanding of student engagement factors and principles are integrated into the development of school-based nutrition education lessons.

2.6 Understanding student engagement

2.6.1 The importance of student engagement

Often viewed as one of many factors necessary for best practice pedagogy (Liberante, 2012), student engagement warrants significant attention given its correlation with improving academic achievement, participation and school completion (Chase, Hilliard, Geldhof, Warren, & Lerner, 2014; Dotterer & Lowe, 2011; Kortering & Christenson, 2009; McMahon, Munns, Smyth, & Zyngier, 2012). However, the term ‘student engagement’ has become highly contested over the years with definitions varying depending on a researcher’s epistemological stance.

The author of this study considers student engagement as a multidimensional and interconnected construct commonly described as a malleable state of being influenced by a range of internal and external factors (Poskitt & Gibbs, 2010). This meaning integrates behavioural, psychological, cognitive and academic components to student engagement, and emphasises that for students to engage with their work, their learning experience needs to be meaningful and authentic. As described by Maeroff cited in McMahon, Munns, Smyth and Zyngier (2012, p. 65), this meaning is created “from seeing the relationship of parts of knowledge to the whole rather than dealing with isolated bits of information”. This process requires students to make connections between what they already know and what they have just learnt.

The variability within and between each of the aforementioned student engagement components aids to explain why some students may be engaged in a learning process whilst others disengage. A strong body of literature seeks to describe factors which influence this student engagement.

2.6.2 Factors influencing adolescent student engagement

According to the New Zealand publication by Poskitt and Gibbs (2010), eight key factors or indicators have been found to have an impact on student engagement, learning and

achievement (Figure 3). Whilst many of these factors are interrelated, some have been found to be more influential than others.



Figure 3. Factors that influence student engagement in the middle school years

A visual representation of eight key factors found to influence student engagement.

(Poskitt & Gibbs, 2010, p. 24.)

Factor one highlights the importance of fostering good relationships between a teacher and a student. It is through their relationships with teachers that students learn how to operate in an academic environment and seek help and support to facilitate their learning. Relational learning, or factor two, refers to providing students with the opportunities to work with their peers during lessons. It is well known peer influences are critical during the adolescent years and according to research conducted by Patrick, Ryan and Kaplan (2007), encouraging relational learning in the classroom can positively impact the mastery of goals, academic efficacy, social efficacy, self-regulatory strategies and student achievement. The acquisition of factor three, dispositions to be a learner, are obtained through the experiences to which a student is exposed. Motivation (factor four) is often seen as being equivalent to engagement (Poskitt & Gibbs, 2010); however, in this thesis these terms are distinctively

unique. Motivation is viewed as the energy or drive an individual possesses to learn, work and achieve their potential. Engagement, however, describes the underpinning behaviours which are associated with this energy and drive (Liem & Martin, 2012). Nurturing motivation amongst students is critical for facilitating student learning and achievement. Fostering personal agency and promoting self-efficacy were identified as the fifth and sixth factors (Poskitt & Gibbs, 2010). Finally, teaching students to be goal orientated and in control of their own learning (factor seven: goal orientation, factor eight: academic self-regulated learning) were identified as the final factors influencing student engagement during the early adolescent or middle school years. This complex and multidimensional nature of student engagement has been well noted in the literature and many academics have attempted to conceptualise its features into various frameworks.

2.6.3 Existing student engagement frameworks

Appleton, Christenson, Kim and Reschly (2006) conceptualised student engagement through identifying four subtypes of engagement (academic, behavioural, cognitive and psychological), their influencing contexts, and examples of corresponding indicators (Figure 4). With reference to this model, Appleton et al., (2006) suggested there has been an overemphasis in school practice on academic and behavioural engagement due to their observable indicators, but little focus has been given to cognitive and psychological engagement indicators. This led Appleton et al., (2006) to develop the Student Engagement Instrument (SEI) to measure these less overt subtypes of student engagement.

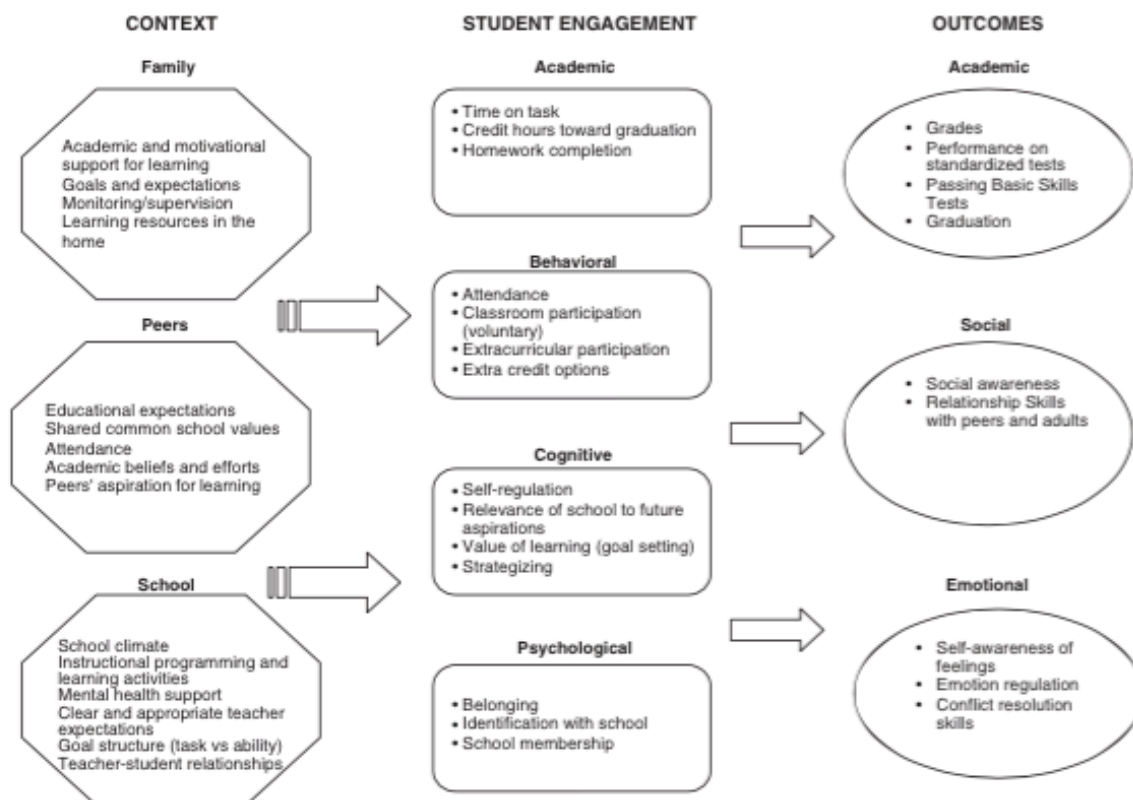


Fig. 1. Engagement subtypes, indicators and outcomes.

Figure 4. Engagement subtypes, indicators and outcomes

Four engagement subtypes, the contexts influencing them and examples of their corresponding indicators.

(Appleton et al., 2006, p.430)

Similarly, in an Australian context, Martin (2001, 2002, 2003, 2008) developed a Motivation and Engagement Wheel and an accompanying Motivation and Engagement Scale (MES) assessment tool. These tools stemmed from recognition that whilst the research and theory surrounding student engagement has continued to grow, much of this research lacks practicality and application (Liem & Martin, 2012). The Motivation and Engagement Wheel conceptualises motivation and engagement into four higher-order factors (adaptive cognition, adaptive behaviour, impeding cognition and maladaptive behaviour) with eleven underpinning components which integrate core principles of psycho-educational theory and research (Liem & Martin, 2012). The complementing MES consists of eleven subscales reflective of the underpinning factors of the Wheel.

Taken together, these two tools seek to assess and evaluate motivation and engagement in a range of settings. However, this psycho-educational approach lacks recognition of the social processes involved in student engagement (Munns & Martin, 2005) and similar to Appleton et al.'s model (2006) fails to integrate the pivotal role of pedagogy in the educational setting.

Munns and Martin (2005) adopted a different perspective in developing the MeE framework (Figure 5), which encompasses both psychological and sociological understandings of student motivation and engagement. This framework evolved out of Australia's Fair Go Project, which focused on researching the "classrooms of exemplary teachers who were making a positive impact on the engagement of students from low socioeconomic backgrounds" (Callow & Orlando, 2015, p. 353).

Pivotal to the MeE framework are three distinct but related areas. The first of these (Motivation) provides a psychological perspective at the individual level and is informed by the aforementioned Student Motivation and Engagement Wheel (Martin, 2008). The second area ('e'ngagement) considers the multi-faceted nature of engagement and explores classroom practices which assist towards meaningfully engaging students. Finally, the third area ('E'ngagement) considers a whole-of-school approach and the policies, practices and interventions which need to be implemented to assist all students to feel school is a place that 'works for them' (Munns et al., n.d.).

The MeE framework provides a number of identified purposes. For example, by acknowledging classroom practices, this presents a starting point for educators to consider how alternative pedagogies can be used to further engage students (Munns & Martin, 2005). Despite this recognition, the MeE framework does not reflect pedagogy in the same comprehensive nature as stand-alone pedagogical frameworks, and hence its use is limited in nutrition education lesson planning.

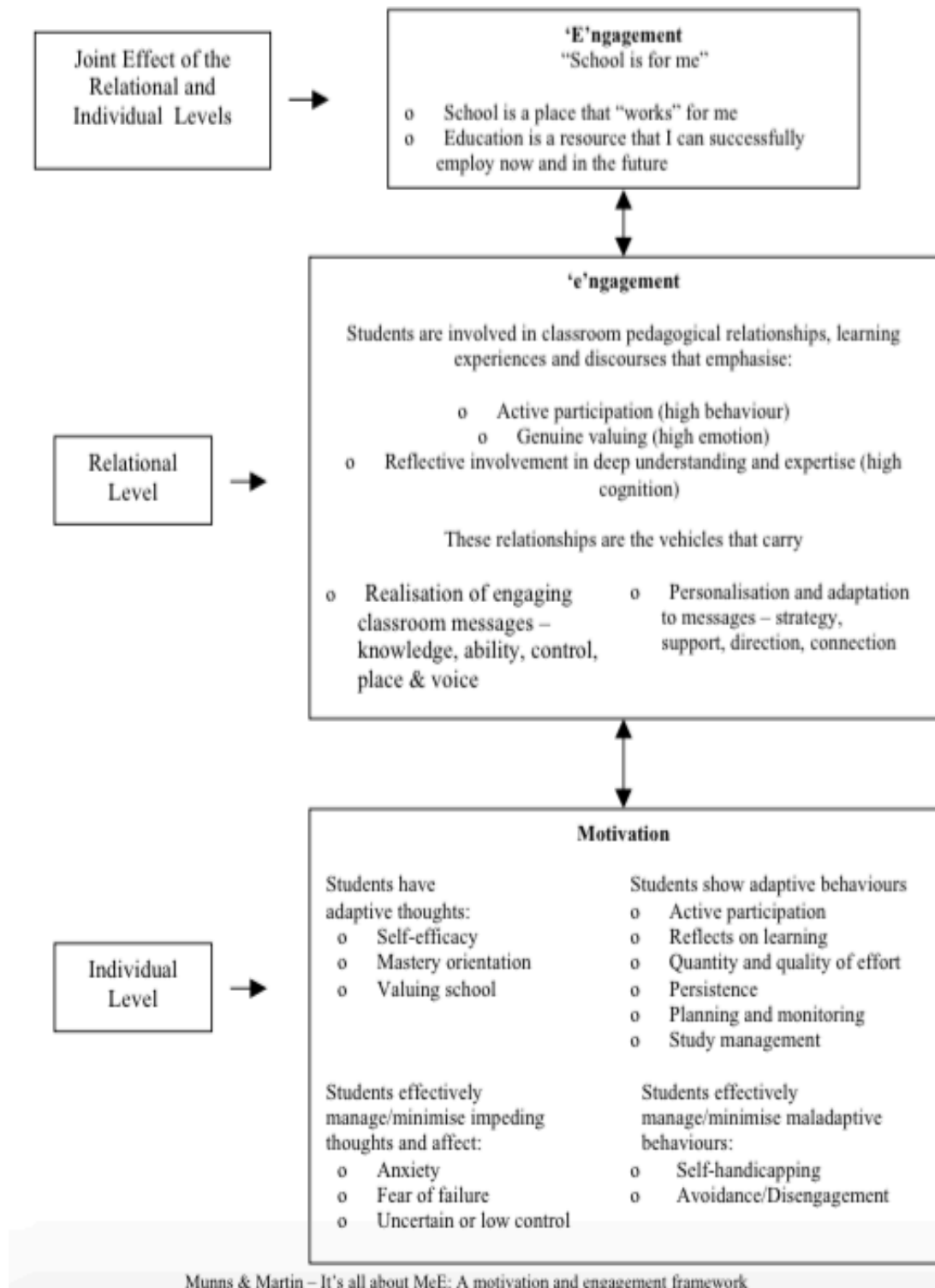


Figure 5. The MeE framework

The MeE framework provides a psychological and sociological perspective on student motivation and engagement through defining three distinct but interrelated levels.

(Munns & Martin, 2005, p.4)

2.7 Existing Australian pedagogical frameworks

Pedagogy, often referred to as the “art and science of teaching” (Sellar & Cormack, 2007, p. 2) is an integral concept in education as it recognises the influence of teaching practices on the quality of learning which takes place in the classroom environment. As a consequence, the academic literature is rich and extensive when it comes to exploring pedagogy and its constructs. For the purposes of this review, discussion is limited to exploring pedagogical frameworks implemented across Australia. Such frameworks provided the potential to influence and guide the development of the framework produced in this study.

In recent years the reform of teaching and teacher education in Australia has strongly been encouraged due to concerns regarding teaching quality and quality student learning (Gore, Griffiths, & Ladwig, 2004). This has led to many Australian States and Territories devising their own pedagogical frameworks to guide teaching practice. For example, the Productive Pedagogies framework was developed from the Queensland School Reform Longitudinal Study (QSRLS), and extended on Newmann, Marks and Gamoran’s (1996) earlier work surrounding authentic pedagogy. This multi-dimensional framework consists of 20 pedagogical elements and four primary categories (intellectual quality, supportive classroom environment, recognition of difference and connectedness) (Gore et al., 2004; Sellar & Cormack, 2007) and its extensive nature has enabled both the psychological and sociological perspectives of pedagogy to be integrated.

Similarly, the New South Wales (NSW) Model of Pedagogy was developed in 2003 to promote teacher professional reflection and improve school practices (Department of Education and Training, 2003). Comparable to the Productive Pedagogies framework, the NSW Model of Pedagogy identifies three broad dimensions (intellectual quality, quality learning environment and significance) (Table 2). Underpinning each of these dimensions are a number of elements which have the “practical capacity...to act as an indicator of the underlying dimension” (Department of Education and Training, 2003, p. 9).

Table 2. Dimensions and elements of Productive Pedagogies and NSW Model of Pedagogy

Productive Pedagogies framework	NSW Model of Pedagogy
Intellectual Quality	Intellectual Quality
Higher-order thinking	Deep knowledge
Deep knowledge	Deep understanding
Deep understanding	Problematic knowledge
Substantive conversation	Higher-order thinking
Knowledge as problematic	Metalanguage
Metalanguage	Substantive communication
Supportive classroom environment	Quality learning environment
Student direction	Explicit quality criteria
Social support	Engagement
Academic engagement	High expectations
Explicit quality performance criteria	Social support
Self-regulation	Students' self-regulation
	Student direction
Recognition of difference	Significance
Cultural knowledge	Background knowledge
Inclusivity	Cultural knowledge
Narrative	Knowledge integration
Group identity	Inclusivity
Active citizenship	Connectedness
	Narrative
Connectedness	
Knowledge integration	
Background knowledge	
Connectedness to the world	
Problem-based curriculum	

(Department of Education and Training, 2003)

A review of other Australian pedagogical frameworks including the Victorian Principles of Learning and Teaching P-12, ACT Model of Pedagogy and the Tasmanian Learning, Teaching and Assessment Principles (Sellar & Cormack, 2007), demonstrates there is a consistency in core pedagogical approaches; however, there is an inconsistency in terminology used and how these frameworks represent the psychological and sociological perspectives of pedagogy across a continuum of four domains (thinking, knowledge, classroom and society) (Table 3). In addition, these frameworks predominately focus on framing pedagogical outcomes, with little focus given to the teaching processes undertaken to achieve these outcomes, and hence restricting their use and application during the lesson planning process.

Table 3. Australian pedagogical framework elements

Pedagogies Comparison Table		Queensland	New South Wales	Victoria	Tasmania	Australian Capital Territory
Psychological Thinking		<ul style="list-style-type: none"> - Higher order thinking - Deep understanding 	<ul style="list-style-type: none"> - Higher order thinking - Deep understanding 	<ul style="list-style-type: none"> - Principle 4 'deep thinking' 	<ul style="list-style-type: none"> - Principle 2 'meaning and understanding' - Principle 10 'metacognition' - Principle 12 'complex learning' 	<ul style="list-style-type: none"> - Principle 3 'metacognition'
	Knowledge	<ul style="list-style-type: none"> - Deep knowledge - Knowledge as problematic - Metalinguage - Knowledge integration - Problem-based curriculum 	<ul style="list-style-type: none"> - Deep knowledge - Knowledge as problematic - Metalinguage - Knowledge integration 	<ul style="list-style-type: none"> - Principle 3 'build on prior knowledge' 	<ul style="list-style-type: none"> - Principle 2 'knowledge constructed' - Principle 4 'connecting knowledge' - Principle 11 'applying knowledge' 	<ul style="list-style-type: none"> - Principle 1 'prior knowledge' - Principle 2 'deep knowledge and connectedness' - Principle 4 'challenge'
	Classroom (micro-social)	<ul style="list-style-type: none"> - Substantive conversation - Student direction - Social support - Academic engagement - Explicit quality - performance criteria - Self-regulation 	<ul style="list-style-type: none"> - Substantive conversation - Student direction - Social support - Academic engagement - Explicit quality - performance criteria - Self-regulation - High expectations 	<ul style="list-style-type: none"> - Principle 1 'supportive environment' - Principle 2 'independence and interdependence' - Principle 4 'substantive discussion and high expectations' - Principle 5 'explicit assessment and feedback' 	<ul style="list-style-type: none"> - Principle 1 'high expectations' - Principle 3 'negotiation' - Principle 8 'learner direction' - Principle 5 'social relationships' - Principle 6 'positive environment' - Principle 7 'positive expectations' 	<ul style="list-style-type: none"> - Principle 5 'explicit expectations and feedback' - Principle 6 'individual differences' - Principle 8 'collaborative learning'
Sociological	Society (macro-social)	<ul style="list-style-type: none"> - Cultural knowledge - Inclusivity - Narrative - Group identity - Active citizenship - Background knowledge - Connectedness to the world 	<ul style="list-style-type: none"> - Cultural knowledge - Inclusivity - Narrative - Background knowledge - Connectedness to the world 	<ul style="list-style-type: none"> - Principle 1 'cultural differences' - Principle 3 'student differences and needs' - Principle 6 'community connection' 	<ul style="list-style-type: none"> - Principle 3 'inclusion' - Principle 9 'social context' 	<ul style="list-style-type: none"> - Principle 7 'socio-cultural effects'

(Sellar & Cormack, 2007, p.14)

2.8 A multiliteracy approach

2.8.1 Towards a future of multiliteracies

At the core of education is the need to provide students with the skills and capabilities to construct meaning and knowledge, and thus successfully navigate life. Literacy pedagogy has been seen to play a key role in achieving this. However, as literacy pedagogy has traditionally referred to teaching learning through reading and writing in a restrictive monolingual, monocultural manner (The New London Group, 1996), its value in today's 21st century has been questioned. With a significant increase in globalised societies and a growing reliance on information and communication technologies in day-to-day life, an increasing body of educational literature has begun to support the notion of a pedagogy of multiliteracies.

First conceived in 1996, by the New London Group, multiliteracies refers to:

Both meaning making from texts and the multimodal nature of texts to explicitly define how meaning making in different cultural, social or domain-specific contexts is made through different textual modes, including written-linguistic modes....Therefore the term multiliteracies describes the skills and capabilities of those who interact with and make meaning from multimodal texts within and across contexts” (Healey, 2016, p. 7).

The New London Group identified six elements to this meaning making process: linguistic, visual, audio, gestural, spatial meanings and multimodal patterns.

2.8.2 Pedagogy of multiliteracies frameworks

The New London Group developed four key components to translate the ‘what’ of multiliteracies into the ‘how’. These included: situated practice; overt instruction; critical framing and transformative practice. The first of these, situated practice, relates to “the immersion in meaningful practices within a community of learners who are capable of playing multiple and different roles based on their backgrounds and experiences” (The New London Group, 1996, p. 85). This aspect must consider both the various needs of the learner in order to effectively evoke motivation and to translate what they have learnt into

practice. Overt instruction is defined as educators placing focus on ‘active interventions’ to scaffold student learning processes. Critical framing focuses student interpretation on the social and cultural contexts. This requires students to review what they have learnt in relation to its context, and finally, transformative practice relates to the transfer of the “meaning-making practice, which puts the transformed meaning to work in other contexts or cultural sites.” (Healey, 2016, p. 8).

Kalantzis, Cope and the Learning by Design Project Group (2005) refined and re-conceptualised the framework proposed by the New London Group, leading to the creation of the Learning by Design framework. This framework comprises four knowledge processes. Table 4 highlights how these processes relate to the New London Group pedagogy of multiliteracies. This focus on the knowledge processes encourages teachers to consider how each one applies to their teaching content and context, and further, how these processes effectively promote, support and scaffold student learning (Yelland, Kalantzis, & Cope, 2008).

According to a study by Yelland et al., (2008), whereby this framework was implemented in a three year study across Victoria, Queensland and the ACT, the Learning by Design framework provided teachers with new ways to plan, think and adapt a broad range of learning styles, hence reinforcing the value and shift towards a pedagogy of multiliteracies in today’s 21st century classrooms. Whilst comprehensive in its design, the complexity of the Learning by Design framework potentially limits teacher uptake and application in lesson planning.

Table 4. A pedagogy of multiliteracies and Learning by Design components

A pedagogy of multiliteracies (The New London Group, 1996)		Learning by Design (Kalantzis, Cope & the Learning by Design Project Group, 2005)	
Situated practice	The immersion in experience and the utilisation of available designs of meaning.	Experiencing	<i>The known</i> – learners reflect on their own familiar experiences, interests and perspectives. <i>The new</i> – learners observe or take part in something that is unfamiliar; they are immersed in new situations or contexts.
Overt instruction	The systematic, analytic and conscious understanding of designs of meaning and design processes.	Conceptualising	<i>By naming</i> – learners group things into categories, apply classifying terms, and define these terms. <i>With theory</i> – learners make generalisations using concepts, and connect terms in concept maps or theories.
Critical framing	Interpreting the social and cultural contexts, where students critically view their study topic in relation to its context.	Analysing	<i>Functionally</i> – learners analyse logical connections, cause and effect, structure and function. <i>Critically</i> – learners evaluate their own and other people’s perspectives, interests and motives.
Transformed practice	The transfer in meaning-making practice, which puts the transformed meaning to work in other contexts or cultural sites.	Applying	<i>Appropriately</i> – learners apply new learning to real world situations and test their validity. <i>Creatively</i> – learners make an intervention in the world which is innovative and creative, or transfer their learning to a different context.

(Healey, 2016, p. 8)

2.8.3 The i.Plan pedagogical model

Barry, Haynes, Muller and Peters (2015) also captured the understanding of multiliteracies in their recently published i.Plan model using four interlinked phases: i.link, i.think, i.know and i.show (Table 5). This model, based on Morris and Stewart-Dore's earlier work on the ERICA model (Morris & Stewart-Dore, 1984; Stewart-Dore, 2003), encourages teachers to employ multiliteracy pedagogical approaches in their designed lessons. Through the model's four phases, specific attention is given to supporting students to:

- Access and build knowledge (i.e. it considers how to engage students in learning)
- Interrogate meanings (i.e. to comprehend and reflect critically)
- Select and organise information (i.e. to connect ideas/information and to construct understanding)
- Represent knowledge (i.e. to synthesis learning)

(Barry et al., 2015, p. i)

Table 5. The four phases of the i.Plan model

i.link	i.think
<ul style="list-style-type: none"> • Access and enhance prior knowledge to engage learning • Preview and define new terminology • Examine text structures 	<ul style="list-style-type: none"> • Comprehend information • Reflect on information critically • Interrogate possible meanings
i.know	i.show
<ul style="list-style-type: none"> • Locate, select and organize information • Connect and construct understanding 	<ul style="list-style-type: none"> • Represent knowledge (what has been learned) by synthesizing it into some form/medium • Design/create new structures/forms of information on the basis of what has been learned

(Barry et al., 2015, p. ii)

The sequential nature of the i.Plan's phases encourages the scaffolding of student learning processes for completing set tasks competently. Further, each phase commences with an 'i', representing the use of strategies which are both instructional and innovative (Barry et al.,

2015). Additionally, the 'i' serves as a reminder to teachers to use strategies which are personal and relevant to each student. To assist user uptake, Barry et al. (2015), also provide teachers with a series of teaching strategies which correspond to each of the i.Plan's phases (Table 6). However, given the date of publication of this model (June, 2015), little is known in regards to its implementation or how it can be adapted across learning areas.

Table 6. Strategies for the four phases of the i.Plan model

Phases from the i.Plan model		Possible strategies
1	i.link	<ul style="list-style-type: none"> • Accessing knowledge (engaging learning) • Brainstorming • Word/concept map • Vocabulary definition map • KWL (What you know, what you want to know, what you have learned)
2	i.think	<ul style="list-style-type: none"> • Responsive evaluation (the worth of the information) • In the margin • Think-pair-share • Reflective dialogue journal
3	i.know	<ul style="list-style-type: none"> • Organizational patterns or top level structures • Graphic organisers • Retrieval chart • Venn diagram • Timeline
4	i.show	<ul style="list-style-type: none"> • Word and concept maps • Procedures for constructing products • Exhibitions • Explanations

(Barry et al., 2015, p. iii)

2.9 The Western Australian curriculum

The recently developed Western Australian curriculum for Western Australian government and non-government schools identifies the “knowledge, understanding, skills, values and attitudes that students are expected to acquire and guidelines for the assessment of student achievement” (School Curriculum and Standards Authority, 2014, background section). This curriculum has been adopted from the Australian Curriculum, Assessment and Reporting Authority (ACARA) curriculum and adapted to a Western Australian context. The curriculum consists of nine learning areas and these are currently being implemented through a series of phases across schools.

Whilst learning areas are currently being implemented in phases, it is anticipated all, except Languages, will form a mandated part of planning, assessment and reporting by 2018 (School Curriculum and Standards Authority, 2014). Given the role of the Western Australian curriculum and its mandated nature, consideration of curriculum requirements and nutrition education specific content (found in Health and Physical Education, and Technologies learning areas) will be essential in the development of this project’s proposed framework.

2.10 Summary

Developing nutrition education lessons suitable to an adolescent population is a critical public health strategy in assisting to combat Australia’s current overweight and obesity epidemic and associated co-morbidities. However, designing effective nutrition education lessons to be specific to this population requires an extensive understanding of adolescent development, lesson planning components, student engagement factors and pedagogical principles and processes. As evident in this review, current literature extensively explores each of these constructs. However, many frameworks take a narrow approach and only focus on one specific construct, with little or no recognition of the interplay between all.

With the increase in globalised societies coupled with expanding information and communication technologies, the education setting has been forced to reconsider and

challenge traditional pedagogies and how students are engaged with the learning process. This has led to the notion of a pedagogy of multiliteracies being explored within a growing body of education literature. This notion of a pedagogy of multiliteracies is the first step towards building a bridge between the aforementioned constructs. Yelland, Cope and Kalantzis (2008) and Healey (2016) among others, indicate how multiliteracy frameworks can be used to review and revise units of work and assist in providing students with “a plethora of opportunities to engage with meaningful and authentic learning experiences” (Healey, 2016, p. 15). However, little is known on how such multiliteracy frameworks can be adapted to an adolescent specific and nutrition education context.

Due to its multiliteracies orientation and recent publication date, the i.Plan pedagogical model (Barry et al., 2015) was considered to be a useful starting platform for the framework proposed in this study. Further, the i.Plan pedagogical model was developed by a team of authors with extensive experience in the education arena, contributing to the framework’s merit and user friendly format for practical implementation within the classroom environment. These literature review findings led to the refinement of this study’s research aim and research questions.

2.11 Aim of the study

The aim of this study was to develop a framework demonstrating the interaction between student engagement and effective pedagogy, and how these constructs can be utilised in an adolescent nutrition education context. This framework will enable teachers, curriculum writers and academics to develop food and nutrition lessons for year 7-8 students, which acknowledge student engagement and effective pedagogy as a key focal point.

2.12 Research questions

To achieve this aim, three specific research questions, guided by the literature review, were devised. The research questions were as follows:

- 1.** Which core food and nutrition concepts are worthwhile for inclusion in adolescent food and nutrition education?
- 2.** (a) Which pedagogical principles and approaches are appropriate in teaching year 7-8 students food and nutrition education?
(b) What are the core student engagement factors underpinning these pedagogical principles and approaches, for practical implementation?
- 3.** How can the i.Plan multiliteracies pedagogical framework be adapted in a year 7-8 food and nutrition education context?

3 Methods

3.1 Introduction

This chapter describes the research methods applied in this formative study. Sub-sections within the chapter examine the research paradigm, design, procedure, protocol development, data analysis plan, framework development process and ethical considerations. The qualitative research approach which was adopted enabled the author to seek the thoughts, views and opinions of year 7-8 students and teachers, regarding school-based nutrition education content they think is important to learn and how this content can be taught in an engaging manner. This qualitative data, coupled with key findings drawn from the literature and stakeholder expertise, guided the development of the framework.

3.2 Research paradigm and philosophical framework

3.2.1 *Qualitative research*

A qualitative research approach was employed in this formative study. The complex nature of qualitative research and its lack of rigid rules and guidelines make it a difficult term to define. However, according to Burns, Grove and Gray (2015), qualitative research focuses on human experience through both systematic and interactive approaches. Often it is utilised when little is known about a topic as it enables a researcher to explore meanings and make interpretations of a particular phenomenon under observation. Qualitative studies tend to be conducted in natural settings in order to provide a context for the observed phenomena, and are frequently utilised in the fields of nursing, pharmacy and health education (Anderson, 2010; Creswell, 2013; Jeanfreau & Jack, 2010).

The author of this study has spent several years working in the child health promotion arena, with much of this time dedicated towards developing, promoting and evaluating the kindergarten – year 10 *Refresh.ED* food and nutrition teaching resources. It became apparent to the author early in her work on *Refresh.ED* that implemented teaching strategies need to be creative and designed in a way to promote student engagement,

learning (Rinkevich, 2011) and academic achievement (Leahy & Sweller, 2008; Schacter, Thum, & Zifkin, 2006). However, little formative work tends to be conducted with teachers and students to seek their perspectives, thoughts and opinions about how lessons are planned and how teaching resources are designed. Through a constructivist epistemological stance, the author was particularly interested in exploring teacher and student perceptions relating to effective pedagogy, student engagement, and nutrition education content considered important for year 7-8 students. Specifically, the author was concerned with examining how adolescents and teachers construct meanings in relation to the importance of nutrition education, effective pedagogy and student engagement (Caelli, Ray, & Mill, 2003; Crotty, 1998).

Qualitative literature describes a number of specific qualitative methodologies that can be utilised including narrative, phenomenology, grounded theory, ethnography and case studies (Creswell, 2013). However, for the purposes of this study a generic qualitative methodology was utilised.

3.2.2 Generic qualitative approach

A generic qualitative approach can be defined as “research ...which is not guided by an explicit or established set of philosophic assumptions in the form of one of the known qualitative methodologies” (Caelli et al., 2003, p. 2). The selection of such an approach may be considered appropriate when a researcher is concerned with identifying the actual outer-world content of their participants’ responses (opinions, life experiences, reflections) rather than exploring the inner organisation and structure of the participants’ experiences (Percy, Kostere, & Kostere, 2015).

Given the intended aim and research questions of this study, a generic qualitative research methodology was deemed the most appropriate. In the field of education, generic qualitative studies are amongst the most common types of qualitative research undertaken as it enables the use and analysis of data in relation to concepts, models and theories in educational, developmental and cognitive psychology or sociology (Caelli et al., 2003; Merriam, 1998). The framework proposed in this study considers various education based

concepts, models and theories at its foundation, hence further supporting the use of a generic qualitative approach.

3.2.3 *Implications for research project*

There are a number of key features to generic qualitative research which played a significant role in shaping the methods used in this study. As defined by Percy et al., (2015), generic qualitative research requires:

- Data collection methods which elicit people's reports on their ideas about things that are outside themselves.
- The use of semi or fully structured interviews, questionnaires, surveys and content or activity specific participant observation.
- Data collection from representative samples. There is a greater focus on gaining a broad range of opinions, ideas and reflections rather than 'in depth' understandings.

Evidence of these key features and how they were applied to this study are present throughout the Methods and Results chapters in this thesis.

3.3 Research design

This study comprised three key phases. The first phase involved an extensive literature review, establishment of a project reference group and qualitative protocol development. The second phase included a series of student focus groups and teacher interviews across six Western Australian non-government schools. Student focus groups were deemed the most appropriate method to utilise as it enabled the author to gain rich information on adolescent perspectives towards the study's three primary research questions. Conducting focus groups with both children and adolescents has been a research practice used for over 25 years (Wyatt, Krauskopf, & Davidson, 2008) and is considered an excellent means of eliciting young people's views on various aspects of health and wellness (Peterson-Sweeney, 2005). Further, the interactive nature of focus groups means young people are less likely to feel pressured to respond in a specific way than if they were involved in a one-on-one interview with the researcher (Wyatt et al., 2008) and one participant's response has

the capacity to provoke response from others (Hoppe, Wells, Morrison, Gillmore, & Wilsdon, 1995).

As a key focus of this project was to develop a framework which was considered relevant and practical to an Australian education context, conducting teacher interviews was also considered an essential method. This enabled rich and detailed information on teacher perspectives towards the study's research questions to be gained, along with an insight into key practical considerations to take into account during framework development.

Focus group and interview responses were then transcribed, coded and thematically analysed. Thematic analysis is not tied to any specific qualitative theoretical framework and hence is considered "a flexible and useful research tool, which can potentially provide a rich and detailed, yet complex account of data" (Braun & Clarke, 2006, p. 78). This data analysis coupled with literature review findings informed phase three; the development of a framework that is relevant and practical to an Australian education context. This framework was then reviewed and refined in accordance with project reference group feedback. Figure 6 provides an overview of the methodological process and Appendix A reflects the timeline for the study.

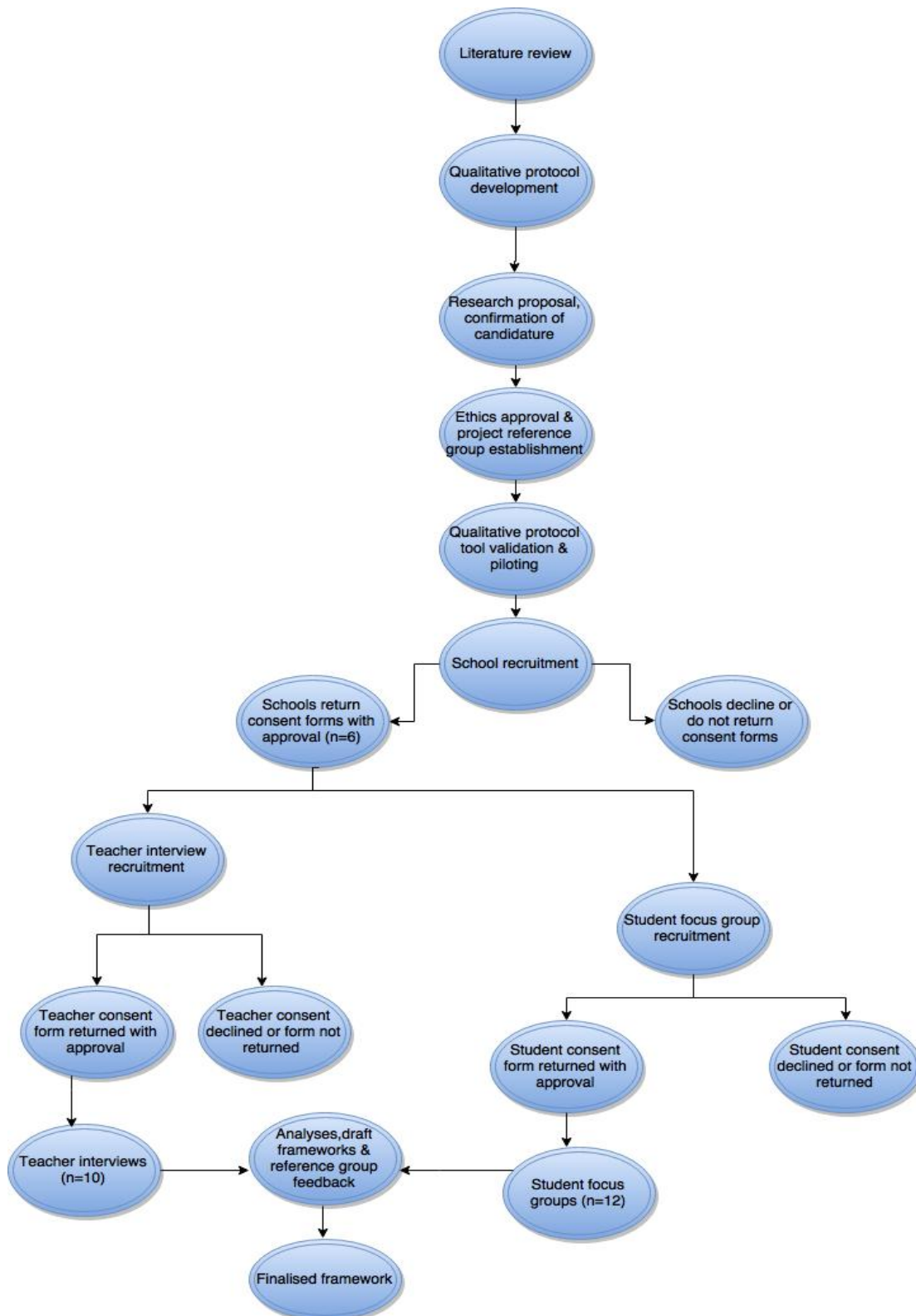


Figure 6. Overview of methodological process

An overview of the methods incorporated into this study.

3.4 Phase 1: Developmental phase

3.4.1 Literature review

A literature review was intensively conducted within the first five months (March–July 2015) of this study with additional literature searching being performed at regular intervals throughout the study to ensure all relevant and current literature was considered. The key focus of this search was to identify any existing frameworks which have been used to guide the development of an adolescent school-based nutrition education lesson, program or resource. Attention was also given to identifying generic frameworks or models used to guide lesson planning. Given the aim of this study was to develop a framework which demonstrates the interaction between student engagement and effective pedagogy, and how these can be utilised in an adolescent nutrition education context, significant focus was also given to identifying key student engagement factors and pedagogical frameworks relevant to the middle school years.

To guide this search, a series of primary search terms were developed. These key words included, but were not limited to:

- “Nutrition education” AND “framework”
- “Nutrition education programs” AND “adolescents”
- “School-based nutrition education” AND “adolescents”
- “Student engagement” AND “early adolescences” AND “framework”
- “Student engagement” AND “middle school” AND “framework”
- “Pedagogical framework” AND “middle years”
- “Pedagogical approaches” AND “adolescence” AND “Australia”
- “Nutrition education” AND “program planning framework”
- “Nutrition education” AND “lesson planning”
- “Adolescents” AND “lesson planning framework”

These keywords and phrases were used to search the scientific literature using academic databases including Health Collection, Medline, ERIC, A+ Education, Google scholar and

Edith Cowan University's Library One. Articles were predominately limited to scholarly peer reviewed publications published since 2009. A grey literature search was also conducted using Google to source additional documents detailing existing adolescent school-based nutrition programs and any relevant government reports. The first three web pages were scanned, recognising that Google displays their search results based on relevancy to the search terms (Google, 2016). Retrieved articles were summarised according to their content and relevance to the study. The key literature review findings are presented and critically analysed in Chapter 2: Literature review.

3.4.2 Establishment of project reference group

Establishing a project reference group was a critical component in the first phase of this study. Potential reference group members were identified through collaboration with the author's supervisors, colleagues and through networks established through Refresh.ED. Following confirmation of candidature and ECU Human Research Ethics Committee approval, a total of 17 experts with backgrounds in nutrition, education and adolescent development were invited to be part of this project reference group and to provide overarching advice on the development of the proposed framework. Participation in the reference group required providing email and/or telephone feedback on the developed protocols and potential framework constructs, and participation in a workshop to review and critique the proposed framework in the final stages of the project. Of the 17 experts invited, 10 consented. Consenting participants included nutritionists, public health nutrition and education lecturers, a Technologies (Home Economics) teacher and a curriculum consultant.

3.4.3 Qualitative protocol development

Given this project was a formative study, the interviews and focus group protocols were designed to explore the views, thoughts and opinions of year 7-8 teachers and students in regards to important adolescent nutrition education content, ways of engaging adolescents and effective pedagogical approaches to utilise in the classroom.

The initial teacher interview questions aimed to explore the teacher's background, specifically in relation to what year groups and subjects they taught, and their experience teaching food and nutrition education. This demographic information provided a context for each study participant during the data analysis stage. Interview questions then progressed to asking teachers about food and nutrition topics and pedagogical approaches, such as "Can you describe to me the types of teaching strategies which you use when teaching year 7 and year 8 students nutrition education and why you use them?" Teachers were presented with a list of food and nutrition topics throughout the interview to facilitate discussion. This list was based on core food literacy components (Vidgen & Gallegos, 2014). Several questions gained teachers' initial impressions of the i.Plan pedagogical model (Barry et al., 2015). This model was identified during the literature review and was considered an effective platform to commence the construction of the proposed framework for this study. Interview questions followed a semi-structured, open-ended format, and an opportunity was provided for teachers to discuss any other nutrition education aspects not directly covered in the questions but which they felt were relevant and useful to the study.

Given the age of students (11-13 years old) in the focus groups, some activities were used to elicit conversation and maximise participation (Fielden, Sillence, & Little, 2011; Kitzinger, 1994). The student focus groups commenced with an icebreaker activity in order to engage students from the outset (Johnson, 2012). Introductory questions asked students what they have learnt about food and nutrition at school and subsequent questions then focused on what nutrition lessons they have and have not enjoyed. Using a think-share activity, students were then required to select the nutrition topics, from a series of illustrated nutrition topic cards, which they thought were the most important and least important to learn about and their justification.

Additional focus group questions and activities included working as a group to rank the nutrition topic cards in order from most to least important and using a nominal group activity to explore students' perceptions of engaging teaching activities (Delbecq, Gustafson, & Van de Ven, 1975). Their thoughts and opinions on two different case scenarios were also sought. One case scenario illustrated ineffective pedagogical

approaches and one illustrated effective pedagogical approaches. Similar to the teacher interviews, the student focus groups followed a semi-structured, open-ended format, enabling students to add further information they felt would be relevant to the study.

Prior to use, the student focus group and teacher interview protocols were also assessed for readability. Microsoft Word enables two readability tests to be conducted on its documents: the Flesch Reading Ease test and the Flesch-Kincaid Grade Level test. The Flesch Reading Ease rates text on a 100-point scale. The higher the score, the easier it is to understand the document (DuBay, 2004). The Flesch-Kincaid Grade Level rates text on a U.S. school grade level (DuBay, 2004). For example, a score of 8.0 means that a year 8 student can understand the document. Table 7 provides the readability scores for the two protocols. Given this study was targeting year 7-8 students, the student focus group protocol was designed to be appropriate at a year 6 Flesch-Kincaid Grade Level. Further, the teacher interview protocols were designed to be appropriate at an upper high school Flesch-Kincaid Grade Level.

Table 7. Teacher interview and student focus group protocol readability scores

	Flesch Reading Ease	Flesch-Kincaid Grade Level
Teacher interview protocol	48.7	11.4
Student focus group protocol	76.6	6.6

3.4.4 Pilot study

3.4.4.1 Pilot teacher interviews

The developed teacher interview protocol was piloted with two teachers who were not part of the main study. One teacher was a practicing Home Economics teacher at a large Government school in the northern suburbs of Perth, Western Australia. The second teacher was an Edith Cowan University lecturer involved in training pre-service teachers, with an extensive background in teaching Home Economics. On completion of both pilot interviews, participants were provided with the opportunity to comment on the questions

developed and the interview process. The pilot interviews were also digitally recorded and transcribed by the author, enabling personal reflection on the flow of the interview, the questions developed and the types of responses received.

Through these pilot interviews it was found the original interview protocol introduction was too detailed, leading to the author reading the protocol rather than engaging with the interviewee. Further, some of the questions were posed as complex sentences, requiring the interviewee to provide multiple answers. As a result, the introduction and interview questions were revised to be shorter and more succinct. For example, question 1.1 was changed from “Can you please provide a brief overview of your teaching career, specifically how long you have been teaching, what year groups and your experience in teaching food and nutrition?” to two separate questions “Can you please provide me with a brief overview of your career to date?” and “what year groups do you currently teach and what is your experience in teaching food and nutrition?” The length of the pilot interviews was found to be sufficient, approximately 20-30 minutes, and therefore minimal changes were made to the number of questions asked. Recommendations were made from the pilot interview teachers to encourage teachers to bring along any activities which they considered engaging for students, and for the interviewer to provide the list of food and nutrition topics and i. Plan pedagogical model handouts to interviewees one week before the scheduled interview date. These recommendations were incorporated into the main study design and were found to facilitate interview discussion.

3.4.4.2 Pilot student focus group

The student focus group protocol was piloted with a small convenience sample of four adolescent girls in year 7 in November 2015. This focus group was digitally recorded and transcribed by the author. The pilot provided the author the opportunity to not only assess the flow, types of questions developed and responses received, but also to gain an understanding of how to communicate effectively with this cohort, specifically in regards to how to appropriately word the questions and engage in informal dialogue, outside of the focus group process. These factors, along with others such as attire worn (smart casual but

not ‘professional’) all played a role in influencing how adolescents connected and related to the moderator (Greenbaum, 1999).

Based on this pilot focus group, wording of the protocol was modified for brevity. Students involved in the pilot study stated they found the activities fun, interactive and engaging; however, there was not sufficient time to cover all activities. In particular, the case scenarios which were read and discussed in section two were found to prompt discussion on the students’ own classroom teachers rather than facilitating a discussion on effective pedagogical practices, therefore this section was removed. In addition, the group activity in section one which required students to rank the provided nutrition topics in order from most to least important was changed to asking students to categorise the topics into three broad categories of ‘most’, ‘moderate’ and ‘low’ importance to learn about in a nutrition class for students of their age.

3.4.4.3 Project reference group feedback

During October - November 2015, the project reference group members were invited to make comment on the draft teacher interview and student focus group protocols. An email with accompanying supporting documentation and a series of review questions was sent to each project reference group member, and 7 of the 10 (n=7; 70%) consenting members returned their responses within the allocated time frame. Review questions were developed to assess the face and content validity of the developed protocols (Appendix B).

Overall, feedback received regarding the teacher interview protocol indicated the questions were easy to understand and sufficiently assessed teachers’ perspectives on (1) nutrition topics that are important to learn as part of adolescent food and nutrition education, and (2) their perspectives on effective pedagogy. Some comments were made regarding what should and should not be included in both the questions and the list of nutrition topics provided to teachers. Recommendations were also made to modify some of the questions to encourage teachers to draw on their own experiences when providing their answers. These issues were addressed and are summarised in Table 8. The finalised teacher interview protocols are available in Appendix C.

Feedback received regarding the student focus group protocol also indicated the questions were easy to understand, assessed what they were intended to assess and the activities incorporated were appropriate for the 11-13 year old age group. Recommendations were made to:

1. Add in several other nutrition topics;
2. Include ‘unhealthy’ images on some of the nutrition topic cards;
3. Reconsider the use of the scenarios given time constraints; and
4. Change the wording of scenario one to minimise the potential to stimulate a discussion on teacher incompetence.

A list of the changes made to the student focus group protocols can be seen in Table 8 and the finalised focus group protocol and nutrition topic cards are available in Appendix D and Appendix E.

Table 8. Recommended revisions to interview and focus group protocols

Teacher interview protocol revisions	Student focus group protocol revisions
<ul style="list-style-type: none"> • Change the introduction to 3-4 key dot points. It is too long reading the entire script. • Reword question 1.1 into two questions: <ul style="list-style-type: none"> ○ Can you please provide me with a brief overview of your career to date? ○ What year groups do you currently teach and what is your experience in teaching food and nutrition? • Reword question 2.1 to: Can you describe for me the core food and nutrition topics which you teach to Year 7-8 students and how these topics are selected? <ul style="list-style-type: none"> ○ Reword question 2.2 to: In teaching year 7-8 students food and nutrition life skills, which of these topics would you consider the most important and why? You can list as many topics as you like. ○ Reword question 2.3 to: In teaching year 7-8 students food and nutrition life skills, which of these topics would you consider the least important and why? Again, you can list as many topics as you like. ○ Reword question 2.4 to: Can you make any suggestions that you would like to add to this list? 	<ul style="list-style-type: none"> • Change the introduction to 3-4 key dot points. It is too long reading the entire script. • Include a brief sentence to introduce myself, what I am studying & why. • Reword question 1.1 into two questions: <ul style="list-style-type: none"> ○ To begin, can you tell me what you have learnt about food and nutrition at school this year? ○ How about in previous years? • Reword question 1.2 to: Can you describe for me one nutrition lesson which you have really enjoyed and why you enjoyed it? • Reword question 1.3 to: Can you describe for me one nutrition lesson which you have not enjoyed and why you did not enjoy it? • Add the following to the nutrition topics: <ul style="list-style-type: none"> ○ Using recipes ○ Australian Guide to Healthy Eating ○ Australian Dietary Guidelines • Reword the 'new' question 1.5 to: Without discussing it with each other, I want you to choose one card which you think is important in a nutrition class. • Delete the section where they discuss in pairs and just ask each person to share back (one at time) to the group why they chose their card. [This will save some time]. • Reword group activity to focus on categories of 'Most important' 'Moderate

<ul style="list-style-type: none"> • Add the following to the nutrition topics: <ul style="list-style-type: none"> ◦ Using recipes ◦ Australian Guide to Healthy Eating ◦ Australian Dietary Guidelines • Reword question 3.1 into two questions: <ul style="list-style-type: none"> ◦ From your experience in teaching Year 7-8 students nutrition education, can you describe for me some of the strategies or activities which you use to engage your students? If you have brought any activities along, it would be great if you could show these to me and explain them. ◦ What do you find does not work engaging Year 7-8 students? • Move question 3.2 to the end of the interview and reword to: Finally, can you make any suggestions on how your school could improve and involve Year 7-8 students more in nutrition education? • Include an introductory sentence about the i.Plan model. • Reword question 3.3 to: I'd like to hear what you think of this i.Plan pedagogical framework for teaching nutrition? • Reword question 3.4 to: If a framework similar to this was developed for Year 7-8 nutrition education, how could it assist you in your planning and teaching? • Reword question 3.5 to: Can you suggest any supports or resources which may be useful to accompany a framework similar to this? 	<p>importance' and 'Least important' to include in a nutrition class for Year 7-8 students.</p> <ul style="list-style-type: none"> • Reword question 1.6 to: You have identified _____ and _____ as two of the most important topics. Why do you consider these the most important? • Reword question 1.7 to: You have identified _____ and _____ as two topics of moderate importance. Why did you place these in this category? • Add question: You have identified _____ and _____ as two of the least important topics. Why do you consider these the least important? • Add question: You would have noticed with some of these topics, there is more than one image for example a healthy and unhealthy food choice option. You have/have not placed some of these in different categories of importance. Can you explain to me why you did this? • Reword question 1.8 to: Do you think there are any topics missing from this list? What are they? • Reword question 2.1 to: You have identified _____ [select the most common activity]. Can you explain to me, why you think this is a good activity to use to make a <u>nutrition class</u> fun and interesting? • Reword question 2.2 to: What about _____ [selected one or two more activities]? Why do you think this is a good activity to use to make a <u>nutrition class</u> fun and interesting? • Consider deleting scenarios all together and reword the conclusion.
--	---

3.5 Phase 2: Data collection and analysis

3.5.1 School selection and recruitment

The schools involved in this study were recruited through a variety of strategies. Initially, purposive sampling was used for the selection of schools. Purposive sampling requires selecting study participants based on a pre-determined set of criteria or strategic choices (Given, 2008). School size and socio-economic status (SES), are known predictors of student engagement (Fullarton, 2002) and hence were considered key criteria in this phase of school selection and recruitment. Principals at each selected school were sent a project information letter and consent form to participate in this project (Appendix F). Each of these schools were categorised into small/medium sized schools (less than 700 students) or large sized schools (greater than 700 students). Similarly, schools were categorised into high, medium or low socioeconomic status areas based on the Socio-Economic Indexes for Areas (SEIFA) classifications (Australian Bureau of Statistics, 2011). Using the Relative Socio-economic Disadvantage (IRSD), the criteria displayed in Table 9 was used. In addition, the decision was made to recruit only non-government schools (Catholic and Independent schools) based in Western Australia. Through previous school-based research experience, the author was aware of the lengthy time delays which can occur if seeking ethics approval for Government schools. As this project formed part of a Master of Public Health and was required to be completed within a short time frame, recruiting non-government schools expedited the process. This approach led to ten schools initially being invited to participate, with two schools consenting to be involved.

Table 9. Determining school SES area classification

IRSD	Score	SES classification
High amount of IRSD	900 – 999	Low SES
Moderate amount of IRSD	1000-1050	Moderate SES
Low amount of IRSD	> 1050	High SES

Due to project time constraints, convenience sampling techniques and advertising through known contacts and relevant organisations were also employed. Convenience sampling can be defined as selecting a sample whereby participants are selected based on their ease of availability (Given, 2008). Organisations which assisted in advertising this study included the Association of Independent Schools of Western Australia (AISWA), Catholic Education Office (CEO), Home Economics Institute of Australia (HEIA), Australian Council for Health, Physical Education and Recreation (ACHPER) and Refresh.ED (2014). This process led to the recruitment of another four schools. All schools recruited through these strategies were required to meet the study's criteria of being located in Western Australia and in the non-government education sector. School size and SES were also still taken in account. In addition, all participating schools were required to return the school consent form, signed by the school Principal.

3.5.2 Teacher participants

Ten teacher interviews were performed with Technologies (Home Economics) and Health and Physical Education (HPE) teachers teaching in non-government schools in Western Australia. Eight of these teachers were from the schools where the student focus groups took place and two teachers were recruited through snowballing. Participating teachers were given an information letter and were required to provide written consent to participate in the 30-minute interview (Appendix G). In addition, written permission was also sought from the principal of the school where the teacher worked

3.5.3 Student participants

Following the return of school consent, the author liaised with the school's Home Economics and/or HPE teachers to determine a suitable year 7 or year 8 class with which to conduct the focus groups. Focus groups have proven to be a useful way of obtaining data from students as they simulate class work and allow a researcher to structure questions around topics and themes rather than ask direct questions. The decision was made by the author to conduct focus groups in single sex groups, given the literature on focus groups describes single sex groups as being more effective when working with children and adolescents (Fielden et al., 2011).

Under the guidance of the classroom teacher, students in the selected classes were all provided with a parent information pack, requesting parents for their consent for their child to participate in the study (Appendix H). The parent information pack included a parent information letter, student information letter and a parent consent form. On the day of the scheduled focus group, all signed and returned consent forms were collected and the author randomly selected 3-6 boys or girls to participate. These numbers varied depending on the number of returned consents. Prior to commencing each focus group, the author sought verbal consent from the students.

3.5.4 Data collection

Data for this study was collected during Term 4, 2015 and Term 1, 2016 (November 2015 – April 2016). The author of this thesis conducted all interviews and focus groups.

All focus groups were conducted on each school's premises on a day and time which suited the school, classroom teacher and participants. A research assistant attended all but four of the focus groups to assist with taking notes and monitoring the digital recorders. Each focus group lasted one class period, approximately 45-55 minutes. Most teacher interviews were also conducted on school premises, with two being conducted over the phone due to teacher location or availability. All interviews were also digitally recorded and notes were made by the author throughout the interview process.

All digitally recorded data was transcribed by an external transcriber and read through several times by the author, in addition to listening to the digital recordings, to ensure accuracy of the transcriptions. NVivo 10 and NVivo 11 for Mac software (QSR International Pty Ltd, 2016) was used to assist with the analyses of the focus group and interview data.

3.5.5 Data analysis

Data were analysed using a hybrid process of inductive and deductive thematic analysis (Braun & Clarke, 2006). Thematic analysis can be defined as being “essentially a method

for identifying and analysing patterns in qualitative data” (Clarke & Braun, 2013, p. 120). According to Clarke and Braun (2013) thematic analysis is theoretically flexible and can be applied to a range of theoretical frameworks, perspectives, research interests and data sets. Whilst the phases of thematic analysis are similar to other qualitative research, Braun and Clarke (2006) outline six key phases to analysis. Table 10 summarises these six thematic analysis phases and their definitions. These six phases were used to guide the analyses of this study.

Table 10. Phases of thematic analysis

Phase	Description of the process
1. Familiarising yourself with your data	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes	Checking if the themes work in relation to the coded extracts and the entire data set, generating a thematic ‘map’ of the analysis.
5. Defining and naming themes	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names of each theme.
6. Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating the analysis back to the research question and literature, producing a scholarly report of the analysis.

(Braun & Clarke, 2006, p. 87)

The first phase, *familiarising yourself with the data*, consisted of adding all transcripts to NVivo 10 (QSR International Pty Ltd, 2016) and systematically organizing the data by creating node classifications for both the focus groups (gender classification, school SES,

education sector, school size and year group) and teacher interviews (gender classification, age group and learning area). Transcribed data was then read and re-read multiple times to enable the author to be immersed in the data. Initial observations noted in the transcripts were recorded through NVivo memos and annotation functions.

Generating initial codes is the second phase of thematic analysis defined by Braun and Clarke (2006). This consisted of coding interesting aspects of the data across the entire data set. In this study, three broad categories (“teaching strategies”, “i.Plan model” and “nutrition topics”) were pre-selected based on the research questions. This segregation assisted in managing data and ensured the research questions were considered at all times throughout the data analyses. Data-driven codes (inductive coding) were then developed for the “teaching strategies” and “i.Plan model” categories. A combination of theory-driven and data-driven codes (deductive and inductive coding) were developed for the “nutrition topics”. Theory-driven codes were largely guided by Vidgen and Gallegos’ (2014) definition of food literacy and its components (Figure 7).

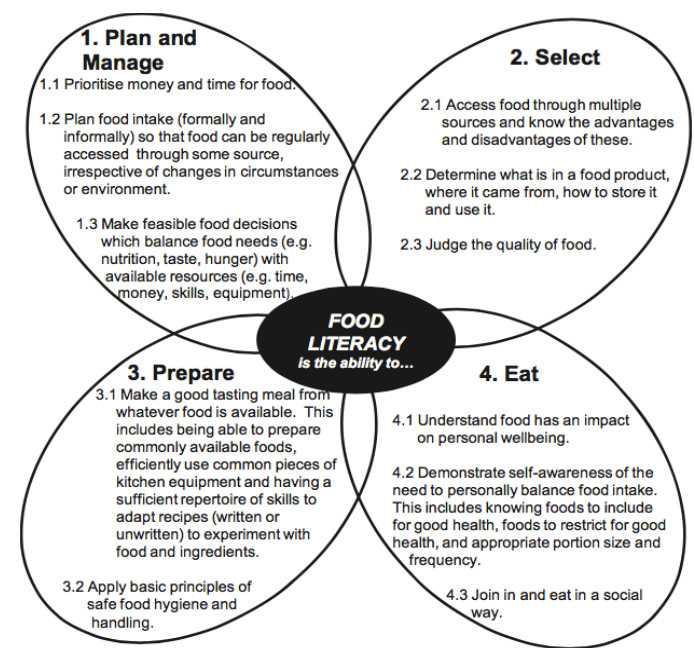


Figure 7. Food literacy components

The eleven components of food literacy.

(Vidgen & Gallegos, 2014, p. 55)

The third phase, *searching for themes*, resulted in reviewing the codes within each pre-selected category and recoding to describe the patterns in the data rather than solely coding at a content level. This recoding enabled emerging themes to be identified by the author. Themes were then reviewed by comparing them against the coded extracts (phase 4) and further, were discussed with the author's principal and associate supervisors. Finally, with ongoing analyses, these themes were refined, defined and named (phase 5). Phase 6, labeled as *producing the report*, refers to the production of this thesis and other accompanying publications from this project.

3.6 Phase 3: Framework development

3.6.1 Developing the draft frameworks

The aforementioned thematic data analyses process led to the development of ten interconnected key themes, which were associated with the project's research questions. Using these key themes, the author designed a series of draft frameworks. As the data analyses and literature review findings guided the framework elements, each draft framework consisted of similar elements. However, the author intentionally created contrasting framework designs. The purpose of this was to provoke 'compare and contrast' discussion amongst the project reference group members. An overview of the draft frameworks and design choice justifications is presented in detail in section 4.8.

3.6.2 Project reference group consultation process

A project reference group workshop was held on 15th June 2016. Prior to the workshop, all reference group members were emailed a 'save the date' request. Upon attendance confirmation, participants were also emailed a project summary and documentation to support the workshop activities. The purpose of this workshop was twofold. Firstly, it provided the author with the opportunity to seek feedback on the draft framework elements and secondly, it enabled multiple perspectives to be gained on different framework designs.

On the day, the author provided an overview of the project's methodology and key findings from the student focus groups and teacher interviews. Participants were then presented with

the draft frameworks and by using small discussion groups, were asked to consider the framework elements and discuss in their groups if they agreed with their inclusion and if not, why. Additionally within their group, participants had the opportunity to discuss alternative framework designs and how the framework could be applied in the classroom.

Phone interviews were also conducted with reference group members who were unable to attend the workshop. These interviews were semi-structured and an overview of the questions asked are presented in Table 11. Findings from this workshop and phone interviews are further discussed in the Results chapter.

Table 11. Project reference group phone interview questions

Phone interview questions

1. Can you tell me about your initial thoughts towards this draft framework?
2. Do you think each framework element should be included? Why or why not?
3. Are there any elements missing? What are they?
4. You would have noticed that I emailed through a couple of other framework formats along with a few formats which were sketched during the project reference group workshop. Do you have a preference towards a particular framework? Why?
5. Any other comments?

3.6.3 Developing the MEAL framework

The consultation process with the project reference group provided valuable feedback and assisted the author in the design of the fourth framework. A graphic designer was then employed to create the final MEAL framework. Working with the graphic designer was an iterative process for approximately six weeks and involved an initial face-to-face meeting and regular email correspondence. During the initial face-to-face meeting, the graphic designer was provided with the fourth framework design, a pre-existing framework which encompassed design features which the author believed would be useful to incorporate into the final design and a verbal design brief. Design brief specifications included:

- use a circular model for the framework;

- use unidirectional arrows between the i.Link, i.Think, i.Know, i.Show phases to represent the scaffolding nature of these phases;
- position i.Reflect in the centre of the framework;
- provide at least one design option which uses multiple colours;
- provide at least one design option which uses only one colour (in varying shades);
- use an easy to read font without serifs;
- ensure an adequate amount of white space is included;
- ensure the framework and supporting guidelines fit on one A4 page; and
- place the example teaching strategies on a separate A4 page.

Using this information, the graphic designer developed several framework options. Minor wording and design modifications were made and led towards the final MEAL framework. Images of the graphic designer's draft frameworks along with a copy of the MEAL framework are presented in Chapter 4: Results.

3.6.4 MEAL framework in action development and validation

As discussed in detail in Chapter 4: Results, providing teachers with templates and examples on how to incorporate the MEAL framework during lesson planning was strongly supported. Due to this outcome, the author developed an example nutrition education lesson plan using *Exploring Dairy* as the topic focus. Lesson content and/or information specific to each MEAL framework element was included along with a list of resources required to complete the unit of work. This lesson plan example was then circulated to the author's supervisors and the project reference group for general comment and feedback. A copy of the final lesson plan example is available in section 4.14.

3.7 Quality of qualitative research

How qualitative research is assessed for quality or rigour has been debated. Many believe qualitative research should be assessed using the same criteria as quantitative data, however, others argue for a different criteria (Petty, Thomson, & Stew, 2012). This thesis supports the latter perspective and refers to four indicators of trustworthiness for qualitative

research. This section defines these four indicators: confirmability, dependability, credibility and transferability (Lincoln & Guba, 1985; Nelson, 2008) and describes the implications for this study.

3.7.1 Confirmability

Confirmability considers the extent to which the research findings reflect the research focus and is not subjected to researcher bias (Petty et al., 2012). The author is a research officer with several years of experience working in school-based nutrition education research. This experience enriched the author's capacity to develop and conduct the teacher interviews and student focus groups due to a comprehensive understanding of the theoretical underpinnings. Various strategies were, however, also required to reduce the potential for subjective analysis and interpretation of the data collected. Data source triangulation, or the collection of data from different types of people (students, teachers, project reference group members), was considered crucial to this project to generate rich information and multiple perspectives towards the project's research questions (Carter, Bryant-Lukosius, DiCenso, Blythe, & Neville, 2014). An independent research assistant (investigator triangulation) also accompanied the author to most focus groups to scribe and to assist in the management of running student focus groups. Having a research assistant also enabled for multiple observations and conclusions to be discussed (Carter et al., 2014; Denzin, 1970).

3.7.2 Dependability

Dependability parallels the quantitative term reliability (Bryman, 2016) and refers to the idea of the study being replicated. Lincoln and Guba (1985) proposed that in order to meet this indicator, the researcher needs to adopt an 'auditing' approach to their research. In other words, logical, sequential and comprehensive records of what has been conducted needs to be kept for all stages of the research process. Peers can then act as auditors to assess how proper procedures have been followed and research conclusions drawn (Bryman, 2016). These records also provide a source of evidence on how the author's perspectives evolve and change as the study progresses. Throughout this study, the author kept detailed records of literature findings, recruitment procedures, fieldwork notes, transcripts and data analysis decisions. Regular meetings with the author's supervisors

meant that this documentation was regularly reviewed. Feedback received during these meetings also assisted to shape the author's ideas and evolving perspectives.

3.7.3 Credibility

The degree to which the research findings can be trusted or believed by the participants of the study is referred to as credibility (Petty et al., 2012). Whilst member checking or respondent validation is a well-known strategy utilised to enhance credibility, this was not a viable option in this study due to working with an adolescent population across a range of school years and project time constraints. However, additional strategies were utilised to increase the credibility of the project findings, including prolonged engagement in the school setting (approximately 22 hours), persistent observation, and triangulation of data sources (teachers, students and project reference group members).

3.7.4 Transferability

Transferability refers to the extent to which findings from a study can be transferred to other contexts or study participants (Petty et al., 2012). Given the nature of qualitative research, findings tend to be unique and significant to their own social context (Bryman, 2016). Therefore, qualitative researchers are encouraged to provide a 'thick description' or comprehensive account of the culture and social setting researched. Such a description "provides others with what they refer to as a database for making judgments about the possible transferability of findings to other milieux" (Bryman, 2016, p. 384). As per the requirements of a Master of Public Health, this thesis provides readers with a detailed account, or thick description, of the research process undertaken and hence enables others to determine the transferability of the findings to other settings or contexts. For example, through understanding this research process, the developed framework could be adapted and utilised in other learning areas such as Science.

3.8 Ethics

Ethics approval was gained from Edith Cowan University in order to comply with ECU's *Conduct of Ethical Human Research* policy (Edith Cowan University, 2015). In addition,

ethics approval was gained from the Catholic Education Office, prior to commencing school recruitment in the Catholic education setting. Formal ethics approval was not required from the Independent schools education sector as it is up to the discretion of the selected school's Principal if they wished to participate.

Following ethics approval, Principals at each selected school were then sent an information and consent letter (Appendix F). Teachers partaking in the study were also sent a teacher information letter describing the study, as well as the contact details of the researcher should they have any questions or concerns. Written consent was sought prior to any interview conducted (Appendix G). Parents/caregivers and students were also provided with an information letter, and parents/caregivers were required to give written consent for their child to participate (Appendix H). Prior to commencing each focus group, students were read an overview of the project and informed all responses would remain anonymous. Verbal consent was gained from each student before progressing with the focus group. Project reference group members were invited via email to be involved in the study and were also sent an information sheet, consent form and Terms of Reference to inform their decision (Appendix I).

It was stipulated to all participants that their participation was completely voluntary, and they had the right to withdraw at any time. All data collected was coded by the author, and master lists of the codes and names were stored according to National Health and Medical Research Council (NHMRC) and ECU guidelines, in locked cabinets and password protected electronic files. Participants have not been named in any reports or documents stemming from this project.

3.9 Summary

This chapter details the methodology employed during this Masters project. A generic qualitative approach was adopted, and in total 12 student focus groups with 59 students were conducted across six Western Australian non-government schools, along with ten teacher interviews. Student focus groups concentrated on determining student perceptions towards nutrition content relevant to their age group, effective pedagogical approaches and

student engagement factors. Similarly, teacher interviews explored teacher perceptions on important content to include in early adolescent nutrition education lessons along with their thoughts and options on effective pedagogy, student engagement and the i.Plan pedagogical model. Data collected were analysed using thematic analyses and assisted in developing a series of draft frameworks. Through collaboration with the project reference group and an iterative process with a graphic designer, the MEAL framework resulted. Details on the outcomes of the data analyses and draft frameworks are detailed in Chapter 4: Results.

4 Results

4.1 Introduction

The results from the data gathered during the student focus groups and teacher interviews will be described and presented in this section under headings related to the study's three key research questions. The draft frameworks and outcomes of the project reference group consultation will be presented. These findings led to the finalised **M**ultiliteracies approach, **E**ngagement focused, **A**dolescent specific **L**esson planning (MEAL) framework, presented in section 4.1s. The MEAL framework is accompanied by guidelines and an example lesson plan to illustrate to educators how the MEAL framework can be utilised.

4.2 Summary of qualitative sample

As described in Chapter 3: Methods, the non-government schools participating in this study were selected through purposive or convenient sampling techniques. These schools were stratified based on school size and socio-economic status. The final mix of the six recruited schools are tabulated below (Table 12).

Table 12. Overview of recruited schools

School	School SES	Education sector	School size
1	High	Independent	Large
2	High	Independent	Large
3	Low	Independent	Large
4	Low	Independent	Medium
5	Moderate	Catholic	Medium
6	High	Catholic	Large

Twelve adolescents focus groups (n= 59) were conducted across the schools and group sizes ranged from 3-6 individuals. All participating students had provided signed written consent from a parent/guardian and provided verbal consent prior to commencing the focus group. It was recognised by the author that student responses may potentially vary

depending on their level of cognitive and socio-emotional development and their level of comfort and confidence talking in groups. For these reasons, the author conducted single sex focus groups based on year level (year 7 or year 8). Two schools which consented to be involved in this study were all girls schools and hence, resulted in a smaller number of males (n=13; 22%) overall. Characteristics of the focus group participants are detailed in Table 13.

Table 13. Focus group characteristic

Focus group number	Number of students in focus group	Gender	Year group	School SES	Education sector	School size
1	6	Females	8	High	Independent	Large
2	6	Females	7	High	Independent	Large
3	6	Males	7	High	Independent	Large
4	4	Females	7	Low	Independent	Large
5	6	Females	7	High	Independent	Large
6	6	Females	8	Low	Independent	Medium
7	5	Males	7	Low	Independent	Medium
8	4	Girls	8	High	Independent	Large
9	5	Females	8	High	Catholic	Large
10	3	Females	7	High	Catholic	Large
11	4	Females	7	Moderate	Catholic	Medium
12	4	Males/Females	8	Moderate	Catholic	Medium

In addition, ten teacher interviews were performed with Technologies and HPE teachers; of those 80% (n=8) were Technologies teachers, while only 20% (n=2) were HPE teachers. All teachers taught in non-government schools in Western Australia. Refer to Table 14 regarding teacher characteristics.

Table 14. Teacher characteristics

Teacher	Gender	Age group	Learning area	School SES	Education sector	School size
1	Female	25-29	HPE	High	Independent	Large
2	Female	50+	Technologies	High	Independent	Large
3	Female	50+	Technologies	Low	Independent	Medium
4	Female	30-34	HPE	Low	Independent	Medium
5	Female	40-44	Technologies	Low	Independent	Large
6	Female	40-44	Technologies	Low	Catholic	Large
7	Male	Unknown	Technologies	High	Independent	Large
8	Female	45-49	Technologies	High	Catholic	Large
9	Female	50+	Technologies	Moderate	Catholic	Medium
10	Female	50+	Technologies	Low	Independent	Large

4.3 Summary of NVivo codes

The iterative coding and data analysis process, described in section 3.5.5, led to a series of nodes being created in NVivo (QSR International Pty Ltd, 2016). Nodes are defined as “a collection of references about a specific theme, place, person or other area of interest” (QSR International Pty Ltd, n.d.-a, para. 2). As is common in qualitative research, some content was coded for multiple nodes (QSR International Pty Ltd, n.d.-b). Table 15 presents the 42 final NVivo nodes which were created and 14 top level nodes. These nodes were then connected into a series of ten themes.

Table 15. Summary of NVivo nodes and research question associated themes

All nodes	Top level nodes	Research question (RQ) associated themes	Author notes
Budget constraints	Barriers to nutrition education		Not related to RQ but has implications for framework guidelines.
Curriculum			
Timetabling & time constraints			
Cross curriculum approach	Future nutrition education recommendations		Not related to RQ but has implications for future studies.
Whole school approach			
Environmental influences	Influences on food choices	Influences on food choices (RQ1)	
Financial influences			
Food & culture influences			
Social influences			
Assessing prior knowledge	Knowledge	Understanding knowledge (RQ2)	
Perceived knowledge			
Perceived relevance	Perceived relevance	Perceived relevance (RQ2)	
Applying classroom learning to real life			
Roles & responsibilities	Skills & safety in the kitchen	Skills & safety in the kitchen (RQ1)	
Skills & safety in the kitchen			
Classroom demonstrations	Teaching approaches	A combination of theory and practice (RQ2)	
Encouraging competition			
Encouraging creativity & challenging students			
Individual work			
Integrating theory with practice			
Sensory learning – tactile, visual & taste			
Written work			
Lecturing			
Pairs or team work			
Equal participation			
Student driven learning			
Balanced diet & moderation			
Health implications	The ‘truth’ to being healthy	The ‘truth’ to being healthy (RQ1)	
Knowledge of what you are eating			

Marketing & advertising impact			
Misleading information			
Using technology	Using technology	Using technology (RQ2)	
Collaboration	Using the i.Plan model	Collaborating and networking (RQ3)	
Reflection process		Reflection (RQ3)	
Templates & examples		Disciplined implementation (RQ3)	
Involving students			
Structure			Not related to RQ but has implications on framework design.
Time constraints			Not related to RQ but has implications for framework guidelines and implementation.
Concepts difficult to understand	Concepts difficult to understand		Not related to RQ but has implications on example teaching strategies & framework in action example.
Scope of the taught curriculum	Scope of the taught curriculum		Recurring theme but not relevant to this study.
Important quotes	Important quotes		Useful for thesis purposes
Miscellaneous	Miscellaneous		Useful for thesis purposes

Note. RQ = Research question

4.4 Research question one

Research question one, ‘Which core food and nutrition concepts are worthwhile for inclusion in adolescent food and nutrition education?’ was addressed in the first set of questions in both the teacher interviews and student focus groups, Appendices C and D respectively. During data analyses, the justifications of why these topics were considered important or not were closely examined and led to the identification of three themes (Table 15); skills and safety in the kitchen, the ‘truth’ to being healthy and influences on food choices.

4.4.1 *Skills and safety in the kitchen*

Skills, safety and related terms (Figure 8) were consistently raised in both the teacher interviews and student focus groups. Whilst many students recognised the role of learning food and kitchen safety to prevent injury or illness, several students also believed that it did not need to be taught in years 7-8 as it should be taught in previous schooling years, at home, or it should be ‘common sense’:

You should know. Like when you are growing up you will watch your Mum in the kitchen, she will say ‘Don’t run with knives’ and the normal things that you learn as you go. Make sure there’s no plastic in the oven. You kind of learn from your parents. Like when you sit on the bench to do your homework, you watch them cook and you kind of pick up things and think – yes, you know that. Like don’t put hot stuff on the bench and just reinforcement. (FG_6) [Nodes: Perceived knowledge; Skills and safety in the kitchen]

It (food safety and hygiene) is important to learn about, but I think most people know. Maybe not on chopping boards because I didn’t know that you shouldn’t chop meat, I can’t remember, but the green, white and red chopping boards. I think that is important, but stuff like knives and that you can kind of just tell. Like if that one is for bread or steak or stuff like that, and you should know not to get it too close to your fingers either otherwise you can cut yourself. I think it is important,

but not that important. (FG_4) [Nodes: Perceived knowledge; Skills and safety in the kitchen]



Figure 8. Focus group and interview word cloud

Words commonly used in association with skills and safety in the kitchen.

Additionally, whilst some students found learning cooking skills was a fun and engaging way of learning nutrition, they also felt that minimum knowledge was required to create a basic snack or meal. As one student commented:

It's not really that important to know how to cook things...some things are really hard to cook and there's other things that aren't hard to cook, like really simple, like either instructions on the back, like using the right pots and pans and stuff is kind of important, but it would necessarily still work out either way. (FG_4)

[Nodes: Perceived knowledge; Skills and safety in the kitchen]

In contrast, teaching all students basic food preparation skills, hygiene and safety from the onset of their high school education, if not earlier, was repeatedly emphasised in the teacher

interviews, as it is believed many students do not have the opportunity to learn these skills in their home environment. As one teacher explained:

Food Safety, Food Hygiene – anything to do with Kitchen Safety is really important because most students actually don't have that skill of cooking at home, so I think we need to teach them those skills to be safe and competent in the kitchen. (TI_10)
[Nodes: Important quotes; Skills and safety in the kitchen]

Teachers expressed various reasons for why these skills are no longer being taught, such as parent/guardian work commitments, or the increasing use of kitchen appliances including dishwashers.

I have noticed all of them don't know how to hand wash up. Most of them. And you have to teach them that, because they have all got dishwashers. They know how to load and unload a dishwasher, but when it actually comes to washing up, wiping down their benches, using hot soapy water, but not washing under a running tap, but putting in hot soapy water and making that water as hot as possible. Lifting your dishes upside down so they drain. Quite often you see the dishes the right way up, and all this water pooling in the bottom. This has changed, I would say, in the last three years. (TI_2) [Node: Skills and safety in the kitchen]

They need to be doing if anything... a little less theory work and more cooking, because we are finding that the last couple of years these kids aren't cooking at home. So, we are getting them in the kitchen and they have no idea, how to wash a dish, how to do any of that sort of thing. So, we are finding that we have to go more toward skill and I think my thinking behind it is that we are introducing topics that we can build on. (TI_6) [Nodes: Integrating theory with practice; Skills and safety in the kitchen]

4.4.2 The 'truth' to being healthy

Overall, student focus groups placed a high level of importance on learning and understanding the health aspects associated with food and nutrition, particularly in regards to knowing what is 'healthy' and what is 'unhealthy'. It was mentioned that students were

often taught about what foods they should and should not include in their diet; however, the underpinning reasons why were not always made clear.

...we're often told, 'you shouldn't eat too much of this' or 'you shouldn't eat too much of that' but we are not told why and sometimes we need an explanation as to why we should cut down on sugar, why we shouldn't eat too much of one thing and not much of another. (FG_6) [Nodes: Health implications; Important quotes]

Additionally, students voiced an understanding that many people do not know what they are eating or how much they should be eating, and therefore do not have a good understanding of the potential implications various foods may have on health and wellbeing.

.... if you don't learn to choose the healthier options early in life and just keep eating unhealthily, then you will get really unfit when you are older and there is a higher chance of getting cancer and stuff." (FG_5) [Node: Health implications]

I think you should know what is in your food, otherwise I know when I did that lesson about the fast food I was really put off, I had no idea that was what they put in them. (FG_3) [Node: Knowledge of what you are eating]

Several student groups also discussed the plethora of conflicting nutrition information now being readily available and delivered to consumers through various means. Some students raised concerns about how difficult they found it to navigate the truth and determine what really constitutes as 'healthy' food.

I would also like to know what is scientifically good for you. Everyone says like fruit and vegetables are healthy, but they've got sugar in them – fruits, so I would kind of like to know what is in things, like they say they are healthy, but they may have one bad thing about them or something. And like some shops lie about what's in their food, so you want to know, it's like the producing one (referring to nutrition topic card), you want to know what's in it. Like what's the actual truth to being healthy. (FG_5) [Nodes: Knowledge of what you are eating; Misleading information; Important quotes]

Teachers reflected similar perspectives, acknowledging that it is critical to encompass the health aspect when teaching food and nutrition. Specifically, it was reinforced that students need to be taught ‘what’ is healthy eating, ‘why’ it is important to eat healthy foods, and ‘what’ are the implications for current and future health.

...if we look at the obesity rate it is really important that we are hitting the nutrition, planning for themselves, eating healthy, why it is important to be healthy, how to reduce obesity, and the finding and understanding nutrition, we have a lot of families where English is a second-speaking language, so trying to up skill the kids in finding that sort of information, and how to go about finding it. (TI_10) [Nodes: Health implications: Important quotes; Scope of the taught curriculum].

4.4.3 Influences on food choices

Some students indicated a level of awareness regarding the role of the environment in influencing our food availability and food choices such as weather conditions, loss of natural resources and the implications of food waste. However, many students also voiced a lack of interest in learning about concepts associated with food security, the environment and how it influences their food choices due to their inability to see its relevance in their daily lives.

Because when you are at our age you don’t really care as much about it. You don’t really care much about that, you are just going to think the food comes from my mum and my mum gets it from the supermarket and I am not really going to care that much about what comes from there. (FG_7) [Nodes: Environmental influences; Important quotes; Perceived relevance; Roles and responsibilities]

Food security was also found to be a term which students struggled to understand and teachers found challenging to teach to 12-13 year old students.

Students also expressed an understanding of how finances can influence food choices. However, food budgeting and finances were perceived by many as being beyond their own personal roles and responsibilities, and hence lacked relevance to the students.

With food budgeting, again we have to rely on our parents for that, because we are not going to go down to the shops and spend all of our pocket money on groceries. We wouldn't really know what to do, so like we are only 13 or 12 years. (FG_9) (Nodes: Financial influences; Perceived relevance; Roles and responsibilities).

We don't shop and budgeting isn't really that interesting and so if you could find a fun way to do that, I would be impressed. (FG_3) (Node: Perceived relevance; Roles and responsibilities).

Teachers mirrored these opinions, stating that food budgeting and finances were given little focus in the taught curriculum as it was beyond the scope for year 7 and 8 students and therefore difficult to teach.

I think if I were to do that it would take at least two lessons with them because they are all at different Maths abilities. But, there is definitely an awareness of the price. (TI_6) [Nodes: Budget constraints; Scope of the taught curriculum]

Recognition of socio-cultural influences on food choices was reported in several student focus groups. For example, several students reported an interest in learning about how diets varied across the globe, and the role of cultural celebrations influencing food choices. In addition, both teachers and students indicated a level of awareness regarding the potential influence of peers and parents on food choices.

I guess a real social thing (is) to go out to the movies here and I find lots of people go and get takeaway. (FG_6) [Node: Social influences]

I had these questions and a couple of the girls actually wrote – because it says why would you eat healthy foods or why would you choose to eat healthy foods and some of the girls actually wrote 'Because I don't want to get fat and teased by my friends'. (TI_1) [Node: Social influences]

4.5 Research question two

Research question two for this project constituted two interlinked questions; (a) which pedagogical principles and approaches are appropriate in teaching year 7-8 students food and nutrition education? and (b) what are the core student engagement factors underpinning these pedagogical principles and approaches, for practical implementation? Given the overlap of these two questions, they were simultaneously considered in the data analyses.

4.5.1 *A combination of theory and practice*

Nearly all students reported preferring hands-on activities, particularly cooking or taste testing exercises, as it gave them the opportunity to be creative, work in groups and engage with their various senses during the learning process.

I would say the practicals of the cooking of the healthy food, because then obviously you get to eat it afterwards, but it's also fun to work with a partner that is the good thing and then make it, prepare it and eat it. It is always fun. (FG_7)
[Nodes: Pairs or team work; Sensory learning – tactile, visual and taste).

Researcher: [reading student notes] Designing or creating a whole new type of food and then we make it and serve it, if it is good. Will someone explain that activity to me a little bit and why it would be a fun and engaging way to learn about Nutrition?
Student: Because of the creativity involved. You can just think of anything, any food you wanted to create. There's no limits kind of. Just create. (FG_12) [Node: Encouraging creativity & challenging students]

While students did recognise the role of learning theory, they expressed a greater level of engagement with activities which encouraged some kind of hands-on work and promoted a sense of autonomy over their learning (student driven learning). Teachers also recognised the need for students to learn through hands-on activities.

I think the most important thing that we use is a combination of practical and theory together, especially in Year 7. We never run a single theory lesson on its own, because I think – and I am very tactile – I get the kids to touch and taste and feel, all

that sort of thing. (TI_10) [Nodes: Integrating theory with practice; Sensory learning – tactile, visual and taste]

This sensory driven approach to the learning process led to teachers identifying activities such as classroom demonstrations, cooking activities or inquiry based activities as popular choices that engaged students. Teaching practices which utilised a lecturing style approach or a dominance of written work were strongly perceived as ‘boring’ or ‘ineffective’ in teaching this age group.

Lots of talking. Talking at them. That whole, the lecture style – they just don’t get it. They don’t want to listen to it and they don’t learn a lot from it. So, I tend to do less of that, the most talking I will do is through a demonstration. And that would be a lot of responding to questions. (TI_7) [Node: Lecturing]

I find if they can’t see it in front of them, they are not engaged. So, if we are talking healthy pyramid in year 8, then we have a pile of food there. Draw a big pyramid on the floor on a piece of paper and move foods around. Actually seeing it and looking at it, what is in that, that makes it healthy, or why isn’t it healthy. I think putting pen to paper, or finger to iPad doesn’t work. (TI_10) [Nodes: Sensory learning – tactile, visual and taste; Written work]

4.5.2 Using technology

When learning about food and nutrition education, most student focus groups reported a high level of technology use in the classroom environment. Student views on how well using technology engaged them with the learning process varied among groups. Some adolescents reported negative perceptions towards engaging with technology, stating that working on their iPad or watching a video was “boring”.

Researcher: ...can you describe for me one nutrition lesson that you have had that you didn’t enjoy?

Student: When we just sit and watch, like a movie, or when we just get written work and that’s all we do. For the whole lesson we are just on our laptops and not really doing anything. (FG_9) [Nodes: Using technology; Written work]

In contrast, other students were more positive towards the use of technology in the classroom. These differences in perception tended to correlate to how the technology was used. For example, technology which students can interact with or relate to were more likely to be considered engaging.

I just found the documentaries a bit boring. They are like sugar documentaries. I know the ones we watched are really old, they need to be updated. They need to be more engaging to our age to make us want to actually watch them. Don't just sit there and listen to somebody talk for an hour. (FG_6) [Nodes: Perceived relevance; Using technology]

A really fun lesson that I had last year, I was at another school, we were searching up what was in fast foods and it really put me off fast foods. We made like a PowerPoint on it and I just found it fun. (FG_3) [Nodes: Perceived relevance; Applying classroom learning to real life; Using technology]

Teachers acknowledged the role of technology in the classroom, with many of the schools now being iPad friendly. Teachers highlighted using resources such as ClickView as well as using the internet to search credible nutrition websites and incorporating digital technologies such as photography and integrating the use of social media.

4.5.3 *Understanding knowledge*

Many adolescents felt some nutrition topics were not that important to cover in year 7-8 nutrition education because they had already learnt about these in previous schooling years, or at home from their family, or were simply 'common sense'. As one student reported when talking about food safety;

It should also be common sense of how you are going to prep. You are not going to eat raw meat or that sort of thing. Hopefully by the age of 12 you should know you are not going to eat raw meat. (FG_6) [Nodes: Perceived knowledge; Skills & safety in the kitchen].

Additionally, several students voiced the opinion that some nutrition topics did not require much background knowledge, specifically when it came to cooking.

And with cooking, some people just like to experiment with different things together and you never really go from a recipe book, you can just experiment with different things until you know what you want. ...and we have learned a bit of cooking skills last year. We learned enough for last year and this year just to know enough for our age group. [FG_9] [Node: [Perceived knowledge]

Teachers on the other hand, voiced contrasting opinions, reporting that there is often a significant discrepancy between student perceived knowledge and their actual knowledge. Underpinning reasons discussed for this discrepancy included different cultural backgrounds and family upbringing.

You have got to be a little bit careful because they will tell you they are excellent at everything, so I think depending on what you are trying to teach and what you are doing, you have got to be a little bit careful that you don't take them at face value if that makes any sense.... Because they all say to me, scrambled eggs, we make that every single weekend, and I think of 25 kids there was one kid who made scrambled eggs well. Even though I had 'dem'd' [demonstrated] it. And when I had demonstrated how to make it, 'Oh, we could do that standing on our heads'. (TI_6) [Nodes: Perceived knowledge; Skills and safety in the kitchen]

Consequently, assessing student knowledge at the start of the school year and/or at the start of commencing Technologies or HPE is a common and necessary teaching practice voiced by teachers.

4.5.4 Perceived relevance

A student's capacity to perceive a nutrition topic as relevant was a significant factor in regards to how well they engaged with the topic. Many students who identified various nutrition topics as unimportant stated it was because they already knew about the topic, did not see it as being significant to their own lives, or it was not part of their own roles and

responsibilities. As highlighted by one student when talking about the importance of learning about food security in year 7-8, it was not seen as important:

...because we are not exposed to it. Like we don't experience it, I don't think it's as important. (FG_8) [Nodes: Important quotes; Perceived relevance]

Conversely, students did report an interest in learning about nutrition topics when it could be demonstrated how the nutrition content or theory relates to 'real life'.

I think they [Home Economics teachers] could do more life skills, like to help you with the job in the future. Like they've got the barista machine over there, if you do Home Ec in year 9/10 it is easier to get a job if you already know the basics. So more life skills like that. (FG_2) [Nodes: Applying classroom learning to real life; Perceived relevance]

Teachers reinforced this view, noting that for nutrition content to resonate with students, it needed to be delivered in a manner in which students can relate.

I guess with any classes, just relating it to their own lives is really important. If it's not in relation to what they're doing, they don't care and I can understand that. That's with everything. That's why Maths is hard. 'Why are we doing fractions?' (TI_4) [Nodes: Important quotes; Perceived relevance]

The stuff that doesn't make sense in real life. Like, if it doesn't relate back to them as a person, they will think why do they even need to know this. So, that is one of those big things. (TI_7) [Nodes: Applying classroom learning to real life; Important quotes; Perceived relevance]

4.6 Research question three

Research question three focused on determining 'how can the i.Plan multiliteracies pedagogical framework be adapted in a year 7-8 food and nutrition education context?' This research question was directly incorporated into the teacher interviews through

presenting participating teachers with a copy of the i.Plan framework (Barry et al., 2015) and asking three specific questions:

1. I would like to hear what you think of this i.Plan pedagogical framework, for teaching nutrition?
2. If a framework similar to this was developed for year 7-8 nutrition education, how could it assist you in your planning and teaching?
3. Can you suggest any supports or resources which may be useful to accompany a framework similar to this?

Overall, the i.Plan model was well received by teachers and the data analyses associated with this research question led to three key themes being developed; reflection, collaborating and networking and disciplined implementation.

4.6.1 Reflection

Incorporating a reflection phase to the i.Plan (Barry et al., 2015) was suggested by one of the teachers early during the interview process and was met with great support from several subsequent teachers interviewed.

The only thing is you haven't got at the end is the reflection. You know the reflection, i.Think again and how do i.Link it again. So, it is almost going back to the i.Link. What is the bigger picture coming in on that. Otherwise, you show, but have you linked it back again to where you have gone. So, it's a circular thing, and what is the bigger picture. (TI_2) [Node: Reflection phase]

....apart from getting them to be reflective and thinking about what they know, and then looking back and saying, what have I learned and what's good for them. (TI_5) [Node: Reflection phase]

I think i.Reflect is a great idea because we can think about it for just a little bit longer and making them cement their knowledge into their brain a little bit. Because just by doing that thinking and by actually putting it into concrete is hopefully going

to settle it in their brain a little bit better than it would have settled if they were just words coming out of their mouth. (TI_8) [Node: Reflection phase]

4.6.2 Collaborating and networking

When questioned about additional supports or resources to accompany the proposed framework in the teacher interviews, providing opportunities for collaborating and networking with colleagues, other education staff, nutritionists and dietitians emerged. This networking would promote cross collaboration and sharing of teaching ideas, resources and nutrition content knowledge. Conducting professional learning workshops or online modes were suggested methods for encouraging collaboration and professional development.

Yes, networking of great ideas I think would be like get Home Ec-ers (sic), that are teaching Nutrition or Health teachers if they are the ones teaching Nutrition and get into your little groups, whether it is just locally, or whether it's PDs (professional development) around the place.... But, yes, get every Home Ec-er (sic), every Health teacher in, do a one day workshop, get some Refresh.ED type stuff together, even have a file – get given a file and teachers bring their own stuff and say, this is what they have done, and just work together. Then ask, how others have found teaching Nutrients, what have they found is a great way to teach Nutrients, and everyone brainstorms and shares their ideas and you come up with the best way. I just always think that ten heads are better than one. Me sitting here trying to decide, I am not the best person to maybe make decisions. If I had ten other people helping me, we can come up with something fantastic. (TI_3) [Node: Collaboration]

Well, I love Twitter and that's because I find a lot of stuff on Twitter, on part of a professional learning network from a teaching point of view called #aussieED and I just jump on there every Sunday night and learn so much stuff. Depending on what the issue is, or what the thing we are talking about and it's just expanding that network of people that I know, I don't actually know, but what I do in the middle of my classroom in Perth, is very different to what someone does in Sydney, or in England, or in America, but when you think about it, we are all trying to do the

same thing. (TI_7) [Node: Collaboration]

4.6.3 Disciplined implementation

To provide guidance and structure to the delivery of year 7-8 nutrition education, several teachers suggested the development of accompanying templates or examples on how the proposed framework can be applied.

If there were some quite specific examples of you know Ms Snow did this with her students, because sometimes you look at these things and you think I know what think-pair-share is, but I am not 100% sure, I would like to see an example. Because I am not trained in the subject, I don't have this big stash of ideas that I have seen other teachers doing, and that I learned when I was on prac (sic) or anything like that. So, I have had to try and kind of make it up as I go. (TI_5) [Node: Templates and examples]

I think maybe some templates. That would be great. So, I think some templates, because I really like your templates that you use in your Refresh.ED, but I definitely think some templates of the i. Link, i. Think, i. Know, i.Show. (TI_6) [Node: Templates and examples]

4.7 Data analysis summary

The results of this thematic data analysis highlighted the i.Plan framework provided a solid foundation for the framework proposed in this study. Its multiliteracies approach was supported by teachers and reflected in student focus group responses relating to engaging teaching activities.

Teaching activities which integrate some theory, but promote a sense of autonomy and emphasis hands-on activities were deemed the most engaging by both students and teachers. Such activities must be perceived as relevant to students of this age and recognise both students' prior and perceived knowledge. Expanding information and communication technologies and its influence on the educational learning environment were also evident

throughout the data collection and thematic analysis, with many schools being iPad friendly. Students voiced both positive and negative perceptions towards this technology; however, the difference tended to lie in how the technology was incorporated into classroom learning.

In terms of nutrition education content, emphasis was placed on ensuring skills and safety in the kitchen were integrated into the taught curriculum. Whilst this theme was represented in both the student focus groups and teacher interviews, it was the discrepancies in perception between these two groups which led the author to include it in the proposed framework. Further, providing nutrition education on the ‘truth to being healthy’ and ‘influences of food choice’ were also important themes apparent from the qualitative findings, and as such, considered necessary to be included in the framework.

The integration of a reflection component, provision of opportunities for teachers to collaborate using the proposed framework and development of accompanying templates and examples were considered essential resources for the framework development phase. These considerations were required in order to encourage both teacher and school uptake of the framework and to facilitate implementation in the classroom setting.

Potential barriers to nutrition education which were repeatedly highlighted during the teacher interviews, included timetabling issues, lack of time to prepare lessons and limited school budgets. These barriers were considered in the development of the proposed framework, as they were recognised as constraints within which teachers work.

4.8 Draft frameworks

Using the key findings from the data analyses, the author designed three draft frameworks. Each draft framework encompassed similar elements, as these were guided by the analyses and literature. However, each framework design was intentionally created to be unique, in order to prompt greater discussion and feedback from the project reference group members.

Draft framework one (Figure 9) presents a circular framework option. Time, budget and curriculum were placed in the outermost layer of this framework to indicate these are the parameters which a teacher must work within when designing nutrition education lessons. Engage with technology, kitchen skills and safety and selecting a topic were positioned as middle layers to symbolise these are the components which a teacher must consider prior to selecting or developing their teaching approaches. The i.Link, i.Think, i.Know, i.Show and i.Reflect phases were placed at the centre of the framework, as this is where the selection or developing of teaching approaches occurs. The use of arrows and the circular design of this component was selected to help portray the scaffolding and repetitive nature of the teaching and learning process. A combination of colours were used in draft framework 1, project reference group feedback was sort on their preference towards having each framework element represented by a different colour or if they preferred the framework to be only one colour, as shown in draft frameworks two and three (Figure 10 -11).

Draft framework 2 (Figure 10) also utilised a circular design; however, this framework used only one colour, blue, for all aspects of the framework. This option was presented to the project reference group to seek their thoughts and opinions on using a more traditional academic or professional design. In addition, this framework placed time, budget and timetabling on the outside of the framework. This positioning was chosen to visually portray that whilst these components are not necessarily part of the lesson planning process, they need to be considered by the teacher.

Similarly, draft framework 3 (Figure 11) used only one colour, red, and a linear design was used. This linear design presented the project reference group with a more step-by-step lesson planning model. The i.Link, i.Think, i.Know, i.Show and i.Reflect phases were still represented in a cyclic nature to accurately convey the nature of the teaching and learning process.

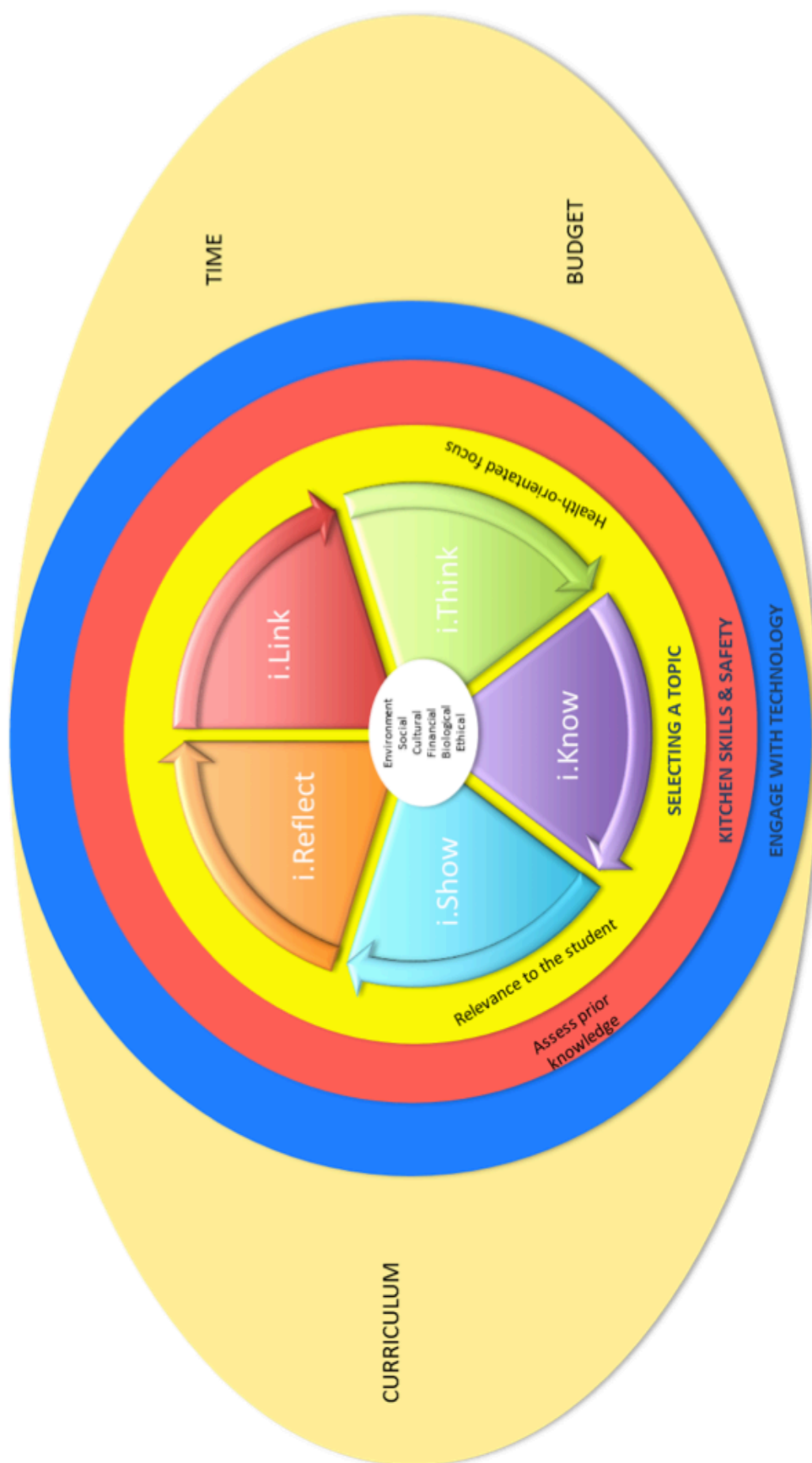


Figure 9. Draft framework 1
Based on the qualitative findings, three draft frameworks were developed and presented to the project reference group

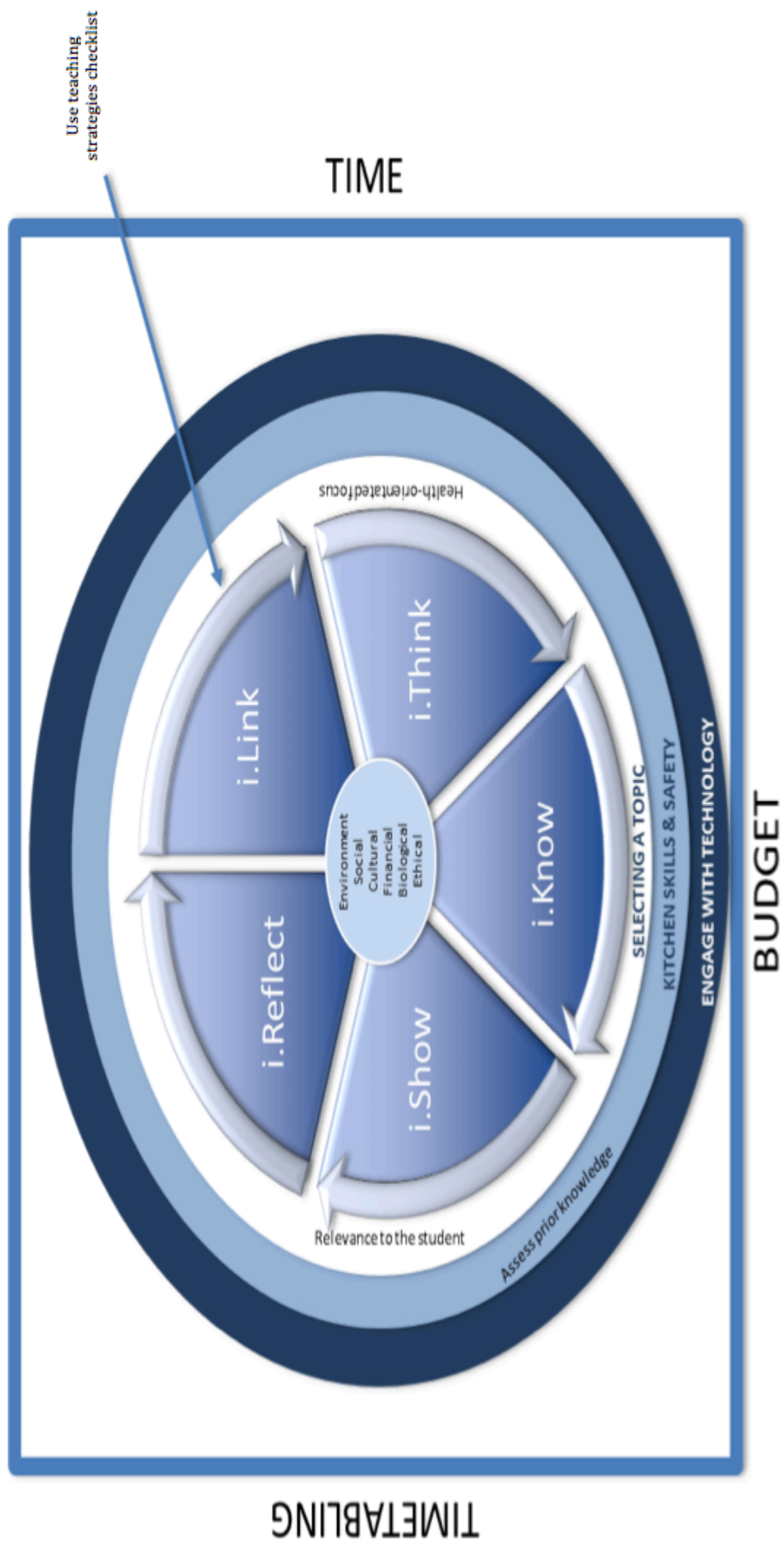


Figure 10. Draft framework 2
Based on the qualitative findings, three draft frameworks were developed and presented to the project reference group

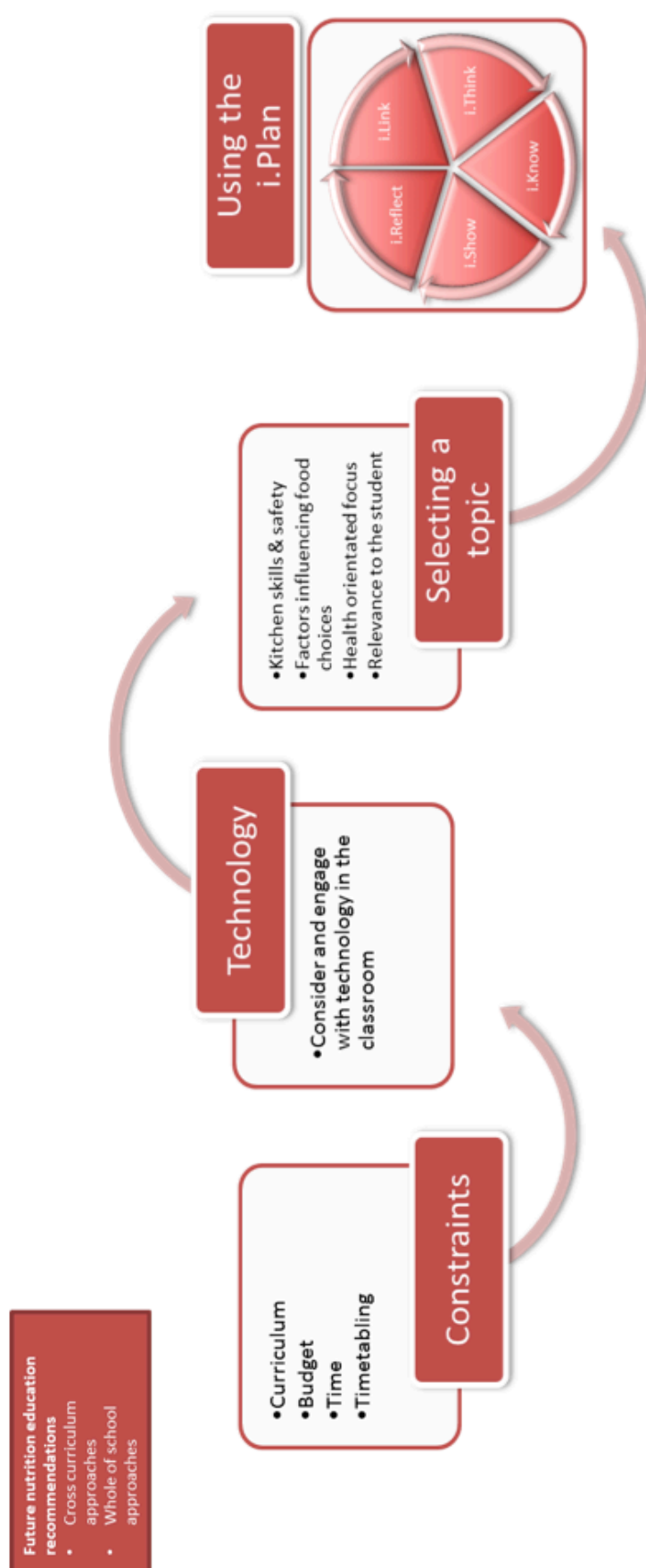


Figure 11. Draft framework 3
Based on the qualitative findings, three draft frameworks were developed and presented to the project reference group

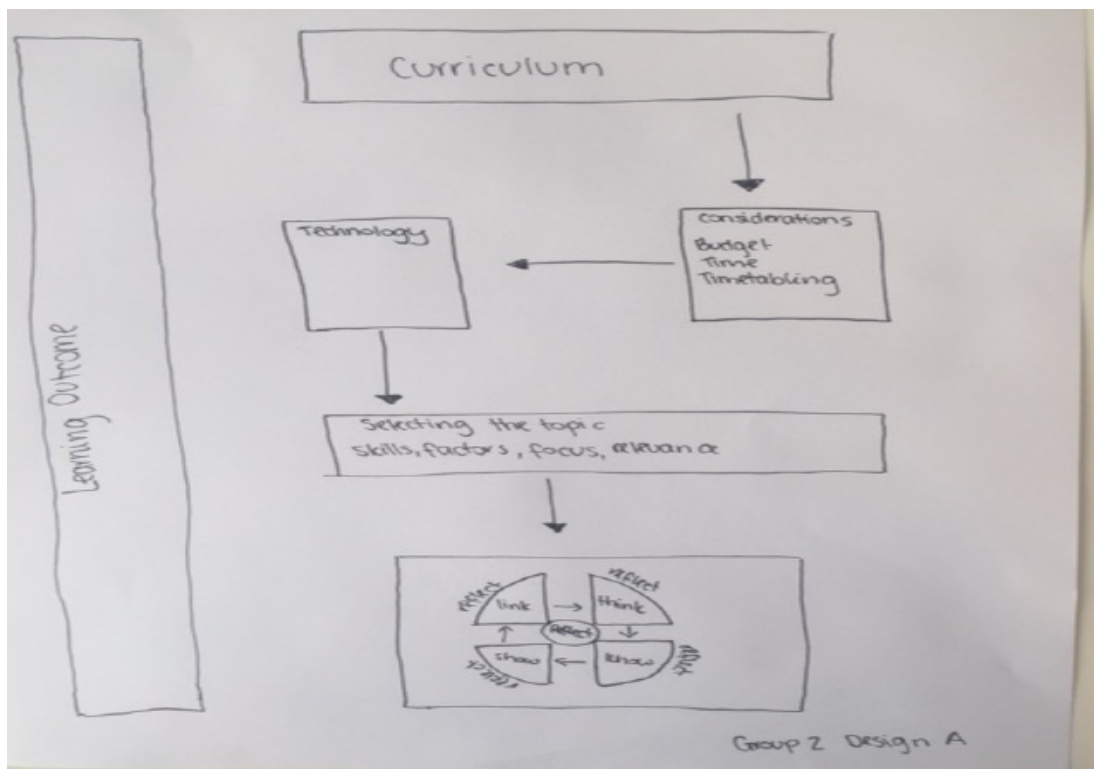
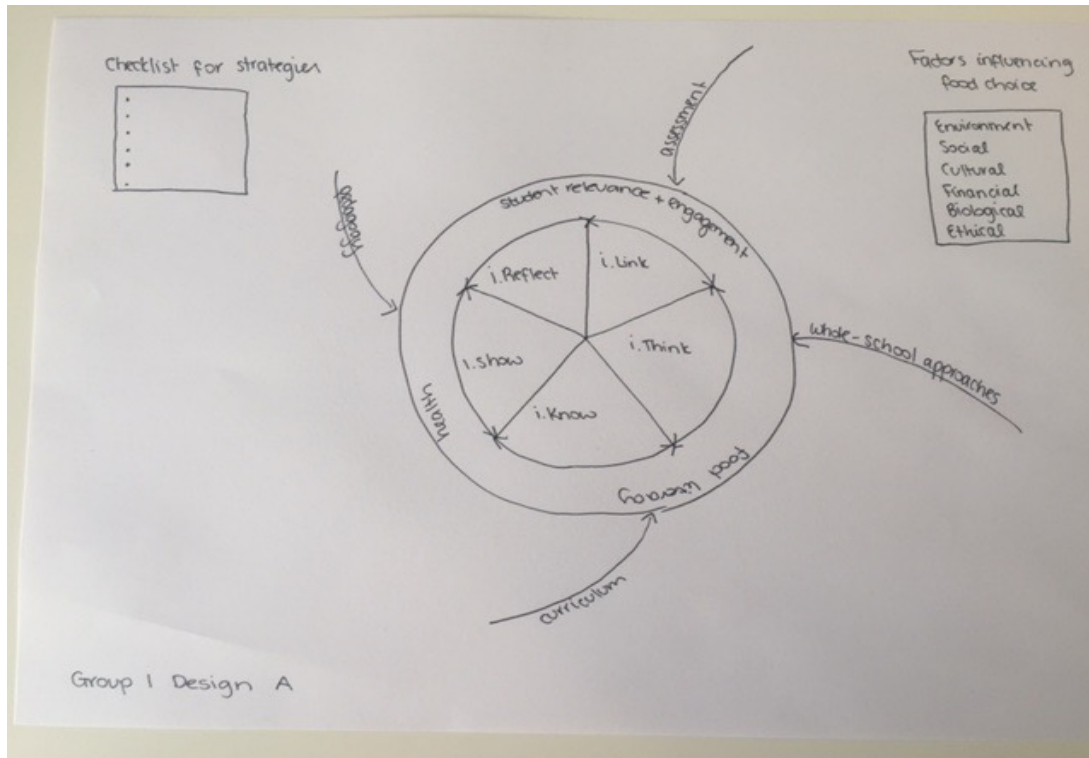
4.9 Project reference group consultation

Following analysis and the development of a series of draft frameworks, a project reference group workshop was held to present reference group members with an overview of the study's findings and to seek their feedback on the draft frameworks.

This 1.5 hour workshop was attended by six reference group members and two of the author's supervisors. The results of this workshop were twofold. Firstly, it strengthened support for the framework elements, identified from both the literature and data. Secondly, it enabled the author to seek multiple perspectives on how these elements could be visually represented in a framework design. Significant comments and alternative designs received during two of the workshop activities are summarised in Table 16 and Figure 12.

Table 16. Feedback received from workshop activity one

Activity One: Provide feedback on the framework elements presented in draft framework 1	
Framework elements	Project reference group comments
Nutrition education constraints	<ul style="list-style-type: none"> • Important considerations but perhaps not part of framework • Acknowledge upfront • Change constraints to limitations or considerations • Agree with inclusion but need to be outside
Engage with technology	<ul style="list-style-type: none"> • Links to relevance to teachers and students • Important but not sure of position (in framework). Consider at each point as to what is appropriate • Undecided about its inclusion – pros and cons • Seen as a way of strengthening and supporting the i.Plan
Kitchen skills and safety	<ul style="list-style-type: none"> • Embedded in all elements
Selecting a topic	<ul style="list-style-type: none"> • No (to being included)
Adapting the i.Plan model	<ul style="list-style-type: none"> • i.Reflect is excellent • Outside, alongside
Factors influencing food choices	<ul style="list-style-type: none"> • Add arrows into each 'I' segment • Needs work • Use the heading, not list them
Other	<ul style="list-style-type: none"> • Assessment



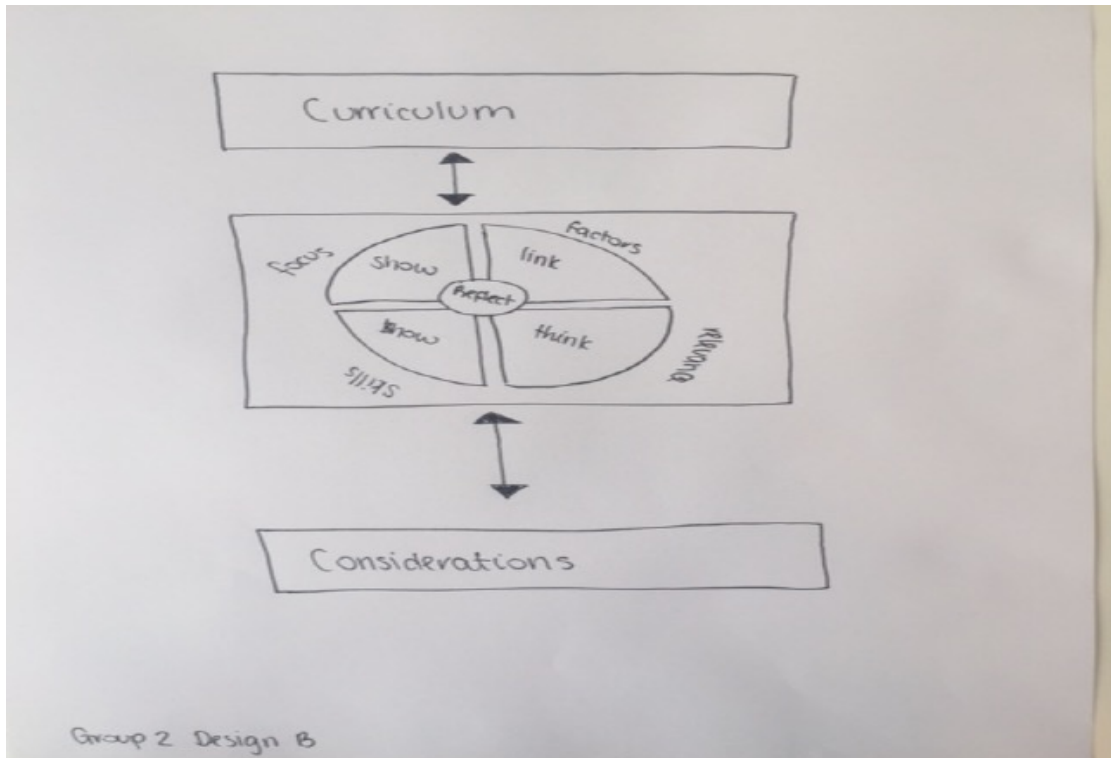


Figure 12. Alternative framework designs

Alternative framework designs presented by project reference group members during the workshop.

Whilst some feedback received during this workshop was agreed unanimously by all project reference group members, such as the i.Reflect being moved to overlap the i.Link, i.Think, i.Know and i.Show phases, the design of the framework itself created varying opinions. One group advocated for a linear style design whereas the second group preferred a circular style. To gain further insight into future framework development, three phone interviews were also conducted with reference group members who were unable to attend the workshop.

These phone interviews reinforced workshop opinions relating to including a curriculum and assessment element to the framework and positioning the i.Reflect to overlap all four i.Plan phases. Phone interviews led to the conclusion that a circular style design was generally the design preferred by reference group members with an education background. These reference group members expressed the circular flow was required as teaching and learning is an iterative and interactive process; moreover, the linear design suggests lesson planning takes place in a linear sequence which is not the

case ‘in reality’. Given this framework targets teachers, it was decided the final framework would therefore be circular in design. Table 17 provides a summary of points justifying the final framework format.

Table 17. Summary of points justifying framework format

Key point	Justification
1. ‘Curriculum’ moved to sit outside of the main framework	<ul style="list-style-type: none"> Represents the overarching role of the curriculum. Ultimately what a teacher teaches needs to draw from the curriculum and relate back to the curriculum.
2. The addition of ‘Assessment’ and ‘Reporting’	<ul style="list-style-type: none"> The addition of assessment was recommended at the project reference group workshop and reinforced through phone conversations with LH (Principal consultant for School Curriculum and Standards Authority) and RH (Associate Professor in literacies education). The addition of assessment recognises the role of student learning within the framework (and a way of ‘measuring’ this learning) rather than being isolated to teaching practice. Reporting was a recommendation from LH as according to the new WA curriculum assessment and reporting go ‘hand in hand’. (This is also evident on the School Curriculum and Standards Authority website) Once the new WA curriculum is mandated, the reporting aspect will become a critical component for teachers.
3. Retaining ‘Health-orientated focus’, ‘Student relevance & engagement’ and ‘Kitchen skills and safety’	<ul style="list-style-type: none"> These elements summarise key findings from my data analysis. They are also the crucial components teachers need to acknowledge and/or integrate in the selection of the nutrition content which they are going to teach. These elements were also clustered in the proposed linear flow frameworks in the workshop (Group 2). There was some workshop discussion on changing the term ‘kitchen skills & safety’ to ‘food literacy’; however, it was determined this term is too broad for this part of the framework as food literacy encompasses a whole array of components.
4. Moving i.Reflect to the centre of the i.Plan model	<ul style="list-style-type: none"> All project reference group members agreed reflection takes place at each phase of the i.plan model and hence it has been placed in the centre to indicate this.

5. Keeping the singular flow between i.Link – i.Think- i.Know – i.Show	<ul style="list-style-type: none"> • It was highlighted in the project reference group workshop that you could potentially freely move between the i.Plan phases and therefore it may be worth having bi-directional arrows between the phases. • The author decided to keep the singular flow to the i.Plan because this part of the framework represents how students create meaning using a variety of traditional and contemporary texts. For this meaning to be created learning needs to be scaffolded (relates back to various theories - Vygotsky, Bruner, Rogoff).
6. Retaining the circular framework design	<ul style="list-style-type: none"> • In the project reference group workshop, one group preferred a circular design and the other a more linear/logical flow design. • During the phone interviews with JM (a current Home Economics teacher) and RH they showed a preference toward the circular flow because teaching and learning is an iterative and interactive process. • Further, as stated by RH, lesson planning often involves “working from the beginning and end” (meeting curriculum needs and knowing what students are to achieve); it is not in a linear sequence. • JM also stated, through her interpretation of the linear flow, it places the teaching at the ‘end’ of the framework, rather than it being the focal point.
7. Developing a series of guidelines to compliment the use of the framework	<ul style="list-style-type: none"> • The inclusion of “Time”, “Timetabling” and “Budget” considerations along with “Engaging with technology” and “Factors influencing food choices” were debated amongst project reference group members with some stating they should be acknowledged in the framework and some saying they should not be. • For this reason, the author thought a series of three guidelines should be developed to guide the use of the framework and the selection of appropriate teaching strategies. These guidelines will focus on: <ul style="list-style-type: none"> ○ Informing teachers to effectively use the framework, considerations such as time, timetabling and budget need

	<p>to be taken into account.</p> <ul style="list-style-type: none"> ○ Engaging students with appropriate technology should be considered at all phases of the i.Plan ○ Content delivered needs to integrate teaching on factors affecting food choices
8. Developing a list of example teaching strategies to use at each i.Plan model phase	<ul style="list-style-type: none"> • As already discussed, this will provide further assistance for teachers to actually use the framework. • An example of the framework in action will also be developed and will specify the WA curriculum outcomes which it meets and align with the technology process.

4.10 Final framework development

Based on this reference group feedback and the qualitative findings, a fourth draft framework was developed. Based on this fourth design and a verbal design brief, a graphic designer was then employed to create the final framework. Working with the graphic designer was an iterative process for six weeks. Figure 13 demonstrates some of the draft frameworks, presented by the graphic designer during this process.

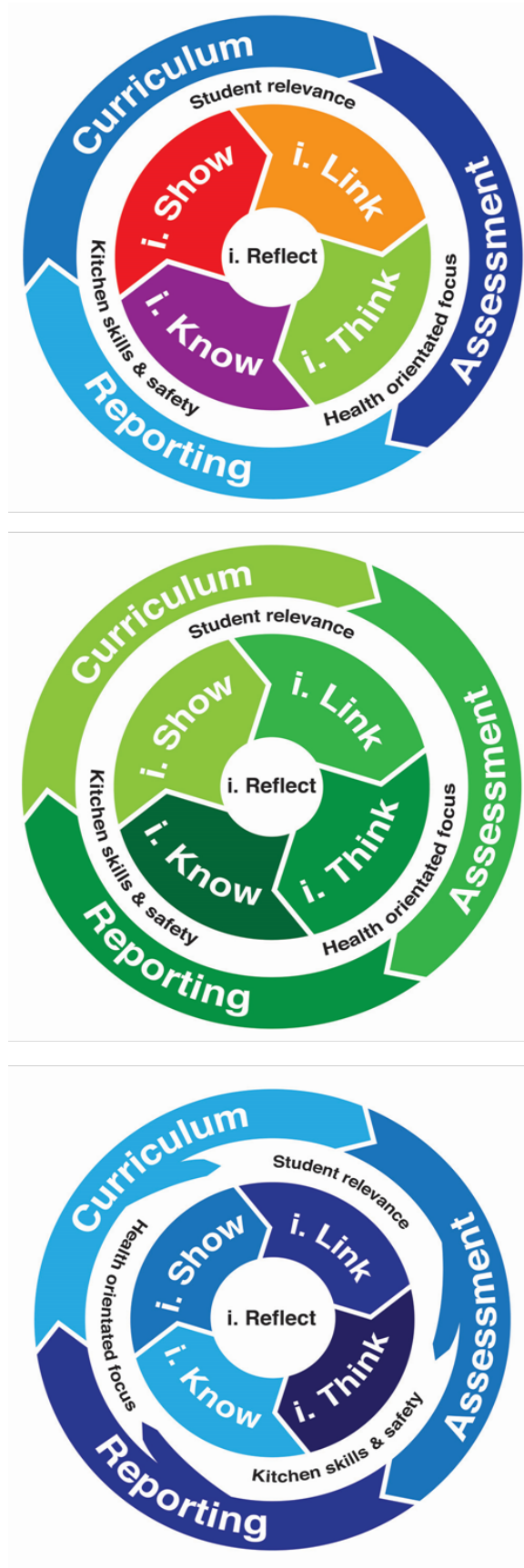
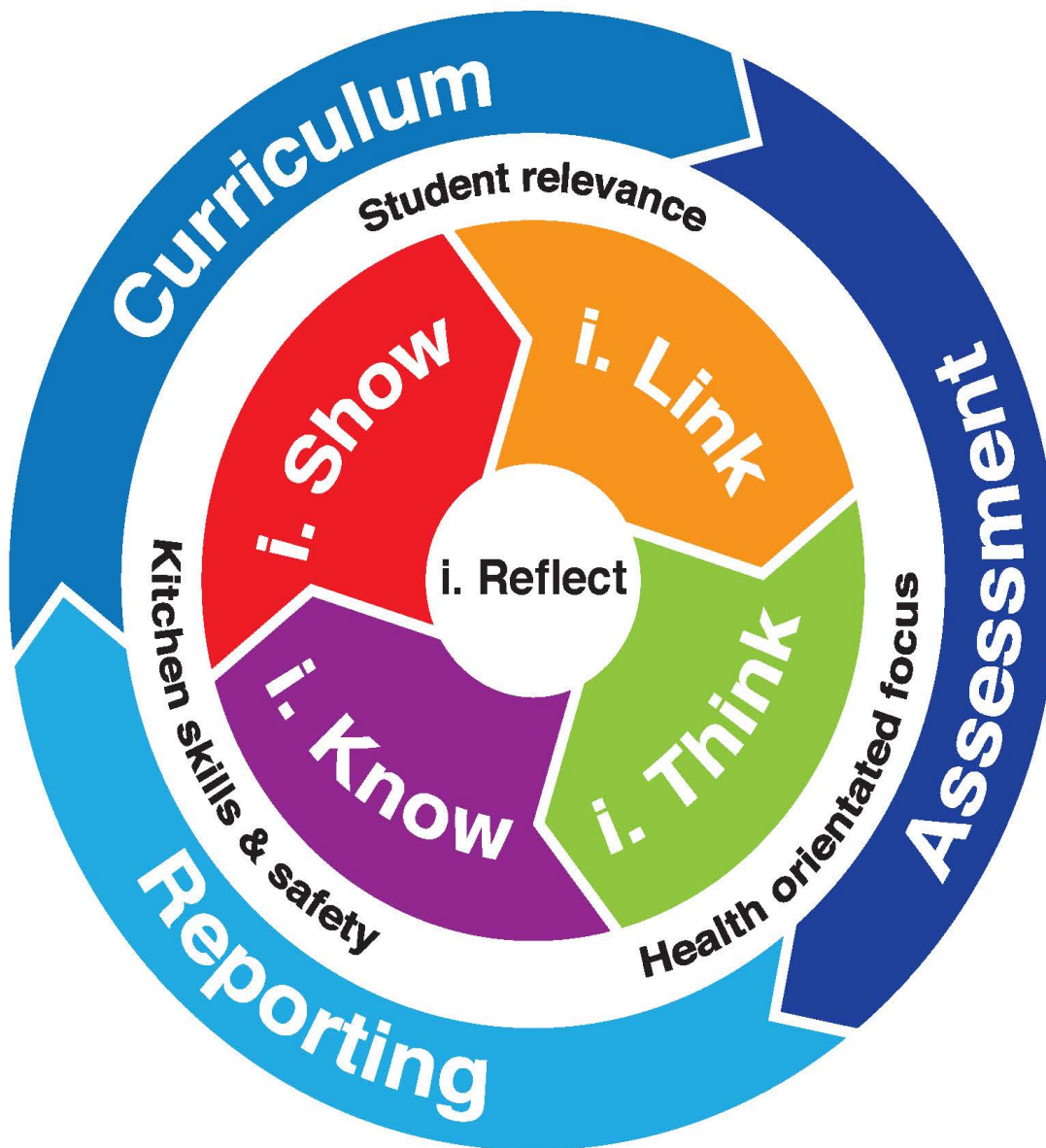


Figure 13. Framework designs presented by graphic designer

Three of the graphic designer framework designs. These were developed based on a provided design brief.

4.11 The MEAL framework

The collaboration process with the graphic designer led towards the final **M**ultiliteracies approach, **E**ngagement focused, **A**dolescent specific **L**esson planning (MEAL) framework and its accompanying guidelines and example teaching strategies (Figure 14). This section provides a description of the MEAL framework elements and guidelines. Discussion on how the framework elements and guidelines were developed based on the literature and aforementioned qualitative research findings are detailed in Chapter 5: Discussion, along with an explanation for why these were included.



Guidelines for implementing the MEAL framework	
1.	Consider external factors including timetabling, time and budget when making lesson planning decisions about nutrition education.
2.	Deliver nutrition education which uses latest technologies and creates high quality student learning experiences.
3.	Integrate content on food choice influences when planning and implementing nutrition education lessons.

Figure 1. The MEAL framework

A Multiliteracies approach, Engagement focused and Adolescent specific Lesson planning framework.

(Adapted from: Barry, B., Haynes, D., Muller, G., & Peters, J. (2015). Developing multiliteracies: A strategic approach using the i.Plan pedagogic framework. *Literacy Learning: the Middle Years*, 23(2).)

Figure 14. The MEAL framework
The final framework developed.

Example teaching strategies for year 7-8 nutrition education		
i. Link	<p>The i.Link phase relates to students exploring their knowledge and experiences on a selected nutrition topic.</p> <p>Example strategies:</p> <ul style="list-style-type: none"> Brainstorming i.e. paddock to plate concepts, foods we buy, influences on food choices Word or concept mapping i.e. paddock to plate concepts, foods we buy, influences on food choices KWL (what you Know, what you want to know, what you have learned) on the selected nutrition topic Fishbone map on the selected nutrition topic Quizzes on the selected nutrition topic 	
i. Think	<p>The i.Think phase relates to students interrogating meanings about the selected nutrition topic. It involves students considering the nutrition topic in greater detail and developing their critical thinking and reflection skills.</p> <p>Example strategies:</p> <ul style="list-style-type: none"> Think-pair-share Guided research using various credible sources (internet, books, advertisements) i.e. National Health and Medical Research Council, Cancer Council, Nutrition Australia, Refresh.ED websites Jigsaw classroom activity (see explanation at: https://www.jigsaw.org) on the selected nutrition topic Cooking demonstrations and class discussion Taste tests and class or group discussion Nutrition education related games or online interactive games 	
i. Know	<p>The i.Know phase relates to students identifying what they know about the selected nutrition topic, based on sourced information, and organising this information in a way which develops their understanding.</p> <p>Example strategies:</p> <ul style="list-style-type: none"> Retrieval charts on the selected nutrition topic Venn diagrams i.e. foods which fit into the red, amber and green categories of the food and drink policy Fishbone map on the selected nutrition topic Quizzes on the selected nutrition topic Class surveys relating to selected nutrition topic i.e. students' consumption of sugar Jigsaw classroom activity (see explanation at: https://www.jigsaw.org) on the selected nutrition topic 	
i. Show	<p>The i.Show phase requires students to synthesis what they know and demonstrate what they can do. Students should be able to present their knowledge and understandings through a range of forms, depending on what is appropriate to the audience and the purpose of the task.</p> <p>Example strategies:</p> <ul style="list-style-type: none"> Cooking i.e. teacher selected recipe, student's own recipe or 'mystery box' activity Written explanations i.e. activity sheet, workbook Verbal explanations i.e. presentation, PowerPoint Visual explanations i.e. photography, poster, class recipe book, exhibition, holding a school food stall, food sculpture, video, establishing and maintaining a kitchen garden 	
i. Reflect	<p>The i.Reflect phase requires students to critically reflect on what they have learnt at each phase and how, if at all, it has shaped their thinking.</p> <p>Example strategies:</p> <ul style="list-style-type: none"> Think-pair-share Reflective journaling Blogging about the selected nutrition topic Sending a reflective email to the teacher about the selected nutrition topic KWL (what you know, what you want to know, what you have learnt) on the selected nutrition topic 	

N.B. Please note these listed teaching strategies are only examples. The strategies you select may vary depending on the nutrition topic being covered.

4.12 Description of the MEAL framework elements

4.12.1 Curriculum, assessment and reporting

During the teacher interviews, adhering to curriculum requirements was consistently raised as a factor which teachers must address and integrate into their lesson planning. Within the context of the MEAL framework, ‘Curriculum’ refers to acknowledging the mandated learning outcomes specified within each Australian State or Territory. Given the overarching role of the curriculum, the author placed ‘Curriculum’ on the outside of the MEAL framework. This provides a visual representation of how the curriculum influences all aspects of the lesson planning process. ‘Assessment’ and ‘Reporting’ were added into the MEAL framework and sit alongside ‘Curriculum’. Whilst these elements were not directly derived from the thematic data analysis, they were included based on project reference group feedback.

4.12.2 Student relevance

This element was derived from both the qualitative research findings and education literature. It specifically refers to integrating knowledge and skills within the selected nutrition topic, which year 7-8 students consider relevant to their own lives.

4.12.3 Health orientated focus

The ‘Health orientated focus’ element serves to remind teachers to consider how they can incorporate the health aspects of their selected nutrition topic into their lesson planning. Health aspects which may be embedded into designed lessons include: choosing from the five food groups and the health benefits of these food groups, exploring the importance of serving and portion sizes and exploring dietary related diseases.

4.12.4 Kitchen skills and safety

Skills and safety in the kitchen were consistently raised in both the teacher interviews and student focus groups. In relation to the MEAL framework, this element refers to encompassing age appropriate kitchen skills and safety into the designed lessons. This

element has the capacity to be integrated into designed lessons, irrespective of the nutrition topic selected.

4.12.5 Adapting the i.Plan model

As previously highlighted, the i.Plan model (Barry et al., 2015) was positively received by teachers during the teacher interviews and hence, was considered a solid foundation for the framework proposed in this study. The four i.Plan phases, i.Link, i.Think, i.Know, i.Show were included, unchanged, within the MEAL framework, and based on teacher feedback, i.Reflect was added and placed at the centre of the framework due to its capacity to overlap with all i.Plan phases. This section provides a definition of each phase and several examples of corresponding teaching strategies which a teacher may consider utilising at each stage (Figure 14).

4.12.5.1 i.Link

The i.Link phase relates to students exploring their knowledge and experiences on a selected nutrition topic. Depending on the selected nutrition topic being taught, teaching activities which may be considered during this phase include: brainstorm, fishbone maps or class quizzes.

4.12.5.2 i.Think

The i.Think phase relates to students interrogating meanings about the selected nutrition topic. It involves students considering the nutrition topic in greater detail and developing their critical thinking and reflection skills. Depending on the selected nutrition topic being taught, teaching activities which may be considered during this phase include: think-pair-share activities, guided research, cooking demonstrations or nutrition-related games.

4.12.5.3 i.Know

The i.Know phase relates to students identifying what they know about the selected nutrition topic, based on sourced information, and organising this information in a way which develops their understanding. Depending on the selected nutrition topic being taught, teaching activities which may be considered during this phase include: retrieval charts, Venn diagrams, fishbone maps, class surveys or a jigsaw classroom activity.

4.12.5.4 i.Show

The i.Show phase requires students to synthesis what they know and demonstrate what they can do. Students should be able to present their knowledge and understandings through a range of forms, depending on what is appropriate to the audience and the purpose of the task. Depending on the selected nutrition topic being taught, teaching activities which may be considered during this phase include: cooking, class presentations, developing a recipe book, holding an exhibition or a school food stall.

4.12.5.5 i.Reflect

The i.Reflect phase requires students to critically reflect on what they have learnt at each phase and how, if at all, it has shaped their thinking. Depending on the selected nutrition topic being taught, teaching activities which may be considered during this phase include: think-pair-share activities, reflective journaling or blogging.

4.13 Description of the MEAL framework guidelines

4.13.1 Guideline 1

Consider external factors including timetabling, time and budget when making lesson planning decisions about nutrition education.

A recurring theme which was present in the teacher interview data was the potential barriers present which can restrict the type of the nutrition education content teachers can teach. Specifically, timetabling issues, limited school budgets and lack of time to prepare lessons were recurrent issues and hence, are acknowledged in the MEAL framework through guideline one.

4.13.2 Guideline 2

Deliver nutrition education which uses latest technologies and creates high quality student learning experiences.

The use of technology was a theme identified across both the student focus groups and teacher interviews. This guideline specifically relates to using technology in the classroom that is appropriate and which supports and seek to create high quality

learning experiences for students.

4.13.3 Guideline 3

Integrate content on food choice influences when planning and implementing nutrition education lessons.

Influences on food choice was identified through the qualitative data analysis. However, project reference group members were divided in its inclusion in the MEAL framework or not. Given this uncertainty, this theme was used to develop guideline three. This guideline specifically relates to including content on food choice influences such as biological, social, cultural and environmental influences. How this guideline is addressed will significantly vary depending on the selected nutrition topic.

4.14 The MEAL framework in action



4.14.1 Providing teachers with an example

This section is intended to provide teachers, curriculum writers and educators with an indication of how the MEAL framework may be used in planning a series of nutrition education lessons. Given the intent is to provide a practical example, this part of the Results chapter is formatted differently. The use of tables and dot points mimics how many teachers approach the lesson planning process. The exemplar ‘*Exploring Dairy*’ (Table 18) has been developed to be delivered over a series of lessons.


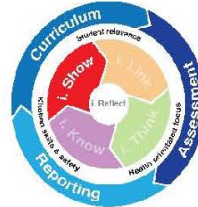
Prior to inclusion in this thesis, this example was circulated to the author’s supervisors and project reference group members for comment. All supervisors and three (n=3) project reference group members provided feedback. Revisions were made in accordance to this feedback.


Table 18. Exploring Dairy lesson plan exemplar using the MEAL framework

MEAL Framework element	Key points for lesson planning
1 CURRICULUM	<ul style="list-style-type: none"> WA curriculum Year 7 Design and Technologies content descriptions to be addressed through this unit of work include: <p>Knowledge and understanding:</p> <ol style="list-style-type: none"> Nutritional value and physical properties of food determine preparation techniques and presentation (ACTDEK033). <p>Processes and production skills:</p> <ol style="list-style-type: none"> Define and breakdown a given task, identifying the purpose. Consider components/resources to develop solutions, identifying constraints. Design, develop, review and communicate design ideas, plans and processes within a given context, using a range of techniques, appropriate technical terms and technology. Follow a plan designed to solve a problem, using a sequence of steps. Safely make solutions using a range of components, equipment and techniques. Independently apply given contextual criteria to evaluate design processes and solutions. Work independently, and collaboratively when required, to plan, develop and communicate ideas and information, using management processes. <p><i>Source: (School Curriculum and Standards Authority, 2016)</i></p>
2 ASSESSMENT	<ul style="list-style-type: none"> Assessment must integrate the assessment principles and reflective questions specified by School Curriculum and Standards Authority (Western Australia). These are available at: http://k10outline.scsa.wa.edu.au/home/assessment/principles-and-reflective-questions Students are required to research, select and write up two dairy based recipes to have as an afternoon snack and provide a written justification on their choices. In the written justification, students must demonstrate: <ul style="list-style-type: none"> An understanding of the health benefits of including dairy and dairy alternative products within the diet; An understanding of what constitutes ‘healthy foods’; and An understanding of how to work within a budget. Students will be required to present their justification to the class. Students will be required to prepare and evaluate a dairy based snack.
3 REPORTING	<ul style="list-style-type: none"> The reporting requirements which this unit of work must adhere to are specified by the School Curriculum and Standards Authority (Western Australia). These are available at: http://k10outline.scsa.wa.edu.au/home/reporting/requirements
4 STUDENT RELEVANCE	<ul style="list-style-type: none"> Students are asked to consider the social, cultural and environmental influences of their <i>own</i> dairy food choices, e.g. Do family members follow specific diets which limit the amount of dairy products available in the home? During i.Know and i.Show students are asked to research, select and prepare an afternoon snack. A snack was chosen at this age (Year 7) as students often prepare their <i>own</i> snacks when they get home from school and hence this knowledge would be transferrable to the ‘real world’.
5 HEALTH ORIENTATED FOCUS	<ul style="list-style-type: none"> The i.Think phase has a specific focus on considering the health benefits of dairy within the diet. Students are required to think about what makes their selected snacks/drinks a healthy option in their justification write up in i.Know.
6 KITCHEN SKILLS AND SAFETY	<ul style="list-style-type: none"> This is integrated into the practical cooking component described in i.Show

TOPIC: Exploring Dairy		
RATIONALE: <ul style="list-style-type: none"> Calcium requirements are higher for adolescents especially when undergoing bone mass growth. Females aged 12 to 18 years have higher requirements than most other age groups, and are at more risk of inadequate intakes if dairy products are not included in their diets. Similarly, males aged 12-18 years are at risk of inadequate intakes due to poor dietary choices. <p>Source: (Australian Bureau of Statistics, 2015)</p>		
Adapting the i.Plan model		
MEAL Framework element	Lesson content	Resources
i.LINK		
7	 <ol style="list-style-type: none"> Set up a display of dairy foods at the front of the classroom. Ask: <i>What do these foods have in common?</i> Accept all answers. If not stated by one of the students, explain each of these foods are derived from milk and as such are included in the dairy products food group of the Australian Guide to Healthy Eating. This group provides a rich source of calcium as well as other nutrients including protein, iodine, riboflavin and vitamin B12. Invite students to discuss different dairy products they like to eat. Place students into groups of four. In their groups, ask students to complete a fishbone map on what influences their dairy food choices. Encourage students to think broadly including social, cultural and environmental influences. 	<ul style="list-style-type: none"> Dairy foods for classroom display Fishbone map template
i.THINK		
8	 <ol style="list-style-type: none"> View the <i>How much dairy kids need every day</i> video (1 minute 20 seconds) http://www.dairy.edu.au/discoverdairy/learning-resources/videos/how-much-dairy-kids-need-every-day. Explain serves and serving sizes for children/adolescents. Ask students: <ul style="list-style-type: none"> Why do we have serves and serving sizes? Who do you think developed these? Explain why/how (according to the Australian Guide to Healthy Eating), students at their age should consume approximately 3.5 serves of milk, yoghurt, cheese and/or alternatives, mostly reduced fat per day. This is to help their growing bodies to receive enough calcium and other nutrients. Ask students: 	<ul style="list-style-type: none"> Video: http://www.dairy.edu.au/discoverdairy/learning-resources/videos/how-much-dairy-kids-need-every-day Video: Refresh.ED <i>Let's look at serves</i> - http://www.refreshedschools.health.wa.gov.au/professional-learning/professional-knowledge/teacher-information-videos/

		<ul style="list-style-type: none"> • How can you use this information about serves and serving sizes? <ol style="list-style-type: none"> 6. Introduce students to the <i>Legendairy</i> website: http://www.legendairy.com.au. 7. Encourage students to explore the information on this website, particularly focusing on health benefits of dairy products http://www.legendairy.com.au/health/dairy-and-your-health/dairy-health-benefits. 8. Provide students with a series of questions to guide their research: <ul style="list-style-type: none"> • What are the nutrients commonly found in dairy products? • Why are these good for my health? • What are some healthy dairy meals and snacks I could eat? • How can I incorporate healthy meals and snacks into my diet? 9. In addition to these guiding research questions, ask students to write down: <ul style="list-style-type: none"> • Two new useful facts they learnt • One interesting fact they learnt. 10. Before commencing steps 8-12 in this phase, check for student allergies and intolerances. 11. Place students into pairs. 12. Give each student pair, a small sample of various dairy products, i.e. full cream milk, skim milk, soy milk, almond milk, ricotta cheese, cheddar cheese and yoghurt. 13. In their pairs, students complete a blind taste testing. One student is to be blind folded, whilst the second student provides he/she with the tasting. 14. For each tasting, the blind folded student must describe the taste, texture, aroma and try to guess the product. The second student is to record the verbalised findings. 15. Students can use the sensory vocabulary resource to guide their verbal descriptions. 16. After a set period, ask students to swap roles and repeat the activity. 	<ul style="list-style-type: none"> • Website link: http://www.legendairy.com.au • Website link: http://www.legendairy.com.au/health/dairy-and-your-health/dairy-health-benefits • Website link: http://www.allergy.org.au • Variety of dairy foods for tasting • Blindfolds, small cups and/or plates • Sensory vocabulary resource - http://www.foodafactoflife.org.uk/attachments/7749a04a-04ca-45266c6a77ba.pdf
--	--	--	--

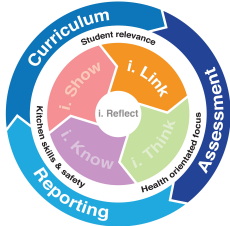
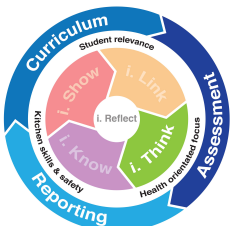
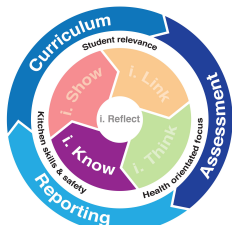
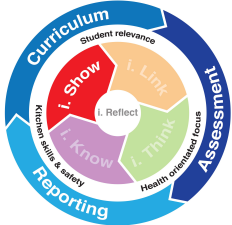
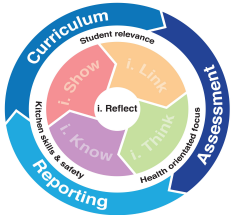
i.KNOW			
9		<ol style="list-style-type: none"> 1. Place students into groups of four. 2. In their groups, students research and select two healthy dairy based afternoon snacks which they would like to make (1 snack and 1 drink). 3. Students must prepare and write out an ingredients list and method for each snack/drink and write a paragraph to justify their snack/drink choices. 4. In their justification, students need to consider their budget and how healthy their choices are. 5. i.Reflect - Each group is to present their two snack choices to the class and explain their justification. 6. Conduct a class vote to choose the best dairy snack and the most popular or successful dairy drink. 	<ul style="list-style-type: none"> • Internet access
i.SHOW			
10		<ol style="list-style-type: none"> 1. In their same groups, students are to prepare and create the dairy snack and dairy drink voted as the best option in the i.Know phase. 2. In each group, one pair is to create the drink whilst the other pair creates the snack. 3. Prior to commencing this activity, discuss key principles of working safely in the kitchen. 4. Depending on the selected snack/drink, certain kitchen skills may need to be demonstrated. 5. Once the snacks/drinks have been created, students are to take a photo of their work using a camera, smartphone or iPad. 6. As a class, sit down to enjoy the created snacks. 7. i.Reflect – Class discussion: what worked well making these snacks? What did not work so well? What could be done differently? Did I work well with my partner? 	<ul style="list-style-type: none"> • Ingredients as per selected recipe • Cooking utensils and equipment • Camera, smartphone or iPad

i.REFLECT			
11		<ol style="list-style-type: none"> 1. Some reflection is integrated throughout the unit. 2. Using the photo taken in i.Show, students create a personal journal entry by describing the photo and what they have learnt in less than 200 words. 3. In their reflection students should consider: <ul style="list-style-type: none"> • What did I do well? • What did I not do so well? • What would I do differently next time? • Did I work well with my partner? 4. If the class/school has an Instagram/social media page, select the best student photo to be uploaded. 	<ul style="list-style-type: none"> • Photo from i.Show

Guidelines for implementing the MEAL framework		Has this guideline been met during lesson planning? (Y/N)	Implications for lesson plan
1	Consider external factors including timetabling, time and budget when making lesson planning decisions about nutrition education.	Y	<ul style="list-style-type: none"> • Ensure selected dairy snacks and smoothies comply with allocated budget. • Split unit over a period of 3-4 lessons.
2	Deliver nutrition education which uses latest technologies and creates high quality student learning experiences.	Y	<ul style="list-style-type: none"> • Using computers/i.Pads and the internet to source credible, reliable information • Using a camera/smart phone/i.Pad to facilitate learning about food presentation & appearance. • Use of social media/Instagram if available.
3	Integrate content on food choice influences when planning and implementing nutrition education lessons.	Y	<ul style="list-style-type: none"> • Integrated into the i.Link phase with the fishbone map activity.

4.14.2 Providing teachers with a planning template

MEAL Framework element		Key points for lesson planning
1	CURRICULUM	
2	ASSESSMENT	
3	REPORTING	
4	STUDENT RELEVANCE	
5	HEALTH ORIENTATED FOCUS	
6	KITCHEN SKILLS AND SAFETY	

TOPIC:		
RATIONALE:		
Adapting the i.Plan model		
MEAL Framework element	Lesson content	Resources
i.LINK		
7		
i.THINK		
8		
i.KNOW		
9		
i.SHOW		
10		
i.REFLECT		
11		

Guidelines for implementing the MEAL framework		Has this guideline been met during lesson planning? (Y/N)	Implications for lesson plan
1	Consider external factors including timetabling, time and budget when making lesson planning decisions about nutrition education.		
2	Deliver nutrition education which uses latest technologies and creates high quality student learning experiences.		
3	Integrate content on food choice influences when planning and implementing nutrition education lessons.		

4.15 Summary

This chapter described the key themes which derived from ten teacher interviews and 12 student focus groups, conducted across a series of regional and metropolitan Western Australian non-government schools. These themes were concocted through the implementation of Braun and Clarke's (2006) six phases to thematic analyses and required the utilisation of both deductive and inductive coding.

Given the plethora of qualitative data obtained through this research project, and an overall intent to develop a concise, user-friendly adolescent specific nutrition education lesson planning framework, it was considered essential that each key theme corresponded to one of the project's underpinning research questions. Key themes associated with research question one included skills and safety in the kitchen, the 'truth' to being healthy and influences on food choices. Research question two, which placed pedagogical principles and approaches as the focus, resulted in three themes, these being a combination of theory and practice, understanding knowledge and perceived relevance. Lastly, research question three considered how the i.Plan pedagogical framework could be used as an underpinning platform for the framework propose in this study. Analysis relating to this question resulted in the themes reflection, collaborating and networking and disciplined implementation being incorporated.

This somewhat structured approach to the data analyses facilitated the framework development process, with each key theme being incorporated or acknowledged. The outcome of these analyses, coupled with the literature review findings, guided the development of the draft frameworks. Through an iterative process with the author's supervisors, project reference group members and a brief to a graphic designer, the final outcome was the **Multiliteracies approach, Engagement focused, Adolescent specific Lesson planning (MEAL)** framework. The MEAL framework is supported by accompanying guidelines, example teaching strategies, an exemplar of the framework in action and a planning template; all presented in this chapter.

5 Discussion, recommendations and conclusions

5.1 Introduction

This research project sought to explore how effective pedagogical principles and approaches, coupled with factors influencing student engagement, could be applied to a nutrition education context and further, be used to develop an early adolescent nutrition education lesson planning framework. The purpose of this chapter is to discuss the key study findings in relation to each of the study's research questions. An interpretation of the results, comparative to other studies will also be provided. In addition, this chapter highlights how these findings aided the creation of the MEAL framework elements, guidelines and accompanying tools, and considers the strengths and limitations of the study. The final outcome of this research project is that the MEAL framework provides educators and curriculum writers with a practical framework which is innovative in its approach. The implications of this framework and how it varies from previously developed multiliteracies frameworks will be described in this chapter. Finally, recommendations for future research, policy and practice and the potential research significance and impact will be presented.

5.2 Aim of study

The aim of the study was to develop a framework demonstrating the interaction between student engagement and effective pedagogy, and how these constructs can be utilised in an adolescent nutrition education context. This framework will guide teachers, curriculum writers and academics in the development of future food and nutrition education teaching and learning activities, targeting year 7-8 students.

A generic qualitative approach was employed and data collection methods constituted a series of 12 year 7-8 student focus groups, 10 teacher interviews and regular communication and collaboration with a project reference group throughout the life of the project. Data gathered were thematically analysed and findings were guided by the study's

three research questions. These findings were then synthesised to develop the final MEAL framework.

5.3 Summary of results

The findings from this study identified 10 interconnected key themes which directly correlated with the study's research questions. These themes were conceptualised into a series of framework elements and guidelines. This section of the thesis will provide a discussion on the study's findings in relation to each of the three research questions. Each section will discuss the relevant themes derived from the qualitative data analysis, and discuss how these themes were used to construct elements and guidelines of the MEAL framework. A diagram is presented at the start of each section to highlight the chronology of these findings. As limited research has been published on existing nutrition education lesson planning frameworks, relevant research findings from other studies will be considered and compared to the findings of this study in each section.

5.3.1 Research question one

Research question one, *Which core food and nutrition concepts are worthwhile for inclusion in adolescent food and nutrition education?* was used to determine nutrition education topics which teachers and year 7-8 students consider imperative to learn at this age. Given the framework was to be specific to a nutrition and early adolescence context, integrating these identified topics into the framework was critical. Figure 15 demonstrates the relationship between research question one, the associated themes and corresponding MEAL framework elements and guidelines.

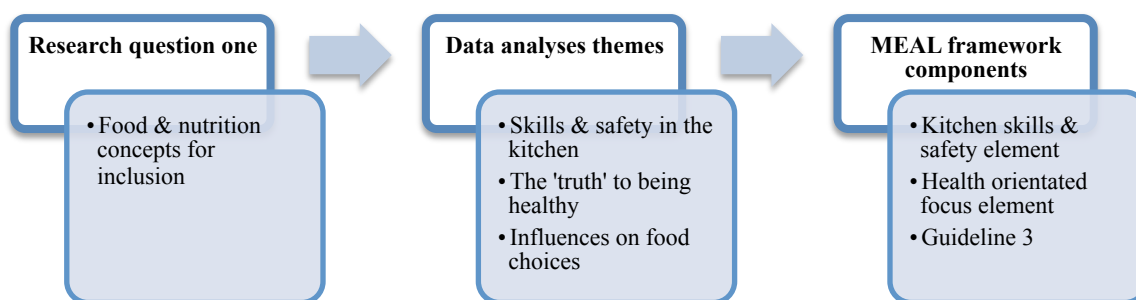


Figure 15. The relationship between research question one, data analyses themes and associated MEAL framework components

5.3.1.1 Skills and safety in the kitchen

The need for ‘skills and safety in the kitchen’ was regularly raised in both the teacher interviews and student focus groups, however, the perspectives of these two groups were different. Some students felt it was not important to learn these skills at their age as they had already learnt about food safety, hygiene and basic skills and learning more advanced cooking skills was redundant as they relied on their parents to cook and prepare meals for the family.

In contrast, teachers emphasised significantly the importance of teaching kitchen skills and safety. Existing nutrition education programs have also placed significance on teaching kitchen skills and safety to early adolescents. Chessen, Nicholson, Sklar and McDermott (2009) for example, described a six-week nutrition program targeting adolescent girls. The focus of this program was on the application of basic cooking skills and as part of this program, participants attended two-hour classes, twice a week. Each class comprised a 30-minute nutrition education session and a 90-minute cooking session. Similarly, Condrasky, Quinn and Cason (2008) detailed a cooking camp program which had its roots in social cognitive theory, and provided 11-14 year olds with the opportunity to develop healthy food preparation skills and food safety on a five day ‘camp’ which included the involvement of a chef/instructor, nutrition instructors and dietetics students. Evaluation findings from this study indicated the youth campers gained confidence and mastery of food skills, with the majority reporting they learnt new skills and improved a skill. Further,

participants involved in this camp reported they were able to apply their new skills by teaching it to a family member or friend.

Given the prevalence of taught kitchen safety and skills in pre-existing adolescent nutrition education programs, coupled with the strong opinions of teachers included within this project, this issue was explored in more depth in the interviews. Several teachers voiced opinions that many students in today's society were no longer exposed to, or taught the fundamentals skills required for cooking and preparing food safely. It was believed this may be attributed to a greater reliance on technology (i.e. dishwashers), increasing parental/guardian work force demands leading to longer work hours, and subsequently less time available to cook. Further, many meals are readily available prepackaged and prepared, thus, opportunities are lost for role modeling to adolescents.

These perceptions are mirrored within the literature, with Soliah, Walter and Jones (2012) stating many individuals and families are now living in fast-paced societies, with limited time to prepare home cooked meals. As a consequence, there has been a societal and cultural shift towards eating outside the home or purchasing premade convenience foods (Bava, Jaeger, & Park, 2008; Soliah et al., 2012). These meals tend to be energy dense yet nutrient poor when compared to meals prepared in the home. These food preparation practices have changed dramatically in the last 50 years and as such, are having a significant impact upon children; with many not being provided the opportunity to learn cooking skills. Research indicates teaching individuals how to cook has the capacity to “empower people to prepare healthful meals, provides a sense of personal achievement, and provides the knowledge needed to evaluate food alternatives and options when eating away from the home” (Soliah et al., 2012, p. 153). Improving cooking skills has also been shown to increase how frequently an individual cooks, along with improving their food knowledge and decreasing how much is spent on food. Moreover, research suggests that enhancing cooking skills can also increase self-efficacy towards cooking (Soliah et al., 2012).

Given the rich body of literature emphasising the significance of learning cooking skills and safety (Begley, 2016; Herbert et al., 2014), and the strong opinions expressed by

teachers in this research, it is likely that the lack of importance placed on such skills by some students reflects their limited prior knowledge regarding the complexities of competently cooking and safely preparing meals. Hence, it was considered pivotal to incorporate this concept into the MEAL framework, and was therefore included as the ***‘Kitchen skills and safety’ element***. In addition, the concept of kitchen skills and safety can be applied to nutrition education irrespective of the nutrition topic selected by the teacher.

5.3.1.2 The ‘truth’ to being healthy

The ‘truth’ to being healthy was a significant theme which emerged in the student focus groups in relation to important nutrition education content. This theme encapsulated students’ expressed interest in understanding what is ‘healthy’ and what is ‘unhealthy’ food and how it affects their health in the short and long term. Students also voiced concern that people do not necessarily know what is in the foods they consume, how food impacts health, nor do they understand how much they should be eating.

Tsorbatzoudis (2005) explored aspects of this topic through the evaluation of a 12-week nutrition education intervention program targeting a sample of 335 high school students. This intervention was based on the Theory of Planned Behaviour (Ajzen, 1985, 2011) and included content on the benefits of healthy eating along with the negative consequences of unhealthy, inactive lifestyles. Results indicated there was some success in changing attitudes, intent, perceived behavioural control and actual behaviour. Given the mean age of adolescents participating in this study was 14.8 years, this focus on health consequences is developmentally justified. However, in this present study with younger adolescents, the strong prevalence of a health focus theme and in particular, the expressed considerations towards future health effects, was an unexpected research finding. Early adolescence is typically described as a developmental period focused on gaining immediate gratification, with less regard for the long term consequences, when compared to older adolescents or adults (Lee et al., 2013). Hence, students’ interest in this topic demanded further investigation.

The global expansion of communication systems and information technologies is one explanation that could contribute towards students' interest in what is healthy and unhealthy food. Traditionally, health information, food marketing and advertising was limited to print, television and radio sources. However, rapidly evolving technologies are providing new platforms for delivering health information, marketing and advertising. Furthermore, today's children and adolescents, often referred to as a 'digitally native' population, are immersed in these technologies (Vodanovich, Shen, & Sundaram, 2015). Statistics indicate over 95% of Australian children aged 8-17 years have access to the internet and 90% of 14-17 year olds have access to their own mobile phone device (Australian Communications and Media Authority, 2013). Consequently, young people are being exposed to an abundance of information through online and social media sources. This exposure to an overwhelming amount of information has led to conflicting health and nutrition information which children and adolescents are trying to navigate and interpret. As a result, developing health literacy skills amongst young people to enable them to identify, interpret and apply credible health information is becoming crucial.

This finding related to teaching the health related aspects of nutrition education was therefore deemed essential for inclusion in the MEAL framework and hence, is included as the ***'health-orientated focus' element***. This element serves to remind teachers to consider how they can incorporate the health aspects of their selected nutrition topic whilst planning their lessons.

5.3.1.3 Influences on food choices

Adolescence is a vulnerable time which is not only shaped by rapid physical change, but also through significant shifts in cognitive, social and emotional development. Consequently, adolescents tend to be vulnerable to risk-taking behaviours (Gambetti & Giusberti, 2016), and are exposed to a greater range of new food choice influences. This nutrition topic and its applicability to the early adolescent years has been recognised in the health curriculum and existing nutrition education programs. Refresh.ED (2014), for example, integrates four key focus areas in its teaching resources: food and drink source; food and drink choice; food and drink experience; and food, drink and health. The food and

drink choice focus area specifically addresses influences on food choices and in the year 7-8 units, this topic is explored through a series of activities which provoke students to consider how nutritional and dietary requirements, along with advertising and marketing, influence food choices.

Given the relevance of this topic to the age group, it was considered important by the author to encompass this theme within the MEAL framework. Furthermore, how this topic is addressed and to what extent, is significantly impacted by the focus of the lesson or unit of work. Project reference group members were divided about whether it should be included within the framework or not. Given this variation and uncertainty, rather than include as a framework element, this theme was used to develop ***Guideline three: Integrate content on food choice influences when planning and implementing nutrition education lessons.***

5.3.2 Research question two

Research question two was considered in two parts; *which pedagogical principles and approaches are appropriate in teaching year 7-8 students food and nutrition education?* and *what are the core student engagement factors underpinning these pedagogical principles and approaches, for practical implementation?* These questions were pivotal to the project, particularly given its qualitative nature and the focus to determine which pedagogical principles and approaches adolescents enjoyed and engaged with in their classroom learning. Similarly, it was critical to ask teachers to provide their perspectives, knowledge and experience related to pedagogical principles and approaches they found to be both successful and unsuccessful amongst this age group. In addition, the author sought to ascertain why certain pedagogical principles and approaches were more engaging than others. Figure 16 depicts the themes within the data which related to this research question and the subsequent MEAL framework components developed.

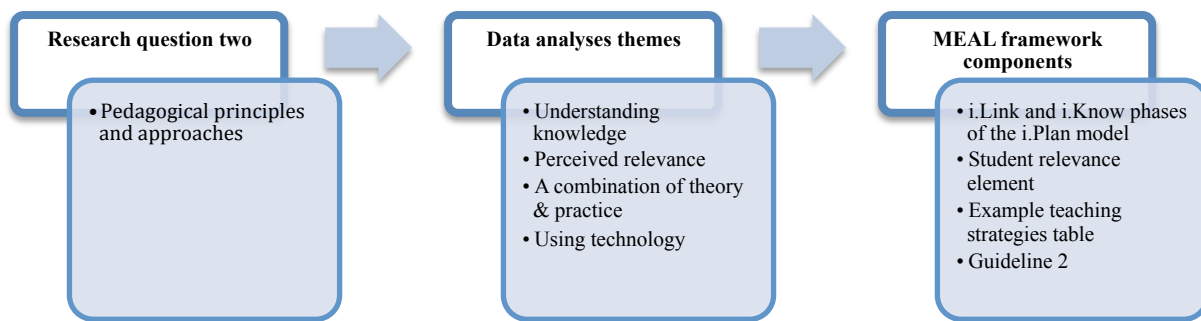


Figure 16. The relationship between research question two, data analyses themes and associated MEAL framework components

5.3.2.1 Perceived relevance and understanding knowledge

If students cannot relate to a topic being taught or think they already know about it, they are less likely to be engaged and motivated. Conversely, if students are able to identify or are informed how the topic relates to their lives, then it is more likely to be perceived as relevant and significant. This is a pivotal element identified through the qualitative data analysis, and also mirrored in much of the education literature. The NSW Model of Pedagogy (Department of Education and Training, 2003), as an example, considers how well students relate to a given topic through the ‘significance’ dimension. Similarly, the Productive Pedagogies framework acknowledges the role of student relevance through its ‘connectedness’ dimension, which encompasses consideration of knowledge integration, background knowledge, connectedness to the world and problem-based curriculum (Sellar & Cormack, 2007).

In a similar manner, the student focus groups and teacher interviews revealed the need to understand how students’ perceive their current level of knowledge along with their actual level of knowledge on a given nutrition topic. Level of perceived knowledge was found to be influenced by what students had already learnt about the given topic in previous schooling years, and at home with their family, or if it was knowledge which they considered ‘common sense’. Consequently, this principle was strongly interconnected with perceived relevance.

Similar to relevance, knowledge has been integrated into the development of several pre-existing Australian pedagogical frameworks. The NSW Model of Pedagogy (Department of Education and Training, 2003) incorporates knowledge in two of its dimensions. Deep knowledge and problematic knowledge are both indicators within the ‘intellectual quality’ dimension. These refer to developing knowledge whereby students are able to provide information or reasoning which address the complexity of the concept, topic or idea being taught (deep knowledge) and developing an understanding that knowledge is socially constructed and influenced by a variety of factors (problematic knowledge). The ‘significance’ dimension integrates knowledge through recognising the role of background and cultural knowledge in shaping how students perceive the significance of the topic being taught.

Given the recognised crucial role of these pedagogical principles, inclusion within the MEAL framework to facilitate the nutrition education lesson planning was warranted. The theme “perceived relevance” was integrated as the **‘student relevance’ element** and “understanding knowledge” was integrated in two parts; in the ***i.Link*** and ***i.Know* phases**.

5.3.2.2 Using a combination of theory and practice

The qualitative data suggested students preferred to engage in hands-on activities which promoted sensory learning, particularly through cooking or taste testing exercises. However, the role of theory within the learning process was also recognised. According to Pendergast and Bahr (2010) it is essential for schools to cater for all learning needs and styles, particularly during the middle school years whereby there is a risk of disengagement and marginalisation. Larson and Keiper (2013) further support this notion, indicating teachers need to consider engaging students through a wide range of learning activities to cater for the different learning styles, and to provide a variety of learning opportunities. For this reason, teachers are encouraged to build a repertoire of teaching activities which can be used across classes, learning areas and place varying emphasis on theoretical and practical work. Consequently, different teaching activities have different benefits for students. Manning and Bucher (2009) provide an overview of some of the instructional strategies which have been proven to be successful with middle school students. These include, but

are not limited to, demonstration, drill and practice, inductive discovery, peer tutoring and projects.

The nature and structure of the i.Plan model (Barry et al., 2015) which has been incorporated into the MEAL framework, supports this current education literature. The ‘example teaching strategies for year 7-8 nutrition education’ table, see section 4.11, was developed to complement the MEAL framework and reiterates the importance of using a combination of theory and practice.

5.3.2.3 Using technology

“Using technology” and its influence on the educational learning environment was a key theme identified during the analysis process. Whilst views about how well technology engages students varied, these differences could for the most part be explained by how well the technology was used in the classroom. For example, if technology was used in a manner which enhanced student connectedness to the world, it was more likely to be considered engaging. Alternatively, if students were directed to simply complete worksheets on their iPad or to search the Internet without being provided clear guidelines, this was less likely to be engaging.

The growing role of technology in the classroom is becoming evident across all areas of the curriculum, with new educational resources frequently relying on Internet access or iPad friendly applications. This shift towards a reliance on technology has the capacity to expand teaching practices and improve student outcomes (Henderson, 2016). Hence, traditional pedagogical approaches need to be re-conceptualised. The concept of multiliteracies (Barry et al., 2015; The New London Group, 1996) is one such approach which integrates the expansive role technology is playing within the education system. The multiliteracies approach encompassed within the MEAL framework supports this theme and hence, the use of technology could not be isolated to one part of the framework. However, to ensure the use of technology which supports and seeks to create high quality learning experiences, is acknowledged by teachers during the lesson planning process, it was integrated as

Guideline two: Deliver nutrition education which uses latest technologies and creates

high quality student learning experiences.

5.3.3 Research question three

The work presented in this thesis builds upon and extends the i.Plan model, demonstrating its applicability across curriculum areas. Barry et al. (2015) defined the i.Plan model, noting it builds upon the earlier work of Morris and Stewart-Dore (Morris & Stewart-Dore, 1984; Stewart-Dore, 2003) and encourages teachers to utilise a multiliteracies pedagogical approach in developing their lessons. As described in detail throughout this thesis, the i.Plan model consists of four interlinked and sequential phases: i.link, i.think, i.know and i.show.

For the purposes of this project, the i.Plan model was adapted to an adolescent nutrition education context and to guide this process, research question three was used; *How can the i.Plan multiliteracies pedagogical framework be adapted in a year 7-8 food and nutrition education context?* Whilst students were not specifically asked about the i.Plan framework during the focus groups, engaging teaching activities that they identified were subsequently considered in relation to each of the i.Plan's four phases. This section describes the themes which emerged in the data relating to this research question and the implications it had on the final outcome, the MEAL framework (Figure 17).

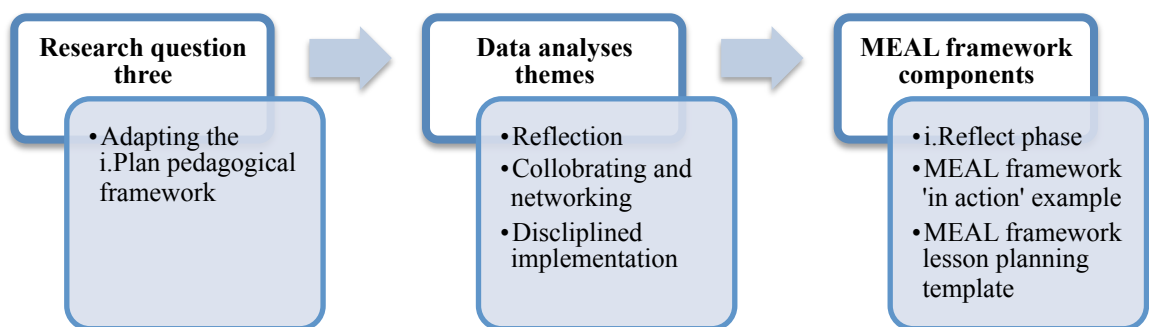


Figure 17. The relationship between research question three, data analyses themes and associated MEAL framework components

5.3.3.1 Reflection

As previously highlighted in Chapter 4: Results, the i.Plan model was positively received by teachers during the interviews and hence, was considered a solid foundation for the framework proposed in this study. The four i.Plan phases, i.Link, i.Think, i.Know, i.Show were included, unchanged, within the MEAL framework and are defined in section 4.12. Based on data analyses, i.Reflect was also added to the MEAL framework.

The i.Reflect phase requires students to critically reflect on what they have learnt at each phase and how, if at all, it has shaped their thinking. Reflection is considered an integral component to the learning process (Coulson & Harvey, 2013) and its significance is particularly emphasised within the Design and Technologies (Home Economics) Western Australian and Australian curriculum through the processes and production skills strand (School Curriculum and Standards Authority, 2016). This presence within the curriculum may in part explain why the addition of a reflection component to the framework was strongly supported by participating teachers, and potentially may promote greater uptake and use of the framework by Australian teachers and schools in their nutrition education lessoning planning. This phase was placed at the centre of the MEAL framework due to its capacity to overlap with all i.Plan phases.

5.3.3.2 Collaborating, networking and disciplined implementation

To gain an insight into how teachers would like to use a nutrition education specific lesson planning framework, questions seeking teachers' thoughts and opinions on useful supports and resources were included within the interview. Two primary themes in the responses emerged. Firstly, teachers spoke of the importance of having opportunities to collaborate and network with colleagues within their department, colleagues in their school, and other education staff along with opportunities to speak with nutritionists and dietitians. Secondly, the need for accompanying templates or examples of how to implement the MEAL framework were considered helpful and therefore could potentially facilitate use and adoption. Having these templates, exemplar and opportunities to collaborate provides teachers with the ability to share and source inspirations to use in their lesson planning.

This is supported by previous researchers, who explain that enabling effective collaboration provides teachers with a means of sharing their ideas, sharing useful resources and finding ways to improve their teaching (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006; Yuan & Zhang, 2016).

To integrate these findings into the MEAL framework, the MEAL framework ‘in action’ was developed. This provides teachers with a methodically mapped example of how the MEAL framework can be used to plan a series of lessons or a unit of work. As described in section 4.14, the provided exemplar focuses on exploring dairy and integrates a series of lessons that encompass inquiry based learning, technology and a balanced combination of both theoretically driven and practice driven activities.

5.4 The integration and influence of the curriculum

The role of the curriculum and curriculum requirements was repeatedly highlighted in the teacher interviews. In Australia, the School Curriculum and Standards Authority Act 1997 specifies curriculum requirements must be set, implemented and adhered to in each Australian state and territory in order to stipulate the specific knowledge, skills, values and attitudes which students are expected to meet and achieve as they progress through their schooling years (Government of Western Australia, 2015). From a lesson planning perspective, the curriculum overarches everything which a teacher chooses to teach and how they choose to teach it. Therefore, it was considered crucial to acknowledge the curriculum within the MEAL framework.

In addition, ‘Assessment’ and ‘Reporting’ were added into the MEAL framework. According to the School Curriculum and Standards Authority (2014), assessment and reporting are seen to go ‘hand in hand’ with curriculum and are an integral component to the Western Australian curriculum and teaching practice. Hence, these elements are critical components for Western Australian teachers once the WA curriculum is mandated. Further, the addition of these elements places student outcomes and evaluation into the framework, and acknowledges their importance during the lesson planning process.

5.5 Tangential MEAL framework components

Whilst not directly related to this study's research questions, a recurrent theme which became evident during the teacher interviews was the potential barriers which can limit the nutrition content teachers would like to teach and how they go about teaching it. As previously discussed, adhering to curriculum requirements was one such barrier. However, given the overarching role of the curriculum, this has been considered separately in section 5.4.

An additional concern repeatedly highlighted during the interviews with teachers related to timetabling issues. The majority of teachers indicated there was not enough time within the school timetable and curriculum dedicated towards nutrition education and this had several implications. If students experienced a significant gap in their nutrition education, for example across split school terms or years, then this resulted in the teacher having to repeat previously taught nutrition content. The tight timetabling schedules experienced at some schools also meant teachers felt they did not have the time or capacity to deeply explore nutrition education concepts. This perceived issue is complex and whilst addressing it in detail is beyond the parameters of this study, it was considered to be important for teachers to acknowledge in their lesson planning process.

As Home Economics tends to be an elective within upper high school, Home Economics teachers were concerned about the competition their subject faces against other subjects included in the Technologies area. Consequently, some teachers feel obligated to teach the 'fun' topics in order to encourage students to pick the subject in subsequent schooling years. The 'fun' topics tended to include creating desserts or sweets and were not necessarily consistent with national nutrition and healthy eating guidelines.

A lack of time to prepare for lessons and limited school budgets were also repeatedly mentioned as barriers to teaching nutrition education. Due to their role in influencing how lessons are designed, the author has included these considerations in the framework as

Guideline one: Consider external factors including timetabling, time and budget when making lesson planning decisions about nutrition education.

5.6 Implications of study findings

Findings from this study indicated the i.Plan framework to be adapted to a nutrition education context; emphasising the need for integrating kitchen skills and safety, the ‘truth’ to being healthy, and influences on food choices. Additionally, to engage with an early adolescent population, pedagogical approaches and principles which were apparent in the data and included understanding knowledge, perceived relevance and using a combination of theory and practice. These principles and approaches aligned with pre-existing Australian pedagogical framework constructs, and further, supported the multiliteracies approach encapsulated within the i.Plan framework and this study’s MEAL framework.

Whilst the concept of multiliteracies is not new, first being conceived in 1996 by the New London Group, the current literature has predominately identified the value of this re-conceptualised pedagogical approach as a means of integrating expanding communication technologies to promote students’ linguistic and cultural diversities in the classroom (Giampapa, 2010). Further, a reasonable body of literature exists describing the application of multiliteracies and multiliteracy frameworks in a general literacies context (Angay-Crowder, Choi, & Yi, 2013; Henderson, 2016; Mills, 2006), and application in English (Healey 2016), Studies of Society and Visual Arts (Neville, 2010) learning areas. However, this literature fails to recognise or elaborate on how multiliteracy frameworks could be extended or adapted within other learning areas, including HPE or Home Economics to teach nutrition education.

For example, researchers such as Healey (2016) used the Learning by Design multiliteracies framework in its original form, to plan a unit of work for an English class. However, no discussion was provided on how the Learning by Design framework elements needed to be reconsidered in light of curriculum and learning area requirements, or varied due to the needs of the year group for which it was designed (year 9). Similarly, Neville (2010) described how three Australian middle years teachers utilised the Learning by Design framework to design and teach students how to produce digital/multimodal texts. The three teachers involved in this study used this framework to develop units of work across varied learning areas including Studies of Society, English and Visual Arts. As with

Healey's research, however, there was no documentation on how each of the Learning by Design framework knowledge processes (experiencing, conceptualising, analysing, applying) were reconsidered in association with curriculum and learning area requirements and the year group being taught.

The MEAL framework and its accompanying guidelines and resources developed in this study therefore provides a valuable addition to the adolescent nutrition education resources available to Australian teachers, particularly for those new to teaching or who are specialists in the Technologies (Home Economics) or HPE learning areas.

5.7 Study strengths

Contributing to the uniqueness of this study and its corresponding findings are a number strengths within its study design including, but not limited to, the involvement of students, teachers and stakeholders.

5.7.1 Involvement of students

Adolescence is a unique, complex time and a period whereby cognitive growth is accentuated. This cognitive growth, coupled with psycho-social changes (Bech-Larsen & Kazbare, 2014) makes it a prime time to instill lifelong healthy eating behaviours, and to address an increase in child and adolescent overweight and obesity, along with their associated co-morbidities. Given the complexities of this developmental period, the need to collaborate and consult with adolescents is therefore paramount. Further, from an education perspective, the wealth of literature highlights the need to engage students in the learning process, and to establish modes for students to be able to connect and construct meaning from taught content (Healey, 2016; Henderson, 2016). Therefore, central to this study was the need to include students within the formative stages of framework development. This was achieved by conducting a series of 12 student focus groups with year 7-8 students attending Western Australian regional and metropolitan schools.

Enabling youth to participate in the formative stages of this project meant students' knowledge, needs and concerns were considered in the development process (Cross, Lester,

Barnes, Cardoso, & Hadwen, 2015) of the framework. Further, the purpose of this study's framework is to assist with nutrition education lesson planning for early adolescents. Therefore, providing this target group with authentic opportunities that contribute to the taught curriculum is likely to enhance their confidence, academic motivation and school attachment (Mitra, 2004). Using focus groups to encourage youth participation is a well-reported data collection method across a broad diversity of nutrition education research studies. Kumar et al., (2016) for example, conducted six focus groups with sixth, seventh and eighth graders to understand behaviours, personal characteristics and environmental factors which influence food choices. Similarly, Verstraeten et al., (2014) ran 20 focus groups with 11-15 year olds to explore factors which influence adolescents' eating behaviours.

Whilst, there is a general consensus in nutrition education literature regarding the value of adolescent focus groups, current literature concentrates on using focus groups to explore perceptions about nutrition and healthy eating behaviours in general (Kumar et al., 2016; Verstraeten et al., 2014), for program evaluation (Condrasky et al., 2008) or to some extent, to assist in the formative stages of curriculum resource development (Bindler et al., 2012; Martens et al., 2008; O'Dea, 2002). However, to the author's knowledge, this is the first project that has used adolescent focus groups to inform and guide the development of a nutrition education lesson planning framework. This collaboration with students has assisted to develop a lesson planning framework which places student engagement and learning at the core.

5.7.2 Involvement of teachers and stakeholders

The MEAL framework developed as part of this Masters project specifically targets secondary school teachers teaching years 7-8 food and nutrition. For this reason, it was considered pivotal to include teacher input in the development process. This was achieved by conducting 10 teacher interviews HPE and Technologies (Home Economics) teachers. This input facilitated the development of a lesson planning framework which is authentic, practical and integrates well with the Western Australian curriculum structure. It is

anticipated such considerations will encourage teacher uptake and implementation of the MEAL framework.

Whilst seeking teacher input and feedback during the formative stages of nutrition education resource or lesson planning development seems imperative, its documentation within existing academic literature is scarce. Linnell et al., (2015) for example, described the role of garden-enhanced nutrition interventions amongst upper primary school students and stated the “specific processes by which curricula used in these programs were developed have not been described in detail” (p. 2). Linnell et al., further explain that if curricula descriptions are provided, they tended to be limited to include a summary of the topics, duration of the program, frequency and quantity of the activities, the objectives and use of behavioural theories. Yet the discussion of the approaches used to develop the curricula, including any collaboration with teachers, is not highlighted. This seems to be common across all nutrition education program areas. O’Dea (2002), was one of the few authors sourced which described the program development process and stated teachers were consulted during this process to aid the development of The Body Basics program. This program targeted year 7-10 students and focused on providing teachers and adolescents with information specific to food, nutrition, growth, development, sensible weight control and body image. The input sought from teachers along with adolescents, health professionals and other key stakeholders was likely to have contributed to the success of this resource, with the program being ordered by 1000 schools in its first month (O’Dea, 2002).

This Masters project also sought to include input from a diversity of government and non-government organisations through the establishment of a project reference group. This reference group included individuals with expertise in nutrition, dietetics, public health and education (HPE and Technologies). Seeking this input from a collaborative group assisted to develop a framework which aligns with current research evidence and current policy and practice in both education and public health nutrition.

5.8 Study limitations

The discussion of this study's findings should be considered in the light of limitations relating to sample selection bias, study design constraints and analysis bias.

5.8.1 *Sample selection bias*

Sample selection bias may have occurred due to the lack of representation of government schools and the use of an active consent process which is generally required to conduct school-based research. As described in Chapter 3: Methods, purposive sampling was initially employed to recruit schools based on a set of pre-determined criteria. Despite follow up phone calls and emails, this process led to the recruitment of only two schools. Through the addition of convenience sampling and advertising through known contacts and educational bodies such as the Association of Independent Schools of Western Australia (AISWA), Catholic Education Office (CEO), Australian Council for Health, Physical Education and Recreation (ACHPER) and the Home Economics Association of Australia (HEIA), a further four schools were recruited.

Based on previous school-based research experience, the author was aware of the lengthy processes required to gain Department of Education ethics. Given the tight time frame of completing a Masters of Public Health, the decision was made to recruit only non-government schools, and therefore the sample is not representative of all Western Australia schools. However, to reduce this potential school level bias, a combination of regional ($n=2$) and metropolitan ($n=4$) schools were included. These schools also represented a mix of low ($n=2$), medium ($n=1$) and high ($n=3$) socio-economic areas.

To be involved in this study, parents were required to discuss the project with their child, and provide written consent for participation. Teachers were also required to provide written consent to be interviewed. Those who chose not to participate compared to those who consented, may have different perceptions towards nutrition education, healthy eating and pedagogical principles and approaches which are effective amongst a year 7-8 student population. This again, potentially limits the representativeness of study findings.

In addition, this study was limited to seeking the thoughts, views and perceptions of teachers and students. There are additional stakeholders whose views could have been integrated, adding new forms of knowledge into the development of the MEAL framework. Such stakeholders could have included parents, those working in the food and nutrition industry and food and nutrition researchers. These views have the potential to be incorporated into future research.

5.8.2 Study design constraints

In this project a combination of qualitative data collection methods were used including, but not limited to, student focus groups, face-to-face teacher interviews and telephone teacher interviews. More female than male students participated in the focus groups, which may have also reduced the generalisability of the findings. The focus group questions and protocol integrated several activities including the use of a series of nutrition topic cards. These forced choice topic cards may have limited the range of responses elicited. However, the inclusion of cards was also considered useful in initiating conversation and discussion amongst the year 7-8 age group. In addition, while the use of focus groups is well described in the academic literature as being an effective way of engaging this age group, there is also the possibility that student responses were influenced by their peers (Peterson-Sweeney, 2005).

A greater number of Technologies teachers (n=8) participated in the teacher interviews when compared to HPE teachers (n=2). This may have therefore potentially biased the study findings and additionally, could limit application of the findings to a HPE learning area context. Potential explanations for the low number of consenting HPE teachers may include the project information and consent letter was not forwarded through at the school level to relevant HPE teachers, preconceptions that a 'food and nutrition' research project only relates to the Technologies learning area, or HPE teachers lacked time, nutrition education knowledge and/or nutrition education teaching confidence and hence, did not wish to participate. To strengthen the representation of HPE, two academics with extensive backgrounds in HPE were asked to be part of the project reference group. These members provided considerable input throughout the project.

To accommodate teacher's participation and time, two teacher interviews were completed over the phone. To ensure the same methods were used in all interview techniques, the author ensured all information was emailed to teachers ahead of the scheduled phone interview time. This allowed the interviewee to read and prepare for the interview. Additionally, these handouts acted as a useful visual aid to facilitate discussion given the absence of face-to-face connection.

5.8.3 *Analysis bias*

All student focus groups and teacher interviews were conducted by the author of this thesis. Whilst this was essential for thesis purposes and enabled greater immersion within the data, the author's previous experience working in school nutrition education research may have introduced some bias in the data analysis. To reduce this bias, initial and subsequent coding was reviewed by the author's supervisors. Several meetings were held to discuss the coding and to ensure there was consensus on how the data were being coded.

5.9 Recommendations for future research

The findings of this study have identified elements, guidelines and supporting resources necessary to facilitate the development of a multiliteracies framework relevant to an early adolescence audience and applicable to a nutrition education context. Based on these findings and the final outcome, the MEAL framework, the following recommendations have been made regarding future research and practice.

5.9.1 *Involving the government sector*

As this study involved staff and students from only the non-government sector, it was not possible to ascertain the experiences and perspectives of those within the government sector. Therefore, future research should consider conducting a series of student focus groups and teacher interviews with those attending or working at government schools. These findings could be used to validate and/or extend the MEAL framework as it currently

stands. Moreover, gaining input from disadvantaged groups and indigenous populations would extend the MEAL framework and incorporate the specific needs of these groups.

5.9.2 Pilot testing the MEAL framework

This study was completed as part of a Master of Public Health and hence, it was limited to the formative research and development of the MEAL framework. Pilot testing to determine the feasibility and usability of the framework is warranted in future research. Specifically, the MEAL framework needs to be pilot tested across both the government and non-government education sectors to determine its applicability within both settings. Such piloting would enable the review and revision of the framework elements, supporting guidelines and provided teaching strategies. Further, this piloting would assist in the creation of additional practical and realistic examples of how the MEAL framework can be utilised in the lesson planning process.

5.9.3 Whole of school approach

Use and successful implementation of the MEAL framework has the capacity to improve the taught curriculum surrounding nutrition education. However, additional supports are required to encourage lasting dietary behaviours amongst children and adolescents. From a school perspective, providing these additional supports means providing physical and social environments within the school which model and encourage healthy eating. These additional supports may take the form of changes to the school food and nutrition policies and/or strengthening partnerships with parents, health professionals or agencies as well as with school staff and students. These are captured with the Health Promoting Schools Framework (HPSF), Figure 18 (Gillies, Dimitrijevic, & Lambert, 2011). The HPSF depicts a whole of school approach to health promotion planning and action within schools (Department of Health, n.d.). This is achieved by addressing three key areas: education, environment and partnerships.

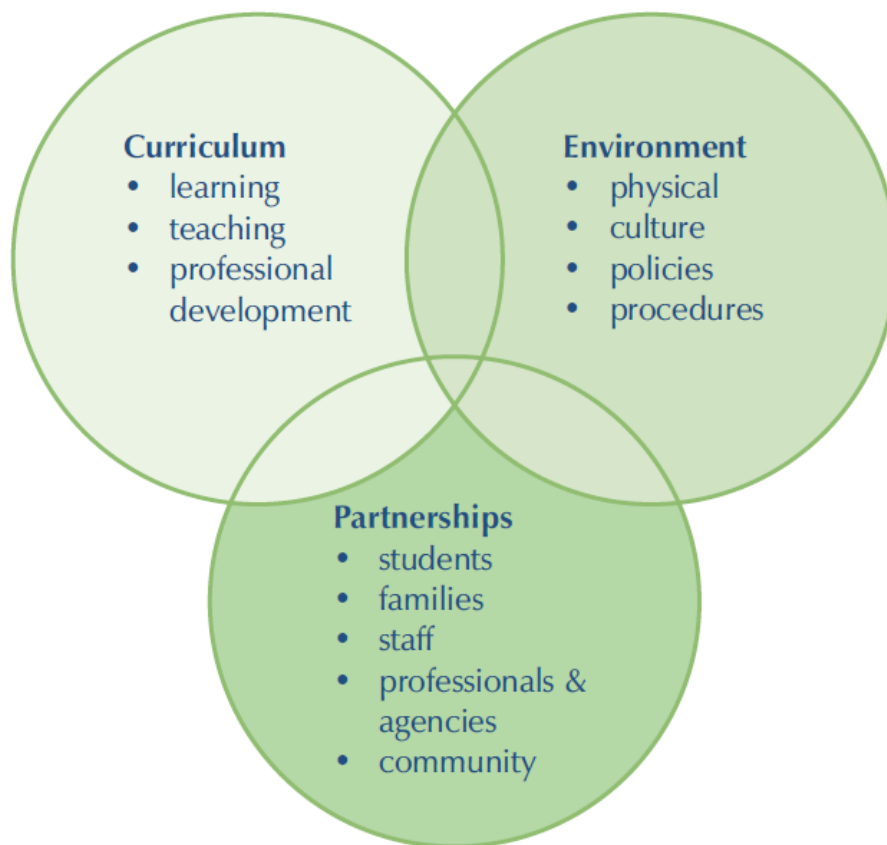


Figure 18. The Health Promoting Schools Framework

The Health Promoting Schools Framework consists of three key focus areas – curriculum, environment and partnerships.

(Gillies et al., 2011, p. 4)

The MEAL framework assists to meet the needs of the education sphere depicted in the HPSF, through initiating changes within the taught curriculum, learning and teaching practices. However, to seek changes within the broader school environment, schools should be encouraged to implement policy changes such as introducing the Healthy Food and Drink policy (Department of Education, n.d.). This policy applies to school canteens and food services, class treats, school camps and excursions, and offers an easy-to-follow 'traffic light' system to assist canteens to plan their menus based on healthy, nutritious and affordable food and drink (Department of Education, n.d.). Physical environmental changes such as planting and growing school vegetable gardens should also be encouraged and promoted.

Due to the complexities of changing dietary habits and behaviours, relying solely on schools to deliver nutrition education programs is unlikely to be sufficient. Involving parents is imperative given their significant influence on their children's food habits and choices. Parents require nutrition knowledge and information as to the importance of establishing and maintaining a healthy diet and how this can be achieved. Further, parents also need to be provided with opportunities to develop their own skills and self-efficacy in relation to food and nutrition. This study proposes future studies should explore how schools can adopt both the MEAL framework and a Health Promoting Schools approach to instigate a school and community wide shift in nutrition education.

5.10 Research impact and significance

5.10.1 The Impact Management Planning and Evaluation Ladder

Given the paucity of existing frameworks similar to that presented in this study, this research appears to have potential significance and impact. Developed by Hinton (2014) the Impact Management Planning and Evaluation Ladder (IMPEL), provides a structured framework for describing and evaluating different types of change which can be instigated by educational projects. According to the IMPEL model, there are seven rungs to the ladder, see Figure 19.

The Impact Management Planning and Evaluation Ladder (IMPEL) model

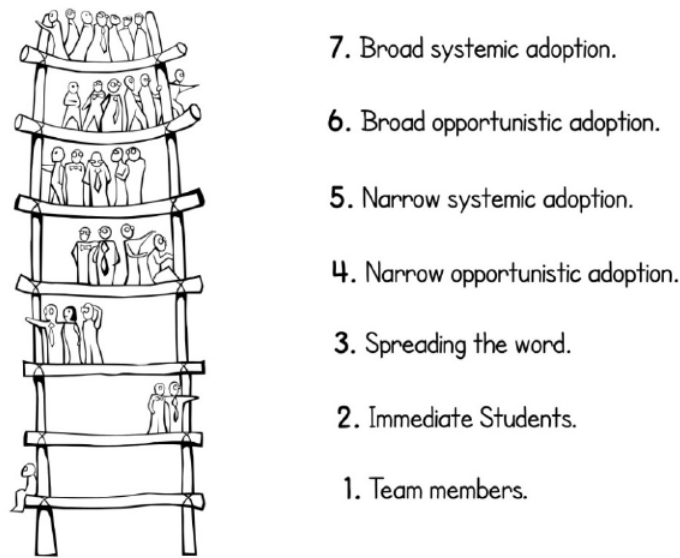


Figure 19. The IMPEL ladder

The seven rungs of the IMPEL ladder.

(Hinton, 2014, p.1)

Each of these rung has a broader impact than the last. These rungs were defined by Hinton (2014, p.1) as:

1. Changes for team members.
2. Changes by team members leading to changes for students who are directly influenced.
3. Contributions to knowledge in the field; growth or spread of disseminated ideas; serendipitous adoption by people beyond the project's intended reach.
4. Changes by opportunistic adopters at participating institutions leading to changes for students who are directly influenced.
5. Systemic changes at participating institutions leading to changes for all relevant students.
6. Changes by opportunistic adopters beyond participating institutions leading to changes for students who are directly influenced.
7. Systemic changes beyond participating institutions leading to changes for all relevant students.

Using the IMPEL model, the next section highlights the potential impact of the MEAL framework.

5.10.2 Application of the IMPEL model

5.10.2.1 Change for team members

As this research project has been completed as part of a Master of Public Health, it has enabled the author to establish new and strengthen existing relationships with her supervisors, public health professionals, nutritionists, dietitians and key stakeholders working within the education sector. This networking and collaboration has helped to build the author's research knowledge, skills and credibility within the research fields of public health nutrition, education, adolescent development and qualitative research.

5.10.2.2 Immediate students

Within the context of this study, teachers are considered the end users of the MEAL framework, and hence are the primary target group. Therefore, the immediate students of this study are the teachers which were involved throughout the MEAL framework development process. This includes the interviewed teachers (n=10) and practicing secondary school teachers involved in the project reference group (n=2). Following approval and publication of the MEAL framework, all teachers involved within this research project will be provided with a copy of the MEAL framework and its accompanying guidelines, exemplar and templates. These teachers will be encouraged and supported to utilise the MEAL framework within their nutrition education lesson planning processes.

5.10.2.3 Spreading the word

The qualitative research design used to develop the MEAL framework, coupled with its multiliteracies underpinning, means the framework is authentic, innovative, developmentally appropriate to early adolescence, practical and aligned with the Western Australian curriculum. Consequently, future activities need to focus on research translation

and dissemination of this study's findings. Research findings have already been presented (Figure 20) to an international audience of nutrition educators and dietitians (Baker, Miller, Dare, & Devine, 2016)

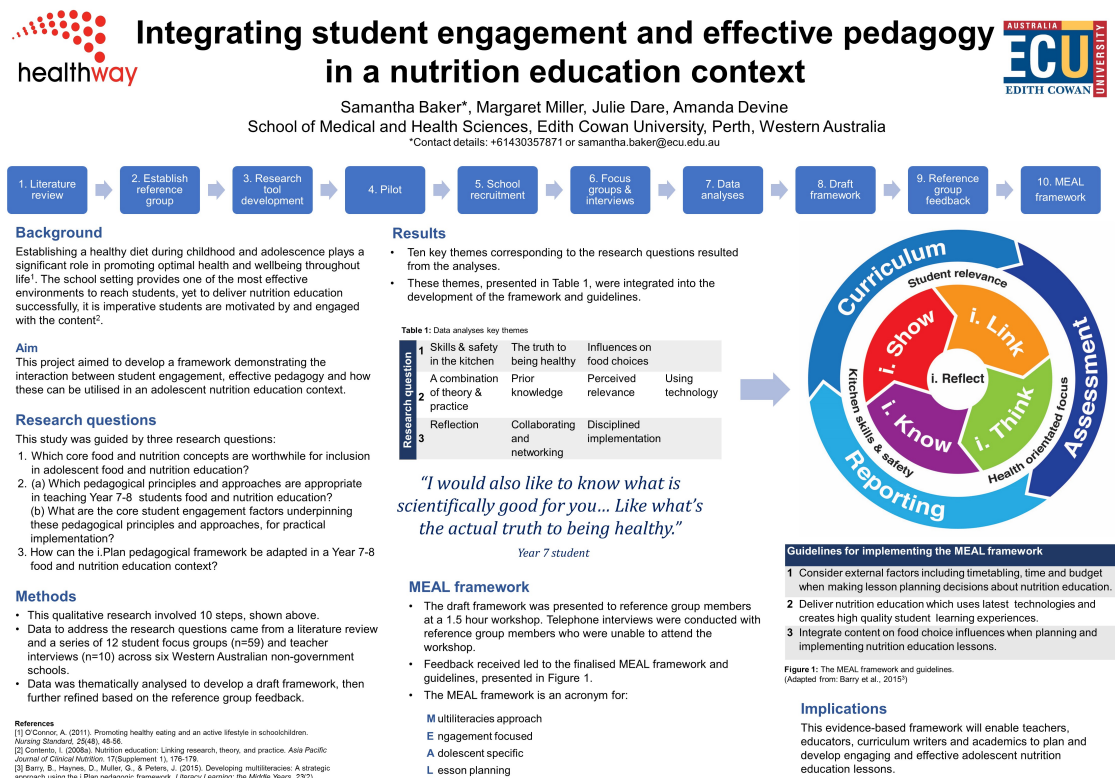


Figure 20. Poster presented at the Society for Nutrition Education and Behavior Conference 2016

Further, an abstract relating to this project has been accepted for the Home Economics Institute of Australia (HEIA) conference in early 2017. According to the 2015 HEIA annual report, there are over 1300 members within this organisation alone (HEIA, 2015). Given teachers on average teach 24 students per class in lower secondary education (OECD, 2015), the potential reach is extensive. Furthermore, the MEAL framework will be shared to the education setting via the Refresh.ED website (with over 2000 registered users), through publications and through the author's established networks. Dissemination of research findings through such activities will extend the potential reach both nationally and internationally.

5.10.2.4 Narrow opportunistic adoption

Through the aforementioned dissemination and translation into practice strategies, it is anticipated that teachers who hear of the MEAL framework will take the opportunity to adopt and implement the framework within their classroom and lesson planning processes. Implementation of this framework has the capacity to contribute towards a positive change in how nutrition education is planned and delivered in the classroom environment. Further, through using this framework, teachers will be able to improve and extend their nutrition education lesson planning practices, and with the assistance of the MEAL framework guidelines, exemplar and templates, plan in a manner which is time efficient and promotes collaboration. Using this framework will also mean teachers will have the confidence in knowing their planned lessons have been informed by research from both the public health and education research arenas.

5.10.2.5 Narrow systemic adoption

As depicted within the qualitative data analyses, a key theme present within the teacher interviews was the need to collaborate and network. The design of the MEAL framework and its accompanying tools, specifically the planning template, encourages this collaboration both within and across learning areas. Through employing the MEAL framework across into other learning areas whereby nutrition education content can be used as a driver to teach curriculum requirements, such as in Science, this would enable narrow systemic adoption at the school level.

5.10.2.6 Broad opportunistic adoption

As the author of this study is employed at a Western Australian university, broad opportunistic adoption is feasible through extending the dissemination and delivery of this study's research findings into the tertiary and TAFE education settings. Specifically, the MEAL framework will be introduced as a teaching tool in courses targeting pre-service teachers, teaching assistants, nutrition and dietetics students. Through disseminating research findings in this broader manner, tertiary and TAFE students would have the opportunity to extend their own learning and knowledge in planning and delivery nutrition

education. Moreover, it will equip these students with a valuable tool and skill set which they can take with them into their placements or workplace, enhancing their employability. Reaching these students would also promote sustainability of the project.

5.10.2.7 Broad systemic adoption

Reaching broader systemic adoption is feasible as a flow on effect from disseminating research findings to tertiary and TAFE students, as described in the broad opportunistic adoption section. For example, through introducing nutrition students to the MEAL framework, it provides them with a tool to introduce to not-for-profit organisations, who develop and deliver food literacy education programs. Through encouraging not-for profit organisations to embed the MEAL framework within the design and delivery of their food literacy programs, this research project has the capacity to extend into the broader Western Australian community.

5.11 Conclusion

A plethora of research literature identifies the steady increase in rates of overweight and obesity amongst Australian children and adolescents; consequently, promoting healthy food and nutrition is considered a key public health priority. Addressing this public health concern in its entirety is complex and beyond the scope of this project. However, the value of providing nutrition education to adolescents during their schooling years cannot be underestimated. Adolescence is a period of considerable life transitions and as such, a unique window of opportunity exists to promote and instil lifelong healthy eating behaviours, improve long term health outcomes and assist in reversing the current overweight and obesity trends. However, to successfully promote nutrition education learning along with academic achievement to this age group, factors influencing student engagement and effective pedagogical principles and approaches need to be examined.

This study enabled the development of an adolescent specific nutrition education lesson planning framework. To the author's knowledge this framework is the first of its kind and contributes to public health and education research approach by connecting three distinct yet interrelated research areas – pedagogy, engagement and nutrition education.

Specifically, this study's MEAL framework embeds the concept of a multiliteracies pedagogical approach.

Given the aim of this study was to develop a nutrition education lesson planning framework which demonstrates the interaction between student engagement and effective pedagogy, using a pre-existing multiliteracies framework (i.Plan pedagogical framework) as a starting platform was deemed appropriate. Current research literature is scarce in describing how such multiliteracy frameworks can be utilised across learning areas to deliver nutrition education content. Consequently, this study employed a generic qualitative research method to determine the thoughts, views and opinions of years 7-8 students and teachers regarding nutrition education content they thought was important to learn at school, and how this content could be taught in an engaging manner.

The findings from this research suggest nutrition content pivotal to years 7-8 includes kitchen skills and safety, the health aspects associated with food and nutrition, and influences on food choices. In addition, research findings support current education literature, highlighting the importance of understanding students' actual and perceived knowledge, along with their views on the perceived relevance of the topic being taught. The use of a combination of theoretical and practical teaching strategies is endorsed, which aligns with pre-existing Australian pedagogical frameworks and provides further support for the underpinning adapted i.Plan model. Whilst the research findings indicated support for the i.Plan model's inclusion, interviewed teachers voiced the need for an additional i.Reflect phase. Moreover, teachers expressed the need to have a framework which has accompanying examples and resources, and which provides opportunities for collaborating and networking. These results were used to develop the MEAL framework, its accompanying guidelines and supporting resources.

Once disseminated, it is anticipated the MEAL framework will contribute towards building teachers' confidence and capacity to plan and deliver nutrition education in the classroom and school environment. Coupled with interventions which focus on instigating physical and social environmental changes in schools and school communities, the MEAL

framework appears to have the capacity to contribute towards improving the overall health outcomes of Australian adolescents and reversing the trend in overweight and obesity statistics. Further, it is suggested within this thesis to disseminate research findings beyond the secondary school education sector. Specifically, through disseminating research findings to relevant tertiary and TAFE students, it will aid in equipping our next generation of educators, nutritionists and dietitians with a useful tool to plan and deliver nutrition education content or programs to the broader Western Australian community.

6 References

- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 11-39). Berlin: Springer
- Ajzen, I. (2011). The theory of planned behaviour: Reactions and reflections. *Psychology & Health, 26*(9), 1113. doi:10.1080/08870446.2011.613995
- Anderson, C. (2010). Presenting and evaluating qualitative research. *American Journal of Pharmaceutical Education, 74*(8), 141. doi:10.5688/aj7408141
- Angay-Crowder, T., Choi, J., & Yi, Y. (2013). Putting multiliteracies into practice: Digital storytelling for multilingual adolescents in a summer program. *TESL Canada Journal, 30*(2), 36.
- Anthony, E., Williams, L., & LeCroy, C. (2014). Trends in adolescent development impacting practice: How can we catch up? *Journal of Human Behavior in the Social Environment, 24*(4), 487-498.
- Appleton, J., Christenson, S., Kim, D., & Reschly, A. (2006). Measuring cognitive and psychological engagement: Validation of the student engagement instrument. *Journal of School Psychology(5)*, 427-445. doi:10.1016/j.jsp.2006.04.002
- Ardzejewski, K., Tadros, R., & Baxter, D. (2013). A descriptive study on the barriers and facilitators to implementation of the NSW (Australia) healthy school canteen strategy. *Health Education Journal, 72*(2), 136-145.
- Australian Bureau of Statistics. (2011). Socio-economic indexes for areas (SEIFA). Retrieved from <http://www.abs.gov.au/websitedbs/censushome.nsf/home/seifa>
- Australian Bureau of Statistics. (2013). *Profiles of health, Australia, 2011-2013 (Cat. No. 4338.0)*. Retrieved from <http://www.abs.gov.au>
- Australian Bureau of Statistics. (2016). *Australian health survey: Consumption of added sugars, 2011-12 (Cat No. 4364.0.55.011)*. Retrieved from <http://www.abs.gov.au>
- Australian Communications and Media Authority. (2013). *Like, post, share: Young Australians' experiences of social media*. Retrieved from [http://www.acma.gov.au/~media/mediacomms/Report/pdf/Like post share Young Australians experience of social media Quantitative research report.pdf](http://www.acma.gov.au/~media/mediacomms/Report/pdf/Like%20post%20share%20Young%20Australians%20experience%20of%20social%20media%20Quantitative%20research%20report.pdf)
- Baker, S., & Miller, M. (2014, May). *Development of a food and nutrition curriculum framework for cross-curriculum use in Australian schools*. Paper presented at the Eating Disorders and Obesity Conference, Queensland, Australia.

- Baker, S., Miller, M., Dare, J., & Devine, A. (2016, July). *Integrating student engagement and effective pedagogy in a nutrition education context [poster]*. Paper presented at the Society for Nutrition Education and Behaviour San Diego, United States of America.
- Baker, S., Miller, M., & Devine, A. (2014, October). *Development of a food and nutrition curriculum framework for use in Australian schools [poster]*. Paper presented at the Home Economics Institute of Australia Conference, Perth, Australia.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. New Jersey, United States of America: Prentice-Hall.
- Barry, B., Haynes, D., Muller, G., & Peters, J. (2015). Developing multiliteracies: A strategic approach using the 'i.Plan' pedagogical framework. *Literacy Learning: The Middle Years*, 23(2), i-viii.
- Bava, C., Jaeger, S., & Park, J. (2008). Constraints upon food provisioning practices in 'busy' women's lives: Trade-offs which demand convenience. *Appetite*, 50(2), 486-498.
- Bech-Larsen, T., & Kazbare, L. (2014). Perceptions of healthy eating in transitional phases of life: Results of four focus groups with adolescents and older adults. *British Food Journal*, 116(4), 570-584.
- Begley, A. (2016). Are cooking skills essential to improving public health? *Nutridate*, 27(1), 3-7.
- Bell, L., Curran, J., Byrne, S., Roby, H., Suriano, K., Jones, T., & Davis, E. (2011). High incidence of obesity co-morbidities in young children: A cross-sectional study. *Journal of Paediatrics and Child Health*, 47(12), 911-917.
- Bindler, R. C., Goetz, S., Butkus, S. N., Power, T. G., Ullrich-French, S., & Steele, M. (2012). The process of curriculum development and implementation for an adolescent health project in middle schools. *The Journal of School Nursing*, 28(1), 13-23.
- Birch, L. L., & Fisher, J. O. (1998). Development of eating behaviors among children and adolescents. *Pediatrics*, 101(3), 539-549.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. doi:10.1191/1478088706qp063oa
- Brooks, N., & Begley, A. (2014). Adolescent food literacy programmes: A review of the literature. *Nutrition & Dietetics*, 71(3), 158-171. doi:10.1111/1747-0080.12096
- Bryan, J., Osendarp, S., Hughes, D., Calvaresi, E., Baghurst, K., van Klinken, J. (2004). Nutrients for cognitive development in school-aged children. *Nutrition Review*, 62(8), 295-306

- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford: Oxford University Press.
- Burnett, S., Thompson, S., Bird, G., & Blakemore, S. (2011). Pubertal development of the understanding of social emotions: Implications for education. *Learning and individual differences*, 21(6), 681-689.
- Burns, N., Grove, S., & Gray, J. (2015). *Understanding nursing research: Building an evidence-based practice* (6th ed.). Missouri, Unites States of America: Elsevier.
- Caelli, K., Ray, L., & Mill, J. (2003). 'Clear as mud': Toward greater clarity in generic qualitative research. *International Journal of Qualitative Methods*, 2(2), 1-13.
- Callow, J., & Orlando, J. (2015). Enabling exemplary teaching: A framework of student engagement for students from low socio-economic backgrounds with implications for technology and literacy practices. *Pedagogies: An International Journal*, 10(4), 349-371. doi:10.1080/1554480X.2015.1066678
- Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology Nursing Forum*, 41(5), 545-547. doi:10.1188/14.ONF.545-547
- Chase, P., Hilliard, L., Geldhof, J., Warren, D., & Lerner, R. (2014). Academic achievement in the high school years: The changing role of school engagement. *Journal of Youth and Adolescence*, 43(6), 884-896. doi:10.1007/s10964-013-0085-4
- Chessen, J., Hey, D., Nicholson, L., & McDermott, A. (2009). Program: What's cooking on the central coast with the pink and dude chefs? *Health Education and Behavior*, 36(6), 975-977. doi:10.1177/1090198109353401
- Chessen, J., Nicholson, L., Sklar, J., & McDermott, A. (2009). The Development and Pilot of a Culinary Intervention Designed Using the Social Cognitive Theory to Teach Nutrition to Adolescent Girls. *Journal of Nutrition Education and Behavior*, 41(4), S16-S16. doi:10.1016/j.jneb.2009.03.092
- Christie, D., & Viner, R. (2005). Abc of adolescence: Adolescent development. *British Medical Journal*, 330(7486), 301-304.
- Clarke, V., & Braun, V. (2013). Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. *The Psychologist*, 26(2), 120-123.
- Condrasky, M., Quinn, A., & Cason, K. (2008). Cooking camp provides hands-on nutrition education opportunity. *Journal of Culinary Science & Technology*, 5(4), 37-52. doi:10.1300/J385v05n04_03
- Contento, I. (2008a). Nutrition education: Linking research, theory, and practice. *Asia Pacific Journal of Clinical Nutrition*, 17(S1), 176-179.

- Contento, I. (2008b). Review of nutrition education research in the journal of nutrition education and behavior, 1998 to 2007. *Journal of Nutrition Education and Behavior*, 40(6), 331-340. doi:10.1016/j.jneb.2008.06.001
- Coulson, D., & Harvey, M. (2013). Scaffolding student reflection for experience-based learning: a framework. *Teaching in Higher Education*, 18(4), 401-413.
- Creswell, J. (2013). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). United States of America: Sage Publications.
- Cross, D., Lester, L., Barnes, A., Cardoso, P., & Hadwen, K. (2015). If it's about me, why do it without me? Genuine student engagement in school cyberbullying education. *International Journal of Emotional Education*, 7(1), 35.
- Crotty, M. (1998). *The foundations of social research: Meaning and perspective in the research process*. New South Wales, Australia: Allen & Unwin.
- Daniels, H. (2005). *An introduction to Vygotsky* (2nd ed.). United States of America: Routledge.
- Daniels, S. (2009). Complications of obesity in children and adolescents. *International Journal of Obesity*, 33, S60-S65.
- Delbecq, A., Gustafson, D., & Van de Ven, A. (1975). *Group techniques for program planning: A guide to nominal group and Delphi processes*. Illinois, United States of America: Scott Foresman.
- Denzin, N. K. (1970). *Sociological methods: A sourcebook*. Chicago, United States of America: Aldine Publishing Company.
- Department of Education. (n.d.). Healthy food and drink. Retrieved from <http://www.det.wa.edu.au/healthyfoodanddrink>
- Department of Education and Training. (2003). *Quality teaching in NSW public schools*. Retrieved from http://www.darcymoore.net/wp-content/uploads/2012/02/qt_EPSColor.pdf
- Department of Health. (n.d.). How to run projects to promote health in schools. Retrieved from http://ww2.health.wa.gov.au/Articles/F_I/How-to-run-projects-to-promote-health-in-schools
- de Onis, M., & Blossner, M. (2003). The World Health Organization global database on child growth and malnutrition: Methodology and applications. *International Journal of Epidemiology*, 32, 518-526.
- Dick, W., Carey, L., & Carey, J. (2005). *The systematic design of instruction* (6th ed.). United States of America: Pearson/Allyn and Bacon.

- Dixey, R., Heindl, I., Loureiro, I., Pérez-Rodrigo, C., Snel, J., & Warnking, P. (1999). *Healthy eating for young people in Europe: A school-based nutrition education guide*. Retrieved from http://www.euro.who.int/__data/assets/pdf_file/0005/119921/E69846.pdf
- Dotterer, A. M., & Lowe, K. (2011). Classroom context, school engagement, and academic achievement in early adolescence. *Journal of Youth and Adolescence*, 40(12), 1649-1660.
- Dowson, M., Ross, M., Donovan, C., Richards, G., & Johnson, K. (2005). *The current state of middle schooling: A review of the literature*. Paper presented at the Australian Association for Research in Education, Parramatta, Australia.
- DuBay, W. (2004). *The principles of readability*. Retrieved from <http://www.impact-information.com/impactinfo/readability02.pdf>
- Eccles, J., Midgley, C., Wigfield, A., Buchanan, C., Reuman, D., Flanagan, C., & Mac Iver, D. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist*, 48(2), 90-101.
- Edith Cowan University. (2015). *Conduct of Ethical Human Research*. Retrieved from Western Australia: http://www.ecu.edu.au/GPPS/policies_db/policies_view.php?rec_id=0000000416
- Erikson, E. (1963). *Childhood and society* (2nd Ed.). New York, United States of America: Norton.
- Fielden, A., Sillence, E., & Little, L. (2011). Children's understandings' of obesity, a thematic analysis. *International Journal of Qualitative Studies on Health and Well-being*, 6(3), 1-14. doi:10.3402/qhw.v6i3.7170
- Fitzgerald, A., Heary, C., Nixon, E., & Kelly, C. (2010). Factors influencing the food choices of Irish children and adolescents: A qualitative investigation. *Health Promotion International*, 25(3), 289 – 298.
- Flynn, P., Mesibov, D., Vermette, P., & Smith, R. (2004). *Applying standards-based constructivism: A two-step guide for motivating middle and high school students*. Larchmont, New York: Eye On Education.
- Frary, C., Johnson, R., & Wang, M. (2004). Children and adolescents' choices of foods and beverages high in added sugars are associated with intakes of key nutrients and food groups. *Journal of Adolescent Health*, 34(1), 56-63. doi:10.1016/S1054-139X(03)00248-9
- Fullarton, S. (2002). *Student engagement with school: Individual and school-level influences*. Retrieved from http://research.acer.edu.au/lsay_research/31

- Gambetti, E., & Giusberti, F. (2016). Anger and everyday risk-taking decisions in children and adolescents. *Personality and Individual Differences*, 90, 342-346.
- Gatti, E., Ionio, C., Traficante, D., & Confalonieri, E. (2014). "I like my body; Therefore, I like myself": How body image influences self-esteem—A cross-sectional study on Italian adolescents. *Europe's Journal of Psychology*, 10(2), 301–317.
- Giampapa, F. (2010). Multiliteracies, pedagogy and identities: Teacher and student voices from a Toronto elementary school. *Canadian Journal of Education*, 33(2), 407.
- Gillies, S., Dimitrijevič, S., & Lambert, M. (2011). *What is a health promoting school? A resource to assist schools to implement a whole school approach*. Retrieved from <http://wahpsa.org.au/wp-content/uploads/2015/09/What-is-a-HPS-2011.pdf>
- Given, L. M. (2008). *The Sage encyclopedia of qualitative research methods*. Los Angeles, United States of America: Sage Publications.
- Google. (2016). Google Inside Search. Retrieved from <http://www.google.com/intl/es419/insidesearch/howsearchworks/thestory/>
- Gore, J., Griffiths, T., & Ladwig, J. (2004). Towards better teaching: productive pedagogy as a framework for teacher education. *Teaching and Teacher Education*, 20(4), 375-387. doi:10.1016/j.tate.2004.02.010
- Government of Western Australia. (2015). *School Curriculum and Standards Authority Act 1997*. Retrieved from [https://www.slp.wa.gov.au/pco/prod/FileStore.nsf/Documents/MRDocument:27327P/\\$FILE/School Curriculum and Standards Authority Act 1997 - %5B03-e0-02%5D.pdf?OpenElement](https://www.slp.wa.gov.au/pco/prod/FileStore.nsf/Documents/MRDocument:27327P/$FILE/School%20Curriculum%20and%20Standards%20Authority%20Act%201997-%5B03-e0-02%5D.pdf?OpenElement)
- Gratton, L., Povey, R., & Clark-Carter, D. (2007). Promoting children's fruit and vegetable consumption: Interventions using the theory of planned behaviour as a framework. *British Journal of Health Psychology*, 12, 639-650. doi:10.1348/135910706X171504
- Greenbaum, T. L. (1999). *Moderating focus groups: A practical guide for group facilitation*. California, United States of America: Sage Publications.
- Haerens, L., De Bourdeaudhuij, I., Maes, L., Vereecken, C., Brug, J., & Deforche, B. (2007). The effects of a middle-school healthy eating intervention on adolescents' fat and fruit intake and soft drinks consumption. *Public Health Nutrition*, 10(5), 443-449. doi:10.1017/S1368980007219652
- Haerens, L., Deforche, B., Maes, L., Brug, J., Vandelanotte, C., & De Bourdeaudhuij, I. (2007). A computer-tailored dietary fat intake intervention for adolescents: Results of a randomized controlled trial. *Annals of Behavioral Medicine*, 34(3), 253-262. doi:10.1007/BF02874550

- Healey, A. (2016). Transforming pedagogy with multiliteracies in the English classroom. *Literacy Learning: The Middle Years*, 24(1).
- Henderson, R. (2016). *Teaching literacies in the middle years: Pedagogies and diversity*. Victoria, Australia: Oxford University Press.
- Herbert, J., Flego, A., Gibbs, L., Waters, E., Swinburn, B., Reynolds, J., & Moodie, M. (2014). Wider impacts of a 10-week community cooking skills program-Jamie's Ministry of Food, Australia. *BMC public health*, 14(1), 1.
- Hinton, T. (2014). *The impact management planning and evaluation ladder (IMPEL)*. Retrieved from https://docs.education.gov.au/system/files/doc/other/impact_resources.pdf
- Hoelscher, D. M., Evans, A., Parcel, G., & Kelder, S. (2002). Designing effective nutrition interventions for adolescents. *Journal of the American Dietetic Association*, 102(3), S52-S63. doi:10.1016/S0002-8223(02)90422-0
- Home Economics Institute of Australia. (2015). *Annual Report 2015*. Retrieved from http://www.heia.com.au/resources/documents/HEIA_Annual_Report_2015.pdf
- Hoppe, M., Wells, E., Morrison, D., Gillmore, M., & Wilsdon, A. (1995). Using focus groups to discuss sensitive topics with children. *Evaluation review*, 19(1), 102-114.
- Instructional Design Central. (2016). Instructional Design Models. Retrieved from <http://www.instructionaldesigncentral.com/instructionaldesignmodels>
- Jasik, C. B., & Lustig, R. H. (2008). Adolescent obesity and puberty: The perfect storm. *Annals of the New York Academy of Sciences*, 1135(1), 265-279. doi:10.1196/annals.1429.009
- Jeanfreau, S., & Jack, L. (2010). Appraising qualitative research in health education: Guidelines for public health educators. *Health Promotion Practice*, 11(5), 612-617. doi:10.1177/1524839910363537
- Johnson, L. (2012). *Kick-start your class: Academic icebreakers to engage students*. San Francisco, United States of America: Jossey-Bass.
- Jones, K., Vermette, P., & Jones, J. (2009). An integration of "backwards planning" unit design with the "two-step" lesson planning framework. *Education*, 130(2), 357-360.
- Kalantzis, M., Cope, B., & Learning by Design Project Group. (2005). *Learning by design*. Melbourne, Australia: Victorian Schools Innovation Commission.
- Kalra, G., De Sousa, A., Sonavane, S., & Shah, N. (2012). Psychological issues in pediatric obesity. *Industrial Psychiatry Journal*, 21(1), 11-17. doi:10.4103/0972-6748.110941

- Khalil, M., & Elkhider, I. (2016). Applying learning theories and instructional design models for effective instruction. *Advances in Physiology Education*, 40(2), 147-156.
- Kitzinger, J. (1994). The methodology of focus groups: The importance of interaction between research participants. *Sociology of health & illness*, 16(1), 103-121.
- Kortering, L., & Christenson, S. (2009). Engaging students in school and learning: The real deal for school completion. *Exceptionality: A Special Education Journal*, 17(1), 5-15. doi:10.1080/09362830802590102
- Kumar, J., Adhikari, K., Li, Y., Lindshield, E., Muturi, N., & Kidd, T. (2016). Identifying barriers, perceptions and motivations related to healthy eating and physical activity among 6th to 8th grade, rural, limited-resource adolescents. *Health Education*, 116(2), 123-137. doi:10.1108/HE-03-2014-0035
- Kupolati, M., Gericke, G., & MacIntyre, U. (2015). Teachers' perceptions of school nutrition education's influence on eating behaviours of learners in the Bronkhorstspuit District. *South African Journal of Education*, 35(2), 01-10.
- Larson, B., & Keiper, T. (2013). *Instructional strategies for middle and high school*. United States of America: Routledge.
- Latzer, Y., & Stein, D. (2013). A review of the psychological and familial perspectives of childhood obesity. *Journal of Eating Disorders*, 1(7), 1-13.
- Leahy, W., & Sweller, J. (2008). The imagination effect increases with an increased intrinsic cognitive load. *Applied Cognitive Psychology*, 22(2), 273-283. doi:10.1002/acp.1373
- Lee, N., de Groot, R., Boschloo, A., Dekker, S., Krabbendam, L., & Jolles, J. (2013). Age and educational track influence adolescent discounting of delayed rewards. *Frontiers in psychology*, 4.
- Liberante, L. (2012). The importance of teacher–student relationships, as explored through the lens of the NSW quality teaching model. *Journal of Student Engagement: Education Matters*, 2(1), 2-9.
- Liem, G., & Martin, A. (2012). The motivation and engagement scale: Theoretical framework, psychometric properties, and applied yields. *Australian Psychologist*, 47(1), 3-13. doi:10.1111/j.1742-9544.2011.00049.x
- Lincoln, Y., & Guba, E. (1985). *Naturalistic inquiry*. California, United States of America: Sage Publications.
- Linnell, J. D., Zidenberg-Cherr, S., Briggs, M., Scherr, R. E., Brian, K. M., Hillhouse, C., & Smith, M. H. (2015). Using a Systematic Approach and Theoretical Framework to Design a Curriculum for the Shaping Healthy Choices Program. *Journal of Nutrition Education and Behavior*. doi:10.1016/j.jneb.2015.09.010

- Manning, M., & Bucher, K. (2009). *Teaching in the middle school* (3rd ed.). Boston, United States of America: Pearson Education.
- Marshall, W. A., & Tanner, J. M. (1969). Variations in pattern of pubertal changes in girls. *Archives of Disease in Childhood*, 44(235), 291-303.
- Marshall, W. A., & Tanner, J. M. (1970). Variations in the pattern of pubertal changes in boys. *Archives of Disease in Childhood*, 45(239), 13-23.
- Martens, M., Van Assema, P., Paulussen, T., Van Breukelen, G., & Brug, J. (2008). Krachtvoer: Effect evaluation of a Dutch healthful diet promotion curriculum for lower vocational schools. *Public Health Nutrition*, 11(3), 271-278. doi:10.1017/S1368980007000298
- Martin, A. (2001). The student motivation scale: A tool for measuring and enhancing motivation. *Australian Journal of Guidance and Counselling*, 11(1), 1-20.
- Martin, A. (2002). Motivation and academic resilience: Developing a model for student enhancement. *Australian Journal of Education*, 46(1), 34-49.
- Martin, A. (2003). The student motivation scale : Further testing of an instrument that measures school students' motivation. *Australian Journal of Education*, 47(1), 88-106. doi:10.1177/000494410304700107
- Martin, A. (2008). Enhancing student motivation and engagement: The effects of a multidimensional intervention. *Contemporary Educational Psychology*, 33(2), 239-269.
- McMahon, B., Munns, G., Smyth, J., & Zyngier, D. (2012). Student engagement for equity and social justice: Creating space for student voice. *Teaching & Learning*, 7(2), 63-78.
- Melo, H., de Moura, A., Aires, L., & Cunha, L. (2013). Barriers and facilitators to the promotion of healthy eating lifestyles among adolescents at school: The views of school health coordinators. *Health Education Research*, 28(6), 979-992.
- Merriam, S. B. (1998). *Qualitative research and case study applications in education* (2nd ed.). San Francisco, United States of America: Jossey-Bass Publishers.
- Mills, K. A. (2006). *Critical Framing in a Pedagogy of Multiliteracies*. Paper presented at the Voices, Vibes, Visions: Hearing the Voices, Feeling the Vibes, Capturing the Visions, Darwin. <http://eprints.qut.edu.au/4844/>
- Mitra, D. L. (2004). The significance of students: can increasing " student voice" in schools lead to gains in youth development? *The Teachers College Record*, 106(4), 651-688.

- Morris, A., & Stewart-Dore, N. (1984). *Learning to learn from text*. Australia: Addison-Wesley Publishing Company.
- Mortimore, P. (1999). *Understanding pedagogy and its impact on learning*. London, United Kingdom: Paul Chapman Publishing Ltd.
- Munns, G., Arthur, L., Downes, T., Gregson, R., Power, A., Sawyer, W., . . . Steele, F. (n.d.). *Motivation and engagement of boys: Evidence-based teaching practices*. Retrieved from Australia: ecta.org.au/_dbase_upl/Motivation%20Engagement%20Boys.pdf
- Munns, G., & Martin, A. (2005). *It's all about MeE: A motivation and engagement framework*. Paper presented at the Australian Association for Research in Education Conference, University of Western Sydney, Australia.
- Murphy, P., & Gipps, C. (2005). *Equity in the classroom: Towards effective pedagogy for girls and boys* (Vol. 1). United Kingdom: UNESCO Publishing.
- National Health and Medical Research Council. (2013). *Eat for health: Educator guide*. Retrieved from https://www.eatforhealth.gov.au/...guidelines/n55b_eat_for_health_educators_guide.p...
- Nelson, A. M. (2008). Addressing the threat of evidence-based practice to qualitative inquiry through increasing attention to quality: A discussion paper. *International Journal of Nursing Studies*, 45(2), 316-322. doi:10.1016/j.ijnurstu.2007.01.012
- Neumark-Sztainer, D., Story, M., Perry, C., & Casey, M. A. (1999). Factors influencing food choices of adolescents: findings from focus-group discussions with adolescents. *Journal of the American Dietetic Association*, 99(8), 929-937.
- Neville, M. (2010). Meaning making using new media: Learning by design case studies. *E-learning and Digital Media*, 7(3), 237-247.
- Newmann, F. M., Marks, H. M., & Gamoran, A. (1996). Authentic pedagogy and student performance. *American Journal of Education*, 280-312.
- NSW Department of Education and Training. (2003). Quality teaching in NSW public schools: Information for parents, caregivers and the community.
- O'Connor, A. (2011). Promoting healthy eating and an active lifestyle in schoolchildren. *Nursing Standard*, 25(48), 48-58.
- O'Dea, J. (2002). Body basics: A nutrition education program for adolescents about food, nutrition, growth, body image, and weight control. *Journal of the American Dietetic Association*, 102(3 Suppl), S68 - S70.

- O'Dea, J. A. (2004). Evidence for a self-esteem approach in the prevention of body image and eating problems among children and adolescents. *Eating Disorders*, 12(3), 225-239.
- Obizoba, C. (2015). Instructional design models-framework for innovative teaching and learning methodologies. *The Business & Management Review*, 6(5), 21.
- OECD. (2015). *Education at a Glance 2015: OECD indicators*. Retrieved from <http://dx.doi.org/10.1787/eag-2015-en>
- Passmore, S., & Harris, G. (2005). School nutrition action groups and their effect upon secondary school aged pupils' food choices. *Nutrition Bulletin*, 30(4), 364-369. doi:10.1111/j.1467-3010.2005.00530.x
- Patrick, H., Ryan, A., & Kaplan, A. (2007). Early adolescents' perceptions of the classroom social environment, motivational beliefs, and engagement. *Journal of Educational Psychology*, 99(1), 83.
- Pendergast, D., & Bahr, N. (2010). *Teaching middle years: Rethinking curriculum, pedagogy and assessment* (2nd ed.). New South Wales, Australia: Allen & Unwin.
- Peralta, L., Dudley, D., & Cotton, W. (2016). Teaching healthy eating to elementary school students: A scoping review of nutrition education resources. *Journal of School Health*, 86(5), 334-345. doi:10.1111/josh.12382
- Percy, W., Kostere, K., & Kostere, S. (2015). Generic qualitative research in psychology. *The Qualitative Report*, 20(2), 76-85.
- Perez-Rodrigo, C., & Aranceta, J. (2003). Nutrition education in schools: Experiences and challenges. *European Journal of Clinical Nutrition*, 57(S1), S82-S85.
- Peterson-Sweeney, K. (2005). The use of focus groups in pediatric and adolescent research. *Journal of Pediatric Health Care*, 19(2), 104-110.
- Petty, N., Thomson, O., & Stew, G. (2012). Ready for a paradigm shift? Part 2: Introducing qualitative research methodologies and methods. *Manual Therapy*, 17(5), 378-384. doi:10.1016/j.math.2012.03.004
- Piernas, C., & Popkin, B. (2011). Increased portion sizes from energy-dense foods affect total energy intake at eating occasions in US children and adolescents: Patterns and trends by age group and sociodemographic characteristics, 1977–2006. *The American journal of clinical nutrition*, 94(5), 1324-1332.
- Poskitt, J., & Gibbs, R. (2010). *Student engagement in the middle years of schooling (year 7-10): A literature review*. Retrieved from New Zealand: [https://nzcurriculum.tki.org.nz/content/download/.../940_Student Engagement.pdf](https://nzcurriculum.tki.org.nz/content/download/.../940_Student%20Engagement.pdf)

- Prentice, A., Schoenmakers, I., Laskey, A., de Bono, S., Ginty F., & Goldberg, G. (2006, June). *Nutrition and bone growth and development*. Paper presented at a meeting for the Nutrition Society, Cork, Republic of Ireland.
- Preventative Health Taskforce. (2009). *Australia: the healthiest country by 2020*. Retrieved from <http://www.health.gov.au/internet/preventativehealth/publishing.nsf/.../obesity-jul09.pdf>
- Pulgarón, E. (2013). Childhood obesity: A review of increased risk for physical and psychological comorbidities. *Clinical Therapeutics*, 35(1), A18-A32. doi:10.1016/j.clinthera.2012.12.014
- QSR International Pty Ltd. (2016). NVivo 10. Retrieved from <http://www.qsrinternational.com/>
- QSR International Pty Ltd. (n.d.-a). About nodes. Retrieved from http://help-nv10.qsrinternational.com/desktop/concepts/about_nodes.htm
- QSR International Pty Ltd. (n.d.-b). Code sources and manage nodes. Retrieved from http://help-nv11.qsrinternational.com/desktop/concepts/code_sources_and_manage_nodes.htm - MiniTOCBookMark6
- Refresh.ED. (2014). Refresh.ED: Food and nutrition teaching resources. Retrieved from <http://www.refreshedschools.health.wa.gov.au/>
- Reilly, J., Methven, E., McDowell, Z., Hacking, B., Alexander, D., Stewart, L., & Kelnar, C. (2003). Health consequences of obesity. *Archives of Disease in Childhood*, 88(9), 748-752. doi:10.1136/ad.88.9.748
- Rinkevich, J. (2011). Creative teaching: Why it matters and where to begin. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 84(5), 219-223. doi:10.1080/00098655.2011.575416
- Ryan, M. (2008). Engaging middle years students: Literacy projects that matter. *Journal of Adolescent & Adult Literacy*, 52(3), 190-201. doi:10.1598/JAAL.52.3.2
- Sanders, D., & Welk, D. (2005). Strategies to scaffold student learning: Applying Vygotsky's zone of proximal development. *Nurse Educator*, 30(5), 203-207. doi:10.1097/00006223-200509000-00007
- Sanders, R., Han, A., Baker, J. S., & Cobley, S. (2015). Childhood obesity and its physical and psychological co-morbidities: a systematic review of Australian children and adolescents. *European Journal of Pediatrics*, 174(6), 715-746. doi:10.1007/s00431-015-2551-3

- Savidge, G., Crawford, D., Worsley, A., & Ball, K. (2007). Food intake patterns among Australian adolescents. *Asia Pacific Journal of Clinical Nutrition*, 16(4), 738-746.
- Savidge, G., MacFarlane, A., Ball, K., Worsley, A., & Crawford, D. (2007). Snacking behaviours of adolescents and their association with skipping meals. *International Journal of Behavioral Nutrition and Physical Activity*, 4(1), 36-36. doi:10.1186/1479-5868-4-36
- Schacter, J., Thum, Y., & Zifkin, D. (2006). How much does creative teaching enhance elementary school students' achievement? *Journal of Creative Behavior*, 40(1), 47-72. doi:10.1002/j.2162-6057.2006.tb01266.x
- School Curriculum and Standards Authority. (2014). School Curriculum and Standards Authority. Retrieved from <http://www.scsa.wa.edu.au>
- School Curriculum and Standards Authority. (2016). Design and Technologies. Retrieved from <http://k10outline.scsa.wa.edu.au/home/p-10-curriculum/curriculum-browser/technologies/design-and-technologies2>
- Scully, M., Wakefield, M., Niven, P., Chapman, K., Crawford, D., Pratt, I., . . . NaSSDA Study Team. (2012). Association between food marketing exposure and adolescents' food choices and eating behaviors. *Appetite*, 58(1), 1-5.
- Sebastian, C., Burnett, S., & Blakemore, S. J. (2008). Development of the self-concept during adolescence. *Trends in Cognitive Sciences*, 12(11), 441-446.
- Sellar, S., & Cormack, P. (2007). *Framing pedagogies: A review of frameworks and research designed to promote effective approaches to teaching and learning*. . Retrieved from <https://espace.library.uq.edu.au/view/UQ:256670/TfEL.pdf>
- Slee, P. (2002). *Child, adolescent and family development* (2nd ed.). Australia: Cambridge University Press.
- Smith, K., Straker, L., Kerr, D., & Smith, A. (2015). Overweight adolescents eat what? And when? Analysis of consumption patterns to guide dietary message development for intervention. *Journal of Human Nutrition and Dietetics*, 28(2), 80-93. doi:10.1111/jhn.12263
- Soliah, L., Walter, J., & Jones, S. (2012). Benefits and barriers to healthful eating what are the consequences of decreased food preparation ability? *American Journal of Lifestyle Medicine*, 6(2), 152-158.
- Spear, B. (2002). Adolescent growth and development. *Journal of the American Dietetic Association*, 102(3), S23-S29.
- Spear, L. (2000). The adolescent brain and age-related behavioral manifestations. *Neuroscience & Biobehavioral Reviews*, 24(4), 417-463.

- Stewart-Dore, N. (2003). Strategies for practising multiliteracies In M. Anstey & G. Bull (Eds.), *The literacy lexicon* (pp. 161-181). Australia: Pearson Education Australia.
- Stoll, L., Bolam, R., McMahon, A., Wallace, M., & Thomas, S. (2006). Professional learning communities: A review of the literature. *Journal of Educational Change*, 7(4), 221-258. doi:10.1007/s10833-006-0001-8
- The New London Group. (1996). A pedagogy of multiliteracies: Designing social futures. *Harvard Educational Review*, 66(1), 60-92.
- Tsorbatzoudis, H. (2005). Evaluation of a planned behavior theory-based intervention programme to promote healthy eating. *Perceptual and motor skills*, 101(2), 587-604.
- Van Cauwenberghe, E., Maes, L., Spittaels, H., van Lenthe, F. J., Brug, J., Oppert, J. M., & De Bourdeaudhuij, I. (2010). Effectiveness of school-based interventions in Europe to promote healthy nutrition in children and adolescents: Systematic review of published and 'grey' literature. *The British Journal of Nutrition*, 103(6), 781-797.
- Verstraeten, R., Royen, K., Ochoa-Avilés, A., Penafiel, D., Holdsworth, M., Donoso, S., . . . Kolsteren, P. (2014). A conceptual framework for healthy eating behavior in Ecuadorian adolescents: A qualitative study. *PLoS ONE*, 9(1). doi:10.1371/journal.pone.0087183
- Vidgen, H. (2015). Food literacy. *Nutridate*, 26(3), 5-6.
- Vidgen, H., & Gallegos, D. (2014). Defining food literacy and its components. *Appetite*, 76, 50-59. doi:10.1016/j.appet.2014.01.010
- Viner, R., & Barker, M. (2005). Young people's health: The need for action. *BMJ*, 330(7496), 901-903.
- Vodanovich, S., Shen, K., & Sundaram, D. (2015). *Social competence of digital natives: Impact of social networking sites (SNS) use*. Paper presented at the AMCIS 2015 Association for Information Systems.
- Vygotsky, L. (1997). Interaction between learning and development. In M. Gauvain & M. Cole (Eds.), *Readings on the development of children* (Vol. 23, pp. 29-36). United States of America: W.H. Freeman and Company.
- Watson, S., & Gable, R. (2013). Cognitive development of adolescents at risk or with learning and/or emotional problems: Implications for teachers. *Intervention in School and Clinic*, 1053451213493171.
- Wiggins, G., & McTighe, J. (2005). *Understanding by Design* (Expanded 2nd ed.). United States of America: Association for Supervision and Curriculum Development.

- Woolfolk, A., & Perry, N. (2012). *Child and adolescent development*. United States of America: Pearson Education.
- World Health Organization. (2015). *Guideline: Sugars intake for adults and children*. Retrieved from Geneva: <http://www.who.int/en/>
- Wyatt, T., Krauskopf, P., & Davidson, R. (2008). Using focus groups for program planning and evaluation. *The Journal of School Nursing*, 24(2), 71-82.
- Yelland, N., Kalantzis, M., & Cope, B. (2008). Learning by design: Creating pedagogical frameworks for knowledge building in the twenty-first century. *Asia-Pacific Journal of Teacher Education*, 36(3), 197-213. doi:10.1080/13598660802232597
- Yuan, R., & Zhang, J. (2016). Promoting teacher collaboration through joint lesson planning: Challenges and coping strategies. *The Asia-Pacific Education Researcher*, 25(5), 817-826. doi:10.1007/s40299-016-0300-7

7 Appendices

Appendix A: Project timeline

[illegible]

Appendix B: Protocol review questions

Project reference group review questions for FOCUS GROUP PROTOCOL

SECTION ONE focuses on gaining an understanding of what students have previously been taught about food and nutrition at school and what nutrition topics they think are important to learn.

In reference to **SECTION ONE ONLY**, please indicate your level of agreement or disagreement for each statement by either circling or highlighting the appropriate response.

	Strongly disagree				Strongly agree
The questions are easy to understand.	1	2	3	4	5
The wording of the questions is appropriate for 11-13 year olds.	1	2	3	4	5
The activities included in this section are appropriate and engaging for 11-13 year olds.	1	2	3	4	5
The questions highlight nutrition topics essential to optimising food literacy.	1	2	3	4	5
The questions assess what students have previously been taught about food and nutrition at school.	1	2	3	4	5
The questions assess nutrition topics students think are important to learn.	1	2	3	4	5

Do you have any other comments on **SECTION ONE?** (i.e. comments on the content, wording, activities, nutrition topics, number of questions or missing questions?)

SECTION TWO of the student focus group questions focuses on gaining an understanding of what activities students think could be used in the classroom to help make nutrition education fun, engaging and interesting to learn.

In reference to **SECTION TWO ONLY**, please indicate your level of agreement or disagreement for each statement by either circling or highlighting the appropriate response.

	Strongly disagree				Strongly agree
The questions are easy to understand.	1	2	3	4	5
The wording of the questions is appropriate for 11-13 year olds.	1	2	3	4	5
The activities included in this section are appropriate and engaging for 11-13 year olds.	1	2	3	4	5
The questions assess what activities students think could be used in the classroom to help make nutrition education fun, engaging and interesting to learn.	1	2	3	4	5

Do you have any other comments on **SECTION TWO?** (i.e. comments on the content, wording, activities number of questions or missing questions?)

Project reference group review questions for TEACHER INTERVIEW PROTOCOL

SECTION ONE focuses on gaining an understanding of the teacher's professional background and their experience with teaching food and nutrition.

In reference to **SECTION ONE ONLY**, please indicate your level of agreement or disagreement for each statement by either circling or highlighting the appropriate response.

	Strongly disagree				Strongly agree
The question is easy to understand.	1	2	3	4	5
The question assesses a teacher's professional background and experience with teaching food and nutrition.	1	2	3	4	5

Do you have any other comments on **SECTION ONE?** (i.e. comments on the content, wording, number of questions or missing questions?)

SECTION TWO focuses on nutrition education including what is currently taught and teachers' perspectives on important concepts relevant for inclusion in an adolescent food and nutrition life skills teaching resource.

In reference to **SECTION TWO ONLY**, please indicate your level of agreement or disagreement for each statement by either circling or highlighting the appropriate response.

	Strongly disagree				Strongly agree
The questions are easy to understand.	1	2	3	4	5
The questions assess what students are currently taught about food and nutrition at school.	1	2	3	4	5
The questions highlight nutrition topics essential to optimising food literacy.	1	2	3	4	5
The questions assess teachers' perspectives on nutrition topics important to learn as part of an adolescent food and nutrition life skills teaching resource.	1	2	3	4	5

Do you have any other comments on **SECTION TWO?** (i.e. comments on the content, wording, nutrition topics, number of questions or missing questions?)

SECTION THREE focuses on determining teachers' perspectives on key best practice pedagogical approaches appropriate to nutrition education (life skills) for year 7-8 students. **SECTION THREE** also seeks teachers' views, thoughts and opinions on the i.Plan model.

In reference to **SECTION THREE ONLY**, please indicate your level of agreement or disagreement for each statement by either circling or highlighting the appropriate response.

	Strongly disagree				Strongly agree
The questions are easy to understand.	1	2	3	4	5
The questions assess teachers' perspectives on best practice pedagogical approaches appropriate to nutrition education for year 7-8 students.	1	2	3	4	5
The questions assess teachers' perspectives on the i.Plan model.	1	2	3	4	5

Do you have any other comments on **SECTION THREE**? (i.e. comments on the content, wording, number of questions or missing questions?)

Appendix C: Finalised teacher interview protocol

Teacher interview questions and protocol

NOTE: At the start of recording the discussion, please say:

- **School name:**
- **Interviewer name:**
- **Interview code:**
- **Date & Time:**

JOONDALUP CAMPUS

270 Joondalup Drive, Joondalup
Western Australia 6027
☎ 134 328

www.ecu.edu.au

ABN 54 361 485 361 CRICOS IPC 00279B

Interviewee:	Gender: M/F
Age Group: 20-24 years	25-29 years 30-34 years 35-39 years 40-44 years 45-49 years 50+ years
School:	
Date:	Time:
Consent: Yes / No	Interview code:

Teacher interview objectives:

- To determine Year 7-8 HPE and Technologies teachers' perspectives on important food and nutrition concepts relevant for inclusion in an adolescent food and nutrition life skills teaching resource.
- To determine Year 7-8 HPE and Technologies teachers' perspectives on key best practice pedagogical approaches appropriate to nutrition education (life skills) for Year 7-8 students.

INTRODUCTION

- Thank you again for meeting with me today.
- The purpose of today's interview is to collect information on your thoughts and opinions on important food and nutrition concepts to be included in a Year 7-8 life skills teaching resource and pedagogical approaches to consider in engaging this age group.
- We have approximately 30 minutes to complete this interview so I may move on to a new question if we have all the information required. However, please stop me if you would like to add more information.
- You have provided written consent to participate today and in doing so, agreed for the interview to be digitally recorded.
- Whilst you have given your consent, you are free to withdraw your participation at any time.
- All comments you make are completely confidential and will only be listened to by staff involved on this project.
- Do you have any questions for me before we begin?

SECTION ONE - PROFESSIONAL BACKGROUND QUESTIONS

- 1.1 Can you please provide me with a brief overview of your career to date?
- 1.2 What year groups do you currently teach and what is your experience in teaching food and nutrition?

SECTION TWO – NUTRITION EDUCATION QUESTIONS

- 2.1 Can you describe for me the core food and nutrition topics which you teach to Year 7-8 students and how these topics are selected?

The following is a list of topics considered important in developing food and nutrition knowledge and skills. *[Hand out nutrition topics list]*

- 2.2 In teaching year 7-8 students food and nutrition life skills, which of these topics would you consider the most important and why? You can list as many topics as you like.
- 2.3 In teaching year 7-8 students food and nutrition life skills, which of these topics would you consider the least important and why? Again, you can list as many topics as you like.
- 2.4 Are there any topics which you think are outside the scope for Year 7-8 students?
- 2.5 Can you make any suggestions that you would like to add to this list?

SECTION THREE – PEDAGOGY AND NUTRITION EDUCATION

- 3.1 From your experience in teaching Year 7-8 students nutrition education, can you describe for me some of the strategies or activities which you use to engage your students?



PROMPT: *If you have brought any activities along, it would be great if you could show these to me and explain them.*

- 3.2 What do you find does not work in engaging Year 7-8 students?

I have been looking for a framework that might be useful for teachers to use when teaching about nutrition and I have found this one, the i.Plan pedagogical framework.

This framework highlights four sequential phases, i.link, i.think, i.know and i.show to facilitate student learning and presents a pedagogy of Multiliteracies.

- 3.3 I would like to hear what you think of this i.Plan pedagogical framework, for teaching nutrition?

3.4 If a framework similar to this was developed for Year 7-8 nutrition education, how could it assist you in your planning and teaching?

3.5 Can you suggest any supports or resources which may be useful to accompany a framework similar to this?

3.6 Finally, can you make any suggestions on how your school could improve and involve Year 7-8 students more in nutrition education?



PROMPT: *What current activities would you like to see happen more often?*

PROMPT: *What type of new activities would help make nutrition more engaging for students in Year 7-8?*

TEACHER INTERVIEW WRAP-UP

That brings us to the end. Thank you very much for your time in participating in this research.

Appendix D: Finalised focus group protocol

Focus group questions and protocol

JOONDALUP CAMPUS

270 Joondalup Drive, Joondalup
Western Australia 6027
☎ 134 328

www.ecu.edu.au

ABN 54 361 485 361 CRICOS IPC 00279B

NOTE: At the start of recording the discussion, please say:

- **Date:**
- **School name:**
- **Interviewer name:**
- **Year Group and Gender Group:**

Student focus group objective:

- To determine Year 7-8 students' perspectives on important food and nutrition concepts relevant for inclusion in an adolescent food and nutrition life skills teaching resource.
- To determine Year 7-8 students' perspectives on key factors influencing students' engagement and learning of nutrition education (life skills).

ICEBREAKER

As you are all in the same class, you may all know each other but to help Lizzie and I get to know you too, we have some nametags here for you to write your name on. Whilst you complete this, I am just going to read through some instructions.

INTRODUCTION

- Firstly, thank you again for attending this group discussion today.
- My name is Sam and I am a student at Edith Cowan University. I am interested in nutrition education and hearing from students your age on how you think this could be taught in a fun and engaging way.
- With me today is Lizzie, also from Edith Cowan University. *[Lizzie to introduce herself]*
- Today, we are very interested in everyone's ideas and comments, so there are no right or wrong answers, just your thoughts and opinions. If at any time you would like to leave the discussion and return to your classroom, please just let me know.
- All of your comments are welcome but please remember that everyone has the right to their own opinion, so if someone makes a comment that you don't agree with, please wait until they have finished talking before having your say.
- In the middle are two digital recorders. All comments you make are completely confidential and will only be listened to by staff involved on this project.
- At no time will anyone at your school or home hear what you have said. I would like to record the conversation so I have an accurate account of comments. At no stage in the future will your name be linked to what you say.
- Because we are recording this discussion it is really important that only one person at a time talks, otherwise it makes it very difficult for me to listen to later.
- We have a number of discussion points to cover today, and we want to be finished in 45 to 60 minutes, so at times I may change the subject or move along to the next question. Please stop me if you have additional comments to add to the discussion.
- Is everyone happy to continue?

SECTION ONE - NUTRITION EDUCATION QUESTIONS

Nutrition education is about giving students information and skills about food and healthy eating.

- 1.1 To begin, can you tell me what you have learnt about food and nutrition at school this year? *[clarify what they call it at their school i.e. food, cooking, health etc...]*



PROMPT: *In what subjects do you learn about food and nutrition?*

- 1.2 How about in previous years?

- 1.3 Can you describe for me one nutrition lesson which you have really enjoyed and why you enjoyed it?

- 1.4 Can you describe for me one nutrition lesson which you have not enjoyed and why you did not enjoy it?

[Think-Share]

For the next set of questions, I want you to look at the pictures placed in front of you.
[Spread out nutrition topic cards]

- 1.5 Before we move on, do you understand the terms on each of these cards?

Without discussing it with each other, I want you to choose one card which you think is important in a nutrition class.

- 1.6 I will give you a few minutes to choose and then I will ask you to each share back to the group which card you have chosen and why.

[Group Activity]

Now as a group, I want you to work together to rank these topics into three categories. These categories are 'most important', 'moderate importance' and 'least important' to include in a nutrition class for students your age.

- 1.7 You have identified _____ and _____ as two of the most important topics.
Why do you consider these the most important?
- 1.8 You have identified _____ and _____ as two topics of moderate importance.
Why did you place these in this category?
- 1.9 You have identified _____ and _____ as two of the least important topics.
Why do you consider these the least important?

1.10 You would have noticed with some of these topics, there is more than one image. For example, a healthy and unhealthy food choice option. You have/have not placed some of these in different categories of importance. Can you explain to me why you did this?

1.11 Do you think there are any topics missing from this list? What are they?

SECTION TWO - ENGAGING STUDENTS IN NUTRITION EDUCATION QUESTIONS

So far we have talked about what you have previously learnt about food and nutrition and discussed topics which you think are important to include in nutrition education.

We have about ____ minutes left, so now I am going to give you two post -it notes. On each post it note, I want you to write down one activity which could be used in the classroom to help make nutrition education fun, engaging and interesting to learn.

Use examples for question 1.3. If you have more than two ideas, you are welcome to use more post it notes.

[Provide each student with two post-it notes]

[Provide time for students to think and write down their responses]

Now I will get you to stick your responses onto this piece of butchers' paper. If someone has already put up a response which is the same or very similar to yours, stick your post it underneath.

2.1 You have identified _____ [select the most common activity]. Can you explain to me, why you think this is a good activity to use to make a nutrition class fun and interesting?

2.2 What about _____ [selected one or two more activities]? Why do you think this is a good activity to use to make a nutrition class fun and interesting?

They are some great ideas, thank you for those. And that also brings us to the end of the discussion.

2.3 Is there anything else you would like to add to today's discussion?

2.4 Is there anything you would like to ask me?

FOCUS GROUP WRAP

- Thank you all very much for sharing your thoughts and opinions with me today.
- Before you go I would like to tell you that if answering any of these questions has raised any concerns or feelings and you would like to talk to someone about them, please talk to an adult you can trust
- You can also call the Kids Help Line and here is a card with their details.
- Thanks again. If there are no more questions, I will now ask that you please make sure you have all your things and then return quietly back to class.

Appendix E: Focus group nutrition topic cards



Where food comes from



Food availability



Food marketing & advertising



What affects what you eat



Finding & understanding nutrition information



Food choice



What affects what you eat



Producing food



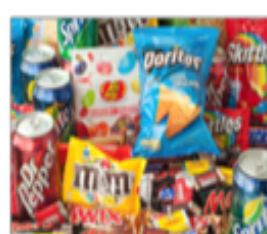
Food budgeting



Food preparation



Snack planning



Snack planning



Food preparation



Cooking skills



Food marketing & advertising



Food marketing & advertising



How does food affect your health



How does food affect your health



Food shopping



Food shopping



How does food affect your health



How does food affect your health



Meal planning



Food & hygiene



Food safety



Kitchen safety



Australian Guide to Healthy Eating



Australian Dietary Guidelines



Food security



Food security



Using recipes

Appendix F: Principal information and consent letter

6 November 2015



JOONDALUP CAMPUS

270 Joondalup Drive, Joondalup
Western Australia 6027
☎ 134 328

www.ecu.edu.au

ABN 54 361 485 361 CRICOS IPC 00279B

Invitation to participate in teacher interviews and student focus groups to develop an adolescent nutrition education curriculum materials framework

Dear Principal,

My name is Samantha Baker and I would like to invite your school to participate in a research project focused on developing a conceptual framework which demonstrates the interaction between student engagement, best practice pedagogy and how these can be utilised in a nutrition education (life skills) context; with the intent of facilitating the development of an early adolescence food and nutrition life skills teaching resource.

This project is being conducted as part of a Master of Public Health at Edith Cowan University, and it is anticipated through the development of this framework and its subsequent food and nutrition life skills teaching resources, that this research will assist to promote healthy eating and food preparation attitudes, knowledge and skills among 11-13 year olds.

What will be the benefits for your school?

- Participating teachers will be able to express their views, thoughts and opinions on important content to include in an early adolescent nutrition education (life skills) teaching resource and best practice pedagogy. These views, thoughts and opinions will help to develop the proposed framework.
- Participating students will be able to express their views, thoughts and opinions on important content to include in an early adolescent nutrition education (life skills) teaching resource and how this content could be taught in an engaging way. These views, thoughts and opinions will help to develop the proposed framework.

What does participation in this project involve?

The methodology of this project requires teacher interviews with year 7-8 Health and Physical Education and/or Technologies (Home Economics) teachers at your school, and running two focus groups with approximately 12 students in year 7 or year 8.

We will ask for your assistance in the following areas:

- Identification of a project contact person. This may be yourself or a staff member involved or interested in nutrition education at your school.
- The project contact person will be asked to distribute a teacher information letter and consent form to all year 7-8 Health and Physical Education and Technologies (Home Economics)

teachers at your school. Interviews will take approximately 30-45 minutes and will be arranged on an individual basis with consenting teachers.

- The project contact person will be consulted regarding the most suitable and convenient way to run two student focus groups at your school.
- The project contact person or a nominated teacher will be asked to distribute a parent/carer information pack to year 7-8 students.
- The project contact person or a nominated teacher will be asked to remind students about the project and consent forms twice during the consent form return period (1 week).
- The project contact person or a nominated teacher will be asked to collect the returned consent forms.
- Student focus groups will be conducted at a pre-arranged time suitable for the school, teacher and students. These focus groups will be approximately 45-60 minutes.

What will happen to the information collected, and is privacy and confidentiality assured?

Information collected will be coded and de-identified to protect confidentiality. All data will be stored securely on ECU's password-protected electronic database or locked in the researcher's office. The data will be stored for a minimum period of 5 years, after which it will be destroyed. At the conclusion of this project, a summary of results will be provided to participants upon request.

The identity of participants and the school will not be disclosed at any time, except in circumstances where the researcher is legally required to disclose that information. Participant privacy and the confidentiality of information disclosed by participants, is assured at all other times.

Your school may withdraw permission to participate in this research project at any time without prejudice. If you choose to withdraw your school's consent to participate, permission may be sought to retain and use any data already collected.

Who do I contact if I wish to discuss the project further?

I will be in contact with further project details following the return of the attached consent form. Should you have any questions prior to this, please do not hesitate to contact me on 0430357871 or at samantha.baker@ecu.edu.au.

If you wish to speak with an independent person about how the project is conducted please contact a Research Ethics Officer from Edith Cowan University on 6304 2170 or research.ethics@ecu.edu.au

How do I indicate my willingness for the school to be involved?

If you wish to register your school's interest in participating in this project, please complete and return the attached consent form by **Friday, 13th November 2015**. Upon affirmative receipt of this form the contact person will be provided further detail regarding your school's participation and final confirmation will be sought.

Thank you for your attention to this project and I look forward to talking with you soon.

Yours sincerely



Samantha Baker
Student
Edith Cowan University
Phone: 0430 357 871
Email: samantha.baker@ecu.edu.au

Project supervisor
A/Prof Amanda Devine
Phone: 6304 5527
Email: a.devine@ecu.edu.au

Invitation to participate in teacher interviews and student focus groups to develop an adolescent nutrition education curriculum materials framework

School Consent Form

- I have been provided with the project information letter.
- I have read and understood the purpose and procedures of the project, or have had it explained to me.
- I understand that participation by students and teachers of our school in the project is voluntary and participants can withdraw at any time without prejudice.
- I understand if consent is withdrawn by the school, teacher or student permission may be sought to retain and use any information already collected.
- I understand that no personal identifying information including school or participant names and addresses will be used and that all information will be securely stored for 5 years before being destroyed.
- I understand that the information provided will only be used for the purposes of research.
- I understand that this research may be published in a scientific journal and/or presented at conferences provided the participants or the school are not identified in any way.
- I have been given the opportunity to ask questions and am satisfied with the answers I received.

☐

YES, XXX would like to register our interest in participating in this project.

Principal Name:

Principal Signature:

Nominated project contact person:

Nominated project contact person email address:

Nominated project contact person phone number:

☐

NO, XXX would NOT like to register our interest in participating in this project.

Please complete and return this consent form to Samantha Baker samantha.baker@ecu.edu.au by no later than **Friday, 13th November 2015.**

Thank you

Appendix G: Teacher information and consent letter

24 November 2015



JOONDALUP CAMPUS

270 Joondalup Drive, Joondalup
Western Australia 6027
☎ 134 328

www.ecu.edu.au

ABN 54 361 485 361 CRICOS IPC 00279B

Invitation to participate in a teacher interview to develop an adolescent nutrition education curriculum materials framework

Dear Participant,

My name is Samantha Baker and I am working on a project to develop a nutrition education curriculum materials framework which demonstrates the interaction between student engagement, best practice pedagogy and how these can be utilised in a nutrition education (life skills) context; with the intent of facilitating the development of an early adolescence food and nutrition life skills teaching resource.

This project is being conducted as part of a Master of Public Health at Edith Cowan University and your school has consented to be involved.

You have been identified as a Health and Physical Education teacher or a Technologies (Home Economics) teacher who may be able to assist me with this project. Hence, I am seeking your consent to participant in a face-to-face interview of approximately 30-45 minutes

What will be the benefits for your school?

Participating teachers will be able to express their views, thoughts and opinions on important content to include in an early adolescent nutrition education (life skills) teaching resource and best practice pedagogy. These views, thoughts and opinions will help to develop the proposed framework.

What would your participation in this project involve?

If you consent to being involved in this project, you will be asked to participate in a 30-45 minute face-to-face interview. This interview will consist of a series of semi-structured open-ended questions seeking your views, thoughts and opinions on important content to include in an early adolescent nutrition education (life skills) teaching resource and best practice pedagogy. These views, thoughts and opinions will help to develop the proposed framework.

Upon affirmative confirmation to participate in this study, consenting teachers will be contacted on an individual basis to arrange a convenient time to conduct the face-to-face interview in the near future. If a convenient time cannot be arranged, this interview can also be conducted as a phone interview.

To what extent is participation voluntary, and what are the implications of withdrawing that participation?

Participation in this research project is entirely voluntary. If you decide to participate and then later change your mind, you are able to withdraw your participation at any time. With permission, research obtained up until the time of withdrawal may still be used in the research and evaluation findings. Any decisions made to withdraw will not affect the relationship with Edith Cowan University or your school.

What will happen to the information collected, and is privacy and confidentiality assured?

During the interview, notes will be made and your permission will be sought to digitally record the interview. All information collected will be coded and de-identified to protect confidentiality. All data will be stored securely on the ECU's password-protected electronic database or locked in the researcher's office. The data will be stored for a minimum period of 5 years, after which it will be destroyed.

At the conclusion of this project, a summary of results will be provided to participants upon request. The identity of participants and the school will not be disclosed at any time, except in circumstances where the researcher is legally required to disclose that information. Participant privacy and the confidentiality of information disclosed by participants, is assured at all other times.

Who do I contact if I wish to discuss the project further?

If you would like to discuss any aspect of this study, please do not hesitate to contact me on 0430357871 or at samantha.baker@ecu.edu.au

If you wish to speak with an independent person about how the project is conducted please contact a Research Ethics Officer from Edith Cowan University on 6304 2170 or research.ethics@ecu.edu.au

How do I indicate my willingness to be involved?

If you wish to register your interest in participating in this project, please complete and return the attached consent form by **Monday 30th November 2015**. Upon affirmative receipt of this form, I will be in contact via your selected preferred method of communication to arrange a suitable date and time to conduct the interview.

I hope you will consider this invitation to participate in this important project.

Yours sincerely



Samantha Baker
Student
Edith Cowan University
Phone: 0430 357 871
Email: samantha.baker@ecu.edu.au

Project supervisor
A/Prof Amanda Devine
Phone: 6304 5527
Email: a.devine@ecu.edu.au

Invitation to participate in a teacher interview to develop an adolescent nutrition education curriculum materials framework

Teacher Consent Form

- I have been provided with the project information letter.
 - I have read and understood the purpose and procedures of the project or have had it explained to me.
 - I understand that my participation in the project is voluntary and I can withdraw at any time without prejudice.
 - I understand if I withdraw my consent, permission may be sought to retain and use any information already collected.
 - I understand my permission will be sought to digitally record the interview.
 - I understand that no personal identifying information including school or participant names and addresses will be used and that all information will be securely stored for 5 years before being destroyed.
 - I understand that the information provided will only be used for the purposes of research.
 - I understand that this research may be published in a scientific journal and/or presented at conferences provided the participants or the school are not identified in any way.
 - I have been given the opportunity to ask questions and am satisfied with the answers I received.
-

I, _____ (please write your full name) have read the information provided and any questions I have asked have been answered to my satisfaction.

☐ I **AGREE** to participate in a 30 - 45 minute interview as part of this project.

Email: _____

Phone: _____

What is your preferred method of communication?

☐ Email

☐ Phone

☐ I **DO NOT AGREE** to participate in a 30 – 45 minute interview as part of this project.

Please complete and return this consent form to Samantha Baker samantha.baker@ecu.edu.au
no later than **Monday 30th November 2015**

Thank you

Appendix H: Parent/caregiver information pack

14 November 2015



JOONDALUP CAMPUS

270 Joondalup Drive, Joondalup
Western Australia 6027
☎ 134 328

PARENT INFORMATION SHEET

www.ecu.edu.au

ABN 54 361 485 361 CRICOS IPC 00279B

Dear Parent/Carer

My name is Samantha Baker and I am working on a project to develop a nutrition education curriculum materials framework. This framework will then be used to help develop engaging, interactive food and nutrition lesson plans specific to 11-13 year olds.

This project is being done as part of a Master of Public Health at Edith Cowan University and your child's school has consented to be involved.

An important part of this project is running student focus groups with year 7 and year 8 students. Therefore I am seeking your consent for your child to participate in a student focus group of approximately 45-60 minutes.

What would my child be asked to do?

- If you consent for your child to being involved in this project, they may be asked to participate in a student focus group.
- Focus groups will be conducted with four or five other students in the group and a series of semi-structured open-ended questions will be asked seeking your child's views, thoughts and opinions on what they think is important nutrition information to learn and how they think nutrition education could be taught to in a fun and engaging way. These views, thoughts and opinions will help to develop the proposed framework.
- If you consent for your child to participate in this project, their name will be added to our consenting participant list. From this list, twelve students will be randomly selected to participate in one of the student focus groups.
- Consenting to participate does not guarantee your child will be involved in this project.
- The student focus groups will be approximately 45-60 minutes and your child's school has been contacted to arrange a suitable time and date. The proposed class, time and date for the focus groups is below:

CLASS:

DATE:

TIME:

Is participation voluntary?

Participation in this research project is entirely voluntary. If you or your child decide to consent and then later change your mind, you are able to withdraw your participation at any time. With permission, research obtained up until the time of withdrawal may still be used in the research and evaluation findings. Any decisions made to withdraw will not affect the relationship with Edith Cowan University or your child's school.

What are the benefits of taking part?

This project will help to guide the development of food and nutrition education lesson plans which early adolescents find interesting, fun, engaging and informative.

How will privacy be protected?

During the focus groups, notes will be made and permission will be sought to digitally record the session. All information collected will be coded and de-identified to protect confidentiality. All data will be stored securely on the ECU's password-protected electronic database or locked in the researcher's office. The data will be stored for a minimum period of 5 years, after which it will be destroyed.

At the conclusion of this project, a summary of results will be provided to participants upon request. The identity of students, teachers and the school will not be disclosed at any time, except in circumstances where the researcher is legally required to disclose that information. Participant privacy and the confidentiality of information disclosed by participants, is assured at all other times.

Who do I contact if I wish to for further information?

If you would like to discuss any aspect of this study, please do not hesitate to contact me on 0430357871 or at samantha.baker@ecu.edu.au.

If you wish to speak with an independent person about how the project is conducted please contact a Research Ethics Officer from Edith Cowan University on 6304 2170 or research.ethics@ecu.edu.au

What do I need to do?

- Please read this Parent Information sheet and discuss participation with your child. A Student Information sheet is also attached for your child to read.
- Indicate whether you do or do not agree for you child to be involved in a student focus group by completing the attached consent form.
- Please ask your child to return the signed consent form to their class teacher by **Monday 23rd November 2015.**

I hope you will consider this invitation for your child to participate in this important project.

Yours sincerely

Samantha Baker
Student
Edith Cowan University
Phone: 0430 357 871
Email: samantha.baker@ecu.edu.au.

Project supervisor
A/Prof Amanda Devine
Phone: 6304 5527
Email: a.devine@ecu.edu.au

14 November 2015



JOONDALUP CAMPUS

270 Joondalup Drive, Joondalup
Western Australia 6027
☎ 134 328

www.ecu.edu.au

ABN 54 361 485 361 CRICOS IPC 00279B

STUDENT INFORMATION SHEET

Dear Student

I am writing to you to invite you to be involved in a project to develop a nutrition education framework. This framework will then be used to help develop fun, engaging and interactive food and nutrition lessons specific to children your age.

This project is being done as part of a Master of Public Health at Edith Cowan University and your school has agreed to be involved.

An important part of this project is hearing from year 7 and year 8 students about what they think is important to learn about nutrition and how nutrition could be taught in fun, engaging ways. This letter is to explain to you what the project is about and to ask you if you would like to be involved.

What will I be asked to do?

- If you agree to be involved, you may be selected to participate in a student focus group. These focus groups will be conducted with four or five other students in your class and we will be asking you about your views and thoughts on nutrition education and how you think it could be taught in a fun and engaging way. Your feedback will help to develop a framework for creating nutrition lessons.
- If you and your parents/carers agree for you to be involved, your name will be added to our consenting student list. From this list, twelve students will be randomly selected to participate in one of the student focus groups.
- Consenting to participate does not guarantee you will be involved in this project.
- The student focus groups will be approximately 45-60 minutes. Your school has been contacted to arrange a suitable time and date. The proposed class, time and date for the focus groups is below:

CLASS:

DATE:

TIME:

Is participation voluntary?

Participation in this research project is entirely voluntary. If you or your parent/carer decide to consent and then later change your mind, you are able to withdraw your participation at any time. With permission, research obtained up until the time of withdrawal may still be used in the research and evaluation findings. Any decisions made to withdraw will not affect the relationship with Edith Cowan University or your school.

What are the benefits of taking part?

This project will help to guide the development of nutrition education lesson plans which early adolescents find interesting, fun, engaging and informative.

How will privacy be protected?

During the focus groups, notes will be made and permission will be sought to digitally record the session. All information collected will be kept confidential and your parents and school will not see or hear your answers. Neither your name nor anything that could identify you, your family or your school will be used in any reports or articles from the study. All information will be stored securely on the ECU's password-protected electronic database or locked in the researcher's office. The data will be stored for a minimum period of 5 years, after which it will be destroyed.

At the conclusion of this project, a summary of results will be provided to you, your parents or your school upon request. Your identity and the name of your school will not be disclosed at any time, except in circumstances where the researcher is legally required to disclose that information. Participant privacy and the confidentiality of information disclosed by participants, is assured at all other times.

Who do I contact if I wish for further information?

If you would like to discuss any aspect of this study, please do not hesitate to contact me on 0430357871 or at samantha.baker@ecu.edu.au.

If you wish to speak with an independent person about how the project is conducted please contact a Research Ethics Officer from Edith Cowan University on 6304 2170 or research.ethics@ecu.edu.au

What do I need to do?

- Please read this Student Information sheet and discuss it with your parents/carer and make sure you understand what it says before you decide to be involved.
- Ask your parents to complete the parent consent form.
- Please return the signed consent form to the class teacher that gave it to you by **Monday 23rd November 2015.**

Thank you for considering helping me with this important research project.

Yours sincerely

Samantha Baker
Student
Edith Cowan University
Phone: 0430 357 871
Email: samantha.baker@ecu.edu.au

Project supervisor
A/Prof Amanda Devine
Phone: 6304 5527
Email: a.devine@ecu.edu.au

Participation in a student focus group to develop a nutrition education framework

Parent Consent Form

- I have been provided with the project information letter.
- I have read and understood the purpose and procedures of the project, or have had it explained to me.
- I understand that my child's participation in the project is voluntary and they can withdraw at any time without prejudice.
- I understand if I or my child withdraw consent, permission may be sought to retain and use any information already collected.
- I understand permission will be sought to digitally record the student focus groups.
- I understand that no personal identifying information including school or participant names and addresses will be used and that all information will be securely stored for 5 years before being destroyed.
- I understand that the information provided will only be used for the purposes of research.
- I understand that this research may be published in a scientific journal and/or presented at conferences provided the participants or the school are not identified in any way.
- I have been given the opportunity to ask questions and am satisfied with the answers I received.
- I have talked to my child about what it means to join this project.

☐ I **AGREE** for my child to participate in a 45-60 minute student focus group as part of this project.

☐ I **DO NOT AGREE** for my child to participate in a 45-60 minute student focus group as part of this project.

Child's name: _____

Parent/Carer name: _____

Parent/Carer signature: _____

Please complete and return this consent to your child's teacher by no later than

Monday 23rd November 2015

Thank you

Appendix I: Project reference group information



JOONDALUP CAMPUS

270 Joondalup Drive, Joondalup
Western Australia 6027
☎ 134 328

www.ecu.edu.au

ABN 54 361 485 361 CRICOS IPC 00279B

Dear [XXXX]

As an Edith Cowan University Master of Public Health student, I am currently conducting a project to develop a conceptual framework which demonstrates the interactivity between student engagement, best practice pedagogy and how these can be utilised in a nutrition education (life skills) context; with the intent of facilitating the development of an early adolescence food and nutrition life skills teaching resource.

Through the development of this framework and its subsequent food and nutrition life skills teaching resources, this project aims to promote healthy eating and food preparation attitudes, knowledge and skills among 11-13 year olds.

You have been identified as a key stakeholder in the nutrition, education and/or adolescent development fields and as someone who could advise on the development of the conceptual framework. Hence I am seeking your consent to participate in the project's reference group.

Participation in the project reference group will involve providing email and/or telephone consultation on potential framework constructs and components in the early stages of the project (insert approx. dates) along with participation in a Delphi survey towards the end of the project (insert approx. dates). This Delphi survey will be used to validate the proposed conceptual framework. It is anticipated there will be 2-4 rounds of the Delphi, with each survey taking approximately fifteen minutes to complete. The first round of the Delphi survey will be sent to you by XXXX and all rounds completed by the XXXX.

For your interest, I have also included the project reference group terms of reference which outlines your roles and responsibilities should you choose to participate. A consent form to participate in this project can also be found on the next page. Please complete and return this consent form to Samantha Baker (sbaker7@our.ecu.edu.au) by no later than XXXX. I hope you will consider this invitation to participate in this important project.

Should you have any questions please do not hesitate to contact Samantha Baker on 0430357871 or sbaker7@our.ecu.edu.au. Alternatively, if you wish to speak with an independent person about how the project is conducted please contact a Research Ethics Officer from Edith Cowan University on 6304 2170 or research.ethics@ecu.edu.au

I look forward to hearing from you.

Yours sincerely

Samantha Baker
Edith Cowan University

Integrating student engagement and best practice pedagogy relevant to year 7-8 students in a nutrition education context: A conceptual framework approach

Letter of Consent

- I have been provided with the project information letter.
- I have read and understood the purpose and procedures of the project, or have had it explained to me.
- I understand that the project itself may not benefit me.
- I understand that my involvement is voluntary and I can withdraw at any time without prejudice.
- I understand if I withdraw my consent, permission may be sought to retain and use any information already collected.
- I understand a summary of results from this project will be made available to me at the conclusion of this project.
- I understand that no personal identifying information like my name and address will be used and that all information will be securely stored for 5 years before being destroyed.
- I have been given the opportunity to ask questions.

I, _____ (please write your full name) have read the information provided and any questions I have asked have been answered to my satisfaction.

☐ I **AGREE** to participate in the reference group for this project. I understand that this involvement will require providing email and/or telephone feedback and completing 2-4 surveys to validate the proposed conceptual framework. Each survey will take approximately 15 minutes to complete.

☐ I **DO NOT AGREE** to participate in the reference group for this project

Please indicate from the below list, the field you would best describe as your field of expertise.

- ☐ Food and nutrition education
☐ Education
☐ Adolescent development
☐ Other _____

Signature: _____ Date: _____

Please complete and return this consent form to Samantha Baker sbaker7@our.ecu.edu.au by no later than [insert date]

Further details regarding the project will follow post the submission of this consent form.

Integrating student engagement and best practice pedagogy relevant to year 7-8 students in a nutrition education context: A conceptual framework approach

Reference Group Terms of Reference

Mandate

To act in an expert advisory capacity to the *Integrating student engagement and best practice pedagogy relevant to year 7-8 students in a nutrition education context: A conceptual framework approach* project. Guidance will be sought in relation to nutrition education, health, education and/or adolescent development content, with the aim of providing overarching advice for the project.

Composition

Members of the Reference Group will be recruited from:

- Secondary and tertiary education in Australia who specialise in Technologies, Health and Physical Education, adolescent development, student engagement and pedagogy;
- Government departments who hold an interest in education, adolescent development, health and nutrition;
- Not-for-Profit organisations who currently provide support and services in education, adolescent development, nutrition and/or the health and well-being of children and their families.

Functions

The function of the Reference Group will be to provide expert knowledge, advice and feedback in relation to:

- The appropriateness, feasibility and practicality of the developed conceptual framework;
- Any other related emerging issues throughout the life of the project.

Involvement

Involvement in this project encourages consenting Reference Group members to:

- Provide email and/or telephone feedback, on at least two occasions, on potential conceptual framework constructs in the first three months of the project;
- Participate in a Delphi survey (consisting of at least two rounds) to validate the proposed conceptual framework in the final stages of the project.