# PEDAGOGY – THE MISSING LINK IN RELIGIOUS EDUCATION:

## Implications of Brain-based learning theory for the development of a Pedagogical Framework for Religious Education


Submitted by

Dan White

B.A., Dip. Ed., Grad. Dip. Rel St., M. Ed (RE)., M. Ed. (Leadership).


**A THESIS SUBMITTED IN PARTIAL FULFILMENT OF**

**THE REQUIREMENTS OF THE DEGREE OF**

**DOCTOR OF EDUCATION**


**SCHOOL OF RELIGIOUS EDUCATION**

**FACULTY OF EDUCATION**

Australian Catholic University
Research Services
Mt. St. Mary's Campus
1A Barkers Road
Strathfield NSW 2135
Australia



July 2004

# Statement of Sources

This thesis contains no material published elsewhere or extracted in whole or in part from a thesis by which I have qualified for or been awarded another degree or diploma. No other person's work has been used without due acknowledgement in the main text of the thesis. The thesis has not been submitted for the award of any degree or diploma in any other tertiary institution. All research procedures reported in the thesis received the approval of the Human Research Ethics Committee of the Australian Catholic University.

I acknowledge the support and encouragement of Archbishop Adrian Doyle, Archbishop of Hobart for allowing the research project to be conducted in Catholic schools across Tasmania. I also note with appreciation the impetus and direction provided by the Diocese of Parramatta during the early developmental phases of the thesis. I am particularly grateful to the Religious Education Coordinators of the Archdiocese of Hobart who participated so willingly and professionally in all phases of the research program. Their capacity to embrace new challenges and engage in a sustained process of professional dialogue contributed substantively to the research outcomes. I am also appreciative of the support of my colleagues at the Catholic Education Office, Hobart for their inspiration and their advice during this project. I especially thank , and Sr. Margaret Henderson rsm for their professional, technical and administrative support. I also thank Dawn Donnelly and Jennifer White for their wonderful support in proof reading and critiquing this thesis.

With great respect, I acknowledge and thank Adjunct Professor Pat Malone rsj. for her challenging and stimulating supervision of the thesis, capably assisted by Dr. Sally Liddy. Their guidance, encouragement and constructive advice throughout the project have been of inestimable value. Finally, I extend my gratitude to my family for their patience and support during this task. I dedicate this work to my wife Sue and my six children. Their inspiration, encouragement and good humour provided an environment that allowed ideas to flourish and dreams to be realised.

…….

Dan White 12th July, 2004

# Abstract

Over the past three decades, the development of religious education in Australia has been largely shaped by catechetical and curriculum approaches to teaching and learning. To date, little emphasis has been placed on the pedagogical dimension of religious education. The purpose of this research project is to explore the manner in which 'brain-based' learning theory contributes to pedagogical development in primary religious education. The project utilises an action research methodology combining concept mapping, the application of 'brain-based' teaching strategies and focus group dialogue with diocesan Religious Education Coordinators (RECs).

The insights derived contribute to the formulation and validation of an appropriate pedagogical model for primary religious education, entitled the '*DEEP* Framework'. The model reflects an integration of insights from brain-based theory with nuances from the contemporary Australian religious education literature. The project identifies four key, interactive principles that are crucial to pedagogical development in religious education, namely: Discernment, Enrichment, Engagement and Participation. It also recognises a fifth principle, 'an orientation towards wholeness', as significant in combining the various pedagogical principles into a coherent whole.

The *DEEP* framework enables teachers to more successfully select and evaluate appropriate, interconnecting teaching strategies within the religious education classroom. The framework underpins the pedagogical rationale of the recently developed Archdiocese of Hobart religious education program and forms the basis for the implementation of a coherent professional development program across the Archdiocese.

# Table of Contents

# List of Appendices

# List of Figures

# List of Concept Maps

# List of Tables

# *Chapter One*

## Pedagogy: A way forward for Religious Education in Australia?

### *'An Introductory Rationale'*

### Introduction:

A review of the literature in Australia over the past two decades would suggest that Religious Education has been significantly shaped by two major approaches (Malone & Ryan, 1994), namely 'Education in Faith' (Groome, 1980; Bezzina, 1997; Holohan, 1999) and 'Education in Religion' (Crawford and Rossiter, 1987; Grimmit, 1987; Smart, 1989; Lovat, 1989; Rossiter, 1999). This research project argues there has been little emphasis placed on the pedagogical dimension of the learning process in religious education and further, that the 'Education in Religion' perspective focuses primarily on broader curriculum issues in preference to exploring processes that would facilitate and enhance student learning.

Overall, an insignificant level of research or commentary is available in Australia that draws direct links between the broad field of learning theory and a pedagogical application to the religious education classroom. In a review of the literature prior to the mid 1990's, Hackett (1995) concluded educational research in religious education has largely been focused upon the nature and expectations of the subject matter rather than on evaluation or the quality of learning. This theme had been earlier highlighted by Crawford and Rossiter (1985) who commented that the 'effectiveness' of religious education was judged on the content contained in the programs in contrast to the manner in which it was being taught or managed by educators.

Recent educational trends across Australia have seen many content based syllabus documents (cf. Ch 3) augmented with greater emphasis on brain-based constructivist pedagogy[1]. However progress in

1 Constructivism identifies knowledge as a human construct that is a consequence of the way in which individuals and communities order their experiences. Constructivist theorists argue human knowledge is subject to multiple interpretations and is problematic by nature (Grimmitt, 2000).

the field of religious education has been limited. Burford (2002, p 3) asserts that if paradigms for teaching and learning don't shift to meet the needs of an uncertain future 'we will fail our children and our stewardship as educators'. Burford holds the clear scaffolding of content frameworks with coherent pedagogical approaches can only but assist 'learners' of the future.

This current research project evolved from a broad perception[2] that Catholic primary school teachers utilise different educational philosophies and employ a relatively restricted range of pedagogical practices when engaged in teaching religious education compared with their approach to teaching other Key Learning Areas (KLA's). This notion was reinforced by Barry, Elliott and Rush (2003, p 1) who commented, the pedagogical and educational paradigms used for decades by many teachers of religion have 'become widely institutionalised and predictably patterned in terms of design and delivery'. They contend teachers are reluctant to apply newly gained pedagogies from other KLA's in the religious education classroom. Malone (2002) adds to this theme by asserting, even with the provision of quality resources, teachers lack the knowledge necessary to make curriculum choices and responsible decisions about the learning processes in religious education.

The 'reticence' or 'inability' of religious education teachers to holistically embrace a more coherent, brain-based constructivist pedagogical style is problematic to religious education for a number of reasons:

- lateral and critical thinking skills are not being reinforced in religious education;
- students are not encouraged to construct personal meaning;
- students are not academically challenged;
- assessment tasks focus on lower level thinking outcomes; and
- teachers tend to revert to simplistic transmission models when they are uncertain of a pedagogical paradigm that will best support religious education.

By providing a sound, well-reasoned approach to pedagogy in religious education, this research intends to provide a basis for the professional skilling of teachers, especially in the area of reflective practice in religious education.

The conceptual paradigm of syllabus documents in Tasmania[3] is constructivist in nature, emphasising the brain-based notion that meaning is most effectively constructed when thinking dimensions are integrated in a holistic manner. In line with the Tasmanian syllabus expectations[4] and the subsequent professional development models utilised in the Hobart Archdiocese[5], brain-based pedagogy is evident

2 Based on an analysis of School Review documentation, extensive class visits by the researcher in his previous and current roles as a supervisor for schools in the Parramatta and Hobart dioceses and through facilitating numerous professional development workshops in religious education.

3 This research project was conducted within the context of the Tasmanian Catholic Education System

4 See Department of Education, Tasmania (2002) 'Essential Learnings Framework', outlined in Chapter 3

5 As indicated in the draft 'Learning & Teaching Platform', Archdiocese of Hobart (2003)

within the majority of Tasmanian Catholic primary school classrooms in areas of learning other than religious education. In particular, there is a growing emphasis on assisting students to create meaning within the learning context and in matching learning experiences to the individual learning styles and developmental stages of the students. Of particular concern to this researcher is that the potential richness of a brain-based learning paradigm is not being transmitted to religious education. Its beneficial impact is being significantly diminished because teachers do not possess a clear pedagogical rationale to underpin the selection and evaluation of interconnecting teaching activities within their religious education classroom.

As the senior diocesan leader[6] in the Catholic Education system in Tasmania, the researcher has a major responsibility for the implementation of the religious education syllabus. Coupled with this, the researcher's interest in constructivist pedagogy has led to the co-publication of a book on brain-based teaching strategies, entitled *'The Thinking Platform'* (O'Brien and White, 2001). More recently in the same genre, stimulated by the research project, a book of higher-order thinking strategies for the religious education classroom titled *'Into the Deep'* (White, O'Brien & Todd, 2003) was published. A catalyst for this study was the desire to explore whether some of the conceptual notions surrounding brain-based learning theory, which inspired the development of such teaching strategies, could have broader theoretical value and contribute to the improvement of pedagogical practice in the religious education classroom.

This research is significant because for the first time in Australia it endeavours to draw links between brain-based learning theory and a pedagogical approach to primary religious education. In particular it explores how the articulation of a pedagogical schema, entitled the '*DEEP' Framework*[7] may enhance the evaluation and development of teaching strategies within the context of religious education, especially within the context of syllabus development in the Hobart Archdiocese[8].

## Aims of the Research Project:

The purpose of this research project is to explore the contribution of 'brain-based' learning theory to pedagogy in primary religious education. In particular, the project articulates a pedagogical framework that informs the evaluation and development of teaching strategies, thereby enhancing the learning process in primary religious education classrooms. The insights derived contribute to the implementation of the emerging Hobart Archdiocesan religious education program and also add to the growing body of literature on effective pedagogy in religious education in Australia.

---

6 The researcher assumed the role of Diocesan Director for Catholic Education in the Archdiocese of Hobart at the commencement of 2003

7 The acronym '*DEEP*' was derived from the four key dimensions of the framework identified by the concept mapping process, namely: Discernment, Enrichment, Engagement & Participation (cf. Ch. 7).

8 At the commencement of 2003 the Archdiocese of Hobart entered into a project with three dioceses in regional Victoria to jointly develop a new religious education syllabus.

## Doctoral Research Question

*What contribution can the articulation of a pedagogical framework derived from brain-based learning theory make to the evaluation of teaching strategies in primary (Yrs 2 – 6) religious education classrooms in the Archdiocese of Hobart?*

## Sub questions:

1. How can brain-based learning theory influence the development of a pedagogical framework in primary religious education?

2. To what extent is brain-based learning theory able to assist primary teachers evaluate teaching strategies in the religious education classroom?

3. How can a critical analysis of this emerging pedagogical framework provide teachers with a better understanding and appreciation of the learning process in primary religious education?

4. How may these insights lead practitioners to an even more effective implementation of the Hobart Archdiocesan religious education program in primary classrooms?

## Key Definitions:

It is important to delineate, in the context of this research project, what is meant by two terms that are central to the research question:

### *Religious Education:*

In broad conceptual terms, religious education within the Catholic context, is a form of ministry of the word (Holohan, 1999). It is considered an activity of evangelisation and thus the purpose of religious education is presented as handing on the Christian faith. *The General Directory for Catechesis* (Congregation for the Clergy, 1997, # 73) states religious education 'makes the Gospel present in a personal process of cultural, systematic and critical assimilation'. Holohan (1999) presents religious education as a process that helps students learn the teachings of the Gospel and develop a sense of the nature of Christianity and of how Christians are trying to live their lives. Another Vatican document, *The Religious Dimension of Education in a Catholic School* (Congregation for Catholic Education, 1988, p 81) describes the process as 'relating all of human culture to the good news of salvation so that the light of faith will illumine everything that the students will gradually come to learn about the world, about life, and about the human person'. More specifically, religious education in this

dissertation refers to the systematic process of formal instruction (religious education lessons) that is undertaken in a classroom setting.

### *Pedagogy:*

In the context of this research, the concept of pedagogy refers particularly to the art and science of teaching (Heinemann Australian Dictionary, 1987), especially as it has been informed by understandings of how students 'best learn'. Pedagogy represents the underlying rationale that informs the selection of specific teaching strategies and is capable of incorporating an eclectic array of methodologies matched to the particular needs of the student cohort.

### *Brain-based Learning:*

Brain-based learning involves drawing insights and connections from the field of neurological research and applying them to an educational context (D'Arcangelo, 1998; Jensen, 1998b; Sylwester, 1998; Leamnson, 2000; Wolfe, 2001). The emerging learning theory attempts to conceptualise and integrate 'traditional' understandings of learning, arising from psychology and sociology, with new insights emerging from neurological research. In essence, brain-based education involves 'designing and orchestrating lifelike, enriching and appropriate experiences for learners' and ensuring that students 'process experience in such a way as to increase the extraction of meaning' (Caine & Caine, 1994, p 8).

## Key Issues addressed in the Literature Review:

The literature review is a vital element of this research project. As well as offering a contextual overview of the relevant fields of knowledge, the review also provides the conceptual data for Stage One of the Action Research process. Utilising a Concept Mapping process (cf. Ch 5), insights from the literature review are analysed and organised into a number of key themes. The integration and synthesis of these themes inform the articulation of the *DEEP* pedagogical model that emerges from this study (cf. Ch 7).

The literature review is sub-divided into three relevant domains. The first field encapsulates an overview of the development of religious education in Australia, especially over the last thirty years (cf. Ch 2). Rather than being an historic exposition, it highlights and critiques the theories and methodologies that have shaped practice in the religious education classroom. In particular, it argues that a coherent approach to pedagogy has been a significant omission from the field of religious education.

Initially, the literature identifies two major intersecting constructs as having evolved and influenced the development of religious education in Australia. These perspectives are conceptualised under the broad headings of the catechetical and educational frameworks.

In its broadest context, the catechetical framework explores programs aimed at conserving the various teachings, practices and traditions of the Church whilst concurrently seeking to form people who are capable of proclaiming the Christian message (Boys, 1989; Ryan, 1999). Of particular importance to this research is the development of an approach which Ryan, Brennan and Willmett (1996) termed as 'critical reconstruction'. The catechetical overview, in particular, presents various analyses (Lovat, 1989; Raduntz, 1995; Malone and Ryan, 1996; Malone, 1997; Bezzina, 1997) of the Shared Christian Praxis model developed by Groome (1980), which underpins the current revision of the Hobart Archdiocesan Religious Education curriculum.

Prior to the 1970's the catechetical dimension embraced the majority of discussion surrounding religious education until the works of Rummery (1977) and later Crawford and Rossiter (1987) challenged theorists and practitioners to clarify their educational paradigms. Crawford and Rossiter (1987) noted a clear delineation occurring between the focus and purpose of religious instruction in the classroom (referred to as 'education in religion') and the religious experiences generated in more informal settings such as retreats and liturgies (referred to as 'education in faith').

An emphasis on the educational dimension of religious education gradually evolved in the critical literature (Rummery, 1977; Rossiter, 1987; Smart 1989; Lovat, 1989). Progressively it tended to assume a narrower focus that concentrated heavily on curriculum structures and issues. This was in contrast to an exploration of the actual pedagogical practices of teachers, which is the focus of this research. In order to properly articulate an authentic educational perspective, it is necessary to incorporate both the learning processes (pedagogy) and the scaffolding of content (curriculum). It is the contention of this researcher that it is necessary to sub-divide the educational dimension into a curriculum framework and a pedagogical framework in order to provide the clarity necessary for this research.

A major assertion of this dissertation is that the integration of a stronger pedagogical perspective will help bridge the criticisms and limitations of both the catechetical and curriculum frameworks when each perspective is critiqued as an individual entity. In particular, it will be argued, since pedagogical issues have not featured prominently in the research literature, the exploration of brain-based learning theory has much to offer the future development of religious education in the Australian context and beyond.

As an overarching principle, this research contends that the pedagogical insights, which have evolved to support other forms of academic inquiry, should be incorporated into religious education. There is no empirical research to suggest that a person learns religion in a manner that is fundamentally different from the way in which they learn any other form of reality (Mitchell, 1995), whilst church documents remind educators that schools should make use of the best educational methods available (Congregation for Catholic Education, 1988 # 70). A significant rationale for placing greater emphasis on pedagogy in the religious education classroom, is the need to address significant weaknesses within the existing curriculum paradigm, especially with regard to repetition, relevance and intellectual rigour (Groome, 1992; Rossiter, 1999; Grimmitt, 2000).

An emphasis on pedagogy in the religious education classroom would address a number of key issues that have emerged of recent times in the literature. Notably:

- the absence of pedagogical approaches in religious education, in areas such as critical thinking, problem solving and open debate (Ryan, Brennan & Willmett, 1996);
- the 'dumbing-down' of the religious education curriculum (Elliott, 1998); the capacity of primary children to do much more in terms of content and learning processes as per other KLA's (Brennan & Ryan, 1996); and
- the tendency of religious education teachers to teach programmed lessons as discrete elements with little connection through cognitive or catechetical linkages (Spurling-Janes, 1995) .

The second section of the literature review (cf. Ch 3) situates the study within the broad-spectrum of the Australian educational scene. Religious education teachers, particularly in a primary context, do not work in isolation from the curriculum and pedagogical trends that surround them. In order to research and develop a pedagogical approach to religious education it is crucial that there be some coherence and empathy with the broader educational trends prevailing across the nation, or alternatively, that the rationale for a distinctive mode of operation in religious education is seen to be compelling and well grounded.

The second component of the review explores the wider context of the research by presenting a concise synopsis of pedagogical developments in Australia, noting especially the Tasmanian perspective. This section highlights some recent pedagogical trends, particularly with regard to rich learning tasks and high order thinking processes (Johnston, 2001; Khoo, 2002; Dusting, 2002). It concludes by summarising current perspectives evident in Australian religious education syllabus documents with regard to their pedagogical orientation.

The third and major field of enquiry centres on providing a synopsis and critique of brain-based learning theory (cf. Ch 4). Broadly defined, brain-based learning involves drawing insights and connections from the field of neurological research and applying them to an educational context

(Jensen, 1998b). Key elements of brain-based learning theory have informed the development of a number of constructivist-oriented learning models (McCarthy, 1990; Gardner, 1991; Herrmann, 1996; Atkin, 2000). The emerging learning theory attempts to conceptualise and integrate 'traditional' understandings of learning arising from education, psychology and sociology, with new insights that are emerging from neurological research.

A review of the literature suggests a number of specific dimensions of brain functioning could provide pedagogical insights relevant to religious education. Notable areas of research include:

- the nature of neuronal functioning (Wolfe, 1998; Armstrong, 1998; Peterson, 2000);
- the nature of acquisition, elaboration and encoding (Jensen, 1998a; Lowery, 1998; Perry, 2000);
- the characteristics of memory systems (Caine, 1992; Peterson, 2000);
- the need for enriched learning environments (Wolfe, 1998; Leamnson, 2000; Peterson, 2000); and
- an awareness of 'critical learning periods' (Sousa, 1995; Bruer, 1998)

Woven throughout the brain-based literature is an articulation of a number of conceptual models on how the brain functions, especially in the context of learning (MacLean, 1978; McCarthy, 1990; Herrmann, 1996; Given, 2000). The review also enunciates a holistic understanding of how the brain functions (Sperry, 1968; McCarthy, 1990; Gardner, 1991; Herrmann, 1996) especially with regards to the recognition of distinct learning and thinking styles. The review concludes with a brief exploration of the concept of neurotheology[9] in order to discern if it has any insights to offer by way of connecting brain-based theories to religious education.

## Methodology:

As noted above, an analysis of literature is a significant component of the research process. Within the broad parameters of a 'technical' action research methodology (Kemmis & McTaggart, 1988; Wortley, 2000), this research project operates in two major stages. Stage One focuses on developing the 'technical' or theoretical basis for the investigation. Utilising a concept mapping technique (Margulies, 1992; Trochim, 2000) key themes are discerned from the religious education, pedagogical and brain-based learning theory literature. The interactions across the fields generate a number of pedagogical principles for the religious education classroom that are conceptually arranged to formulate the initial version of the *DEEP* pedagogical framework. This emerging framework is applied and critiqued in the second stage of the research program.

9 Neurotheology involves the neurobiological study of religion and spirituality (Chismar, 2001), often connected with pinpointing of brain areas involved in spiritual experiences (Begley, 2001).

Stage Two of the project adopts a more 'participatory' action research methodology (Wortley, 2000) by engaging diocesan Religious Education Coordinators (RECs) in the development and analysis of the emerging pedagogical framework. In particular, phases two and three involve twelve primary RECs in the implementation and critiquing of teaching strategies utilising learning principles articulated in the *DEEP* framework and a subsequent reflection on the outcomes through a 'Focus Group' process (Lewis, 1995).

The focal point of the action research methodology is on validating and refining the proposed *DEEP* framework by applying it to the evaluation of nominated teaching strategies. Whilst considerable incidental data was gathered on the perceived merits of various teaching activities and student learning outcomes, this is not analysed in any detail, as it is beyond the scope of this study. The cyclic nature of an action research model enables participants to gradually develop and refine key pedagogical principles in light of a constant interaction between 'theory' and 'practice'.

One of the underlying rationales of an Educational Doctorate is the capacity of researchers to make a direct, positive contribution to their professional environment. The interventionist nature of the action research paradigm enables the researcher to interact with diocesan RECs in a professional development context, whilst concurrently exploring emerging concepts and ideas. The recent emergence of brain-based theory, the growing emphasis on promoting constructivist learning principles and the complexity of primary school learning environment, suggests an exploratory style of research, which also contributes to the professional growth of RECs, could be more usefully explored through a flexible, interpretive and interactive research design.

Justifications for adopting an action research methodology include its capacity to:

- interconnect theoretical insights (i.e. brain-based learning and the emerging *DEEP* framework) with the reality of classroom practice (i.e. reflected in the evaluation of teaching strategies);
- articulate new meanings and clarify existing concepts (Maina, 1999); and
- promote collaborative, interventionist interactions that enhance the organisation being studied (Dick, 1993; Kock, McQueen, & Scott, 2000).

## Timeline:

The formal research project commenced early in 2002 with a detailed analysis of the literature. The concept mapping process progressed in an ongoing manner during this period, culminating towards the end of 2002 with the initial conceptualisation of the *DEEP* framework. The fieldwork dimension of the action research project was conducted during the second half of 2003. Subsequent data analysis and reflection was undertaken at the commencement of 2004, leading to the formulation of a revised model of the framework and the completion of the dissertation.

## Organisation of the Dissertation:

This research has been organised into ten chapters as described below:

***Introduction:***

Chapter One: Pedagogy: A way forward for Religious Education in Australia? - *'An introductory rationale'*

***Review of the Literature:***

Chapter Two: Pedagogy: The 'Missing Link' in Religious Education – '*A critical exploration of the conceptual frameworks that have influenced the development of religious education in Australia'*

Chapter Three: Pedagogy: A National Concern – *'An overview of pedagogical developments within the Australian context'*

Chapter Four: Brain-based Learning Theory: A Pedagogical Stepping Stone? – *'A critical analysis of Brain-based learning theory and implications for pedagogical practice in religious education'*

***Research Methodology:***

Chapter Five: Action Research Methodology: Linking Theory and Practice – '*A rationale and overview of the Action Research process'*

***Action Research – Stage One:***

Chapter Six: Action Research – Stage One: Conceptual Outcomes – *'A presentation of the DEEP concept maps'*

Chapter Seven: The *DEEP* Framework: A pedagogical scaffold for Religious Education – *'An integration of brain-based learning theory into the field of religious education'*

***Action Research – Stage Two:***

Chapter Eight: Action Research - Stage Two: Statistical Data – *'A presentation of the fieldwork statistical data'*

Chapter Nine: The *DEEP* Framework: A Practical Critique – *'A reflection upon the application of the DEEP framework in classroom settings'*

***Conclusion:***

Chapter Ten: The *DEEP* Framework: A Small Step on the Journey – *'Potential implications for pedagogy in primary religious education arising from the articulation of the DEEP framework'*

## Conclusion:

In this chapter the broad parameters relevant to this study are presented. In particular, it highlights there is an absence of a coherent pedagogical framework to underpin the selection and evaluation of teaching strategies in the primary religious education classroom. Further, it articulates the potential for brain-based learning theory to inform the development of a viable conceptual scaffold to underpin pedagogical practice in religious education. An action research methodology is presented as the most appropriate methodology to enable theory and practice to 'interact' with the objective of articulating and refining a pedagogical framework for religious education. Subsequent chapters develop the theoretical basis for the study culminating in the articulation and critique of the *DEEP* pedagogical framework.

# *Chapter Two*

## Pedagogy: The 'Missing Link' in Religious Education

### *A critical exploration of the conceptual frameworks that have influenced the development of Religious Education in Australia*

**Introduction:**

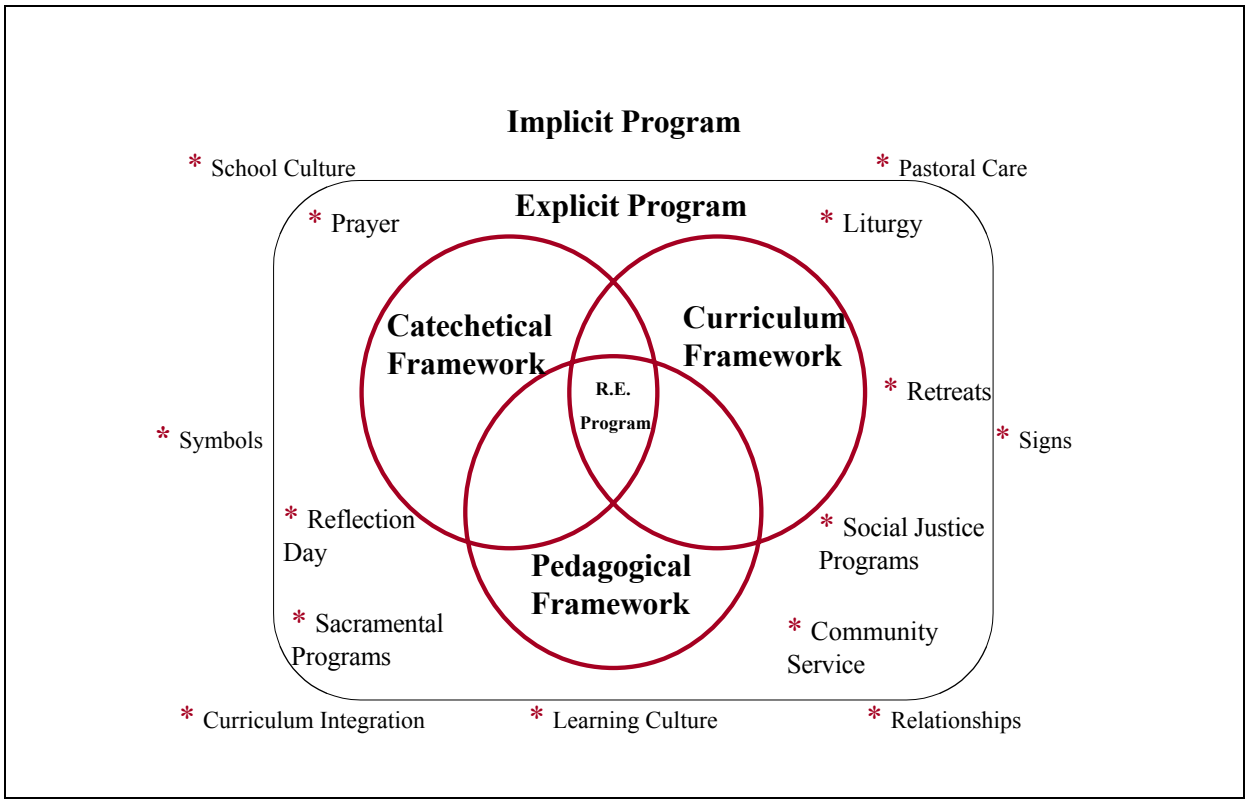
The religious formation of students, in a school setting, is profoundly influenced by a vast diversity of complementary and interacting factors. At an implicit level, the impact of the persuasive school culture, relationships and pastoral care programs, signs and symbols, the overall learning culture and the degree of integration of Catholic values all contribute to nurturing the spiritual awareness and development of students. Similarly more explicit religious activities in the form of classroom programs, retreats, reflection days, liturgies, prayer, sacramental programs, social justice strategies and community service initiatives all play a role in the overall religious formation of a child.

Whilst acknowledging the dynamic interactions of both the explicit and implicit aspects of a program of religious formation (cf. Fig. 1), 'religious education' in this research specifically refers to the process of formal instruction (the religious education program) undertaken in a classroom setting. It is within this area the research is focused. To date, modes of formal instruction have been primarily influenced by the interaction of the prevailing catechetical and curriculum paradigms. It is the contention of this researcher that the inclusion of a pedagogical perspective substantively enhances the quality of the explicit learning process.

The purpose of this chapter is to demonstrate that religious education programs in Australia have lacked a coherent pedagogical framework, which could inform the evaluation and implementation of teaching and learning tasks in primary religious education. The chapter explores three major intersecting frameworks that have influenced the development of religious education programs in Australia. These perspectives are presented under the broad headings of Catechetical, Curriculum and Pedagogical frameworks (cf. Fig 1). Each framework is examined to discern its role and impact on religious formation in a classroom context and, in particular, it is argued the incorporation of

pedagogical principles would address the limitations of contemporary catechetical and curriculum models.

*Figure 1: Religious Formation in a School Context*




## Catechetical Framework:

In order to link the broad process of religious formation (cf. Fig 1) to explicit, classroom-based instruction, religious educators have traditionally sought to articulate a consistent catechetical philosophy so as to influence classroom practice. In its broadest context, a catechetical framework aims to develop religious education programs that conserve the various teachings, practices and traditions of the Church whilst concurrently seeking to form people who are capable of proclaiming the Christian message. As Ryan (1999) notes within a catechetical perspective, it is not sufficient for religious education to simply transmit a set of traditions, it must lead to a positive change in the way things are and contribute to the liberation of the world. As indicated in the work of Boys (1989) this form of religious education is about making the intrinsic connection between traditions and transformation. Ryan (1999, p 19) synthesised the notion when he spoke of the catechetical method as a form of 'rudimentary theologising' that forms, informs and transforms.

According to de Souza (1999), from the late nineteenth century, Catholic schools have been established with a primary purpose of educating Catholic children in their faith tradition. Originally, religious instruction was based on students memorising answers to theological questions found in the

catechisms of the day. Rummery (1977) described the approach based on the Catechism as 'magisterial', with the teaching being viewed as authoritative and proclaiming the message of the Catholic Church. The pedagogy employed was essentially didactic with an emphasis on questions and answers and rote learning.

Shifts in the catechetical framework began to emerge post World War Two, especially with regards to the place of scripture in religious education. De Souza (1999) noted the work of the Austrian theologian, Jungman, who argued traditional methods of religious instruction had become ends in themselves and had camouflaged the true meaning of Christianity and God's Revelation to the human person. The advent of the 'Kerygmatic' approach, with its emphasis on the Bible, stimulated a new phase of religious instruction. However, a lack of foundation in scripture studies on the part of teachers, the perceived lack of relevancy to the needs and interests of students and the assumption that all religion classes were composed of a homogeneous group of believers presented real challenges to this methodology.

The advent of the Second Vatican Council laid the foundations for significant developments in religious education. Of particular note were the enhanced understandings of revelation and religious freedom that emerged. According to Moran (1979), revelation came to be seen as a personal communion of knowledge, an interrelationship of God and the individual within a believing community. Concurrently, de Souza (1999) noted during this period there emerged a greater awareness of the role of individual freedom. As the Declaration on Religious Liberty acknowledges, an 'individual has the right and freedom to search for God and eternal truths in their own way and to bear the responsibility that allowed them to follow the path they followed' (Flannery, 1996, p 552).

Hence, towards the later stages of the twentieth century, the catechetical framework began to embrace the notion that a search for meaning was fundamentally central to the religious experience. Within this context, a more experiential approach to religious education began to emerge. As Dwyer (2000) notes, the impact of humanistic psychology and an emphasis on human relationships were viewed as key aspects in the promotion of personal and spiritual growth. Initially, the methodology focused on seeking relevance by primarily reflecting on the life experiences of the participating students. However, the lack of theological substance and academic challenge led to the need for the development of more sophisticated catechetical models.

Over time a dichotomy developed between the teaching of religion with a cognitive emphasis and so called 'faith development' activities such as retreats and small group discussions. According to Rossiter (1999), processes associated with the affective dimension of education were often labelled as faith development experiences. He suggests this implied a narrow dependence on psychological

processes being at the core of faith development thereby devaluing the role of classroom teaching and implying it was less faith intensive than intimate group processes.

A significant development within the broad umbrella of Catechetical framework was the development of an approach Ryan, Brennan and Willmett (1996) term as critical reconstruction. In its various forms, critical reconstruction had the goal of fostering socially aware and active agents who work for change in the Church and the world in response to the radical demands of the Christian tradition. One example of this model was the development of the *Melbourne Guidelines* (Archdiocese of Melbourne, 1984, 1995). Drawing on the insights of Amalorpavadass (1973), the Archdiocese of Melbourne developed a four-point process to underpin the development of a religious education program (Notably: Experience shared; Reflection deepened; Faith expressed; and Insights reinforced). According to Malone and Ryan (1994), Amalorpavadass advocated a catechetical pedagogy that drew both from theology and human sciences. It emphasised the need for a process that recognised, discerned and interpreted the signs of revelation, both past and present. He viewed religious pedagogy as a continuation or representation of the 'revelation – faith' process. Ultimately, the terminology 'education in faith' became associated with the Melbourne curriculum guidelines.

Another model of critical reconstruction that has featured prominently in religious education in Australia has been the Shared Christian Praxis model. In an endeavour to articulate a comprehensive, integrated model of religious education, Groome (1980, p 184) proposed a framework that encouraged a group of Christians 'to share in dialogue their critical reflection on present action in light of the Christian story and its vision toward the end of lived Christian faith'.

According to Malone and Ryan (1996), Groome was searching for an authentic catechetical activity that enabled participants to share their Christian faith in a realistic and meaningful way in a range of contexts. In essence, by proceeding through five steps or movements, participants are invited to share and reflect on their life experiences, encounter the Christian story, think through their own personal and communal relationship with the Christian message and ultimately decide on a personal response through a process of reflection. All movements are dependent upon the integrity of reflection, dialogue and participation in preceding movements. Bezzina (1997, p 17) noted, Shared Christian Praxis is often referred to inappropriately as a pedagogical approach. Rather, he argues, it is better conceptualised as a 'meta-approach' that provides an overarching perspective and mode for proceeding that can be adapted to a variety of teaching and learning occasions.

The introduction of the Praxis methodology was perceived as having a number of positive outcomes. Malone and Ryan (1996) suggest it offered students a chance to learn and appropriate the Christian tradition in accordance with their own needs and interests. Students were encouraged to critically examine the tradition and not just accept it in 'blind faith'. Questioning, discussion and active

engagement were key aspects of the model. Bezzina (1997) believes a hallmark of the model was its holistic nature and the conviction that the outcomes of religious education should be more than cognitive. As Groome (1991) postulates, it engages a person's whole being in a process of synthesis that subsumes cognition, affection and volition.

However, the Critical Reconstruction models were discerned as having a number of limitations. Malone and Ryan (1996) argued a Catechetical model that presumed a commonality of faith experience was no longer the reality being experienced in Australian Catholic schools. The increasing diversity of students, in terms of their religious and cultural backgrounds, means not all students are ready, willing and able to share their faith experiences during religious education classes. Hence, it is not possible to assume all students are capable of engaging in a process of Christian faith formation within the confines of the compulsory classroom. Additionally, the pressure of multiculturalism makes it incumbent on educators to nurture a greater awareness and sensitivity to the spiritual and religious traditions of other cultures.

Malone and Ryan (1996) also suggested not all content areas were suitably addressed through praxis methodology and alternative approaches may be more effective in promoting student learning. Further, they were concerned the apparent need to direct all classroom teaching towards action and decision-making may orientate students towards offering responses with which they are not truly comfortable.

A significant earlier critique[10] of the Shared Christian Praxis model, in the opinion of Lovat (1989), was Groome's reticence to articulate guidelines for the critical appraisal of proposals or concepts in the 'confessional' dimension of the third movement that focused on articulating the 'Christian Story'. Whilst life experiences and potential responses may be subject to scrutiny, Lovat would suggest it appears there is an emphasis in praxis methodology on asserting faith in contrast to critical dialogue.

This perspective was strongly endorsed by Raduntz (1995, p 193) who holds the primary concern of Shared Christian Praxis was to maintain the institutional integrity of the church. She contends in Groome's schema critique functions as a sorting mechanism in gathering what participants find as acceptable to the Catholic tradition into a new synthesis and rejecting what is not. However, Raduntz argues to accommodate student viewpoints is not sufficient, all values, even the tradition's values, need critiquing if radical transformation is to occur.

A further pointer in this direction came from a very limited case study research project conducted by Spurling-Janes (1995), who observed distinct pedagogical changes in the practice of teachers when

10 In his later work Groome (1991) has endeavoured to address this critique by highlighting that classroom approaches should engage students in a 'hermeneutics of suspicion' in the context of the Christian tradition.

they moved into the 'Christian Story' phase of the Melbourne Guidelines. The interactive processes in movements one and two reverted to more traditional 'magisterium' models, while that in phase three were heavily reliant on transmission in contrast to constructing meaning. This point was affirmed by Malone and Ryan (1994) who commented, some teachers use a different type of language or different process when working with the human experience aspect of the catechetical models in comparison to the story of the tradition.

At a more practical level, the curriculum resource packages used to support the praxis methodology were not always well understood or utilised by teachers. Malone's (1997) critique of the Parramatta diocese's '*Sharing Our Story'* program indicated, in spite of comprehensive professional support, many teachers had not integrated an understanding of praxis into their own thinking and practice. Malone (1997, p 15) suggested a 'theoretical dissonance' existed, meaning that teachers approached support units as a source of activities to keep students occupied and to comply with syllabus requirements whilst not necessarily keeping with the spirit of the underlying catechetical approach. Essentially, in terms of pedagogy, teachers were not analysing the praxis approach relative to the needs and readiness of their students, nor were they incorporating the critical, reflective mode that is central to the praxis approach. Furthermore, Ryan (1999, p 21) has observed the development of structured programs such as Shared Christian Praxis and the Melbourne 'Four Step' model, where students progressed through distinct steps, inevitably led to lock step lesson sequences that became 'predictable and stultifying'.

By way of synthesis, whilst it is acknowledged that the various Catechetical models inherently incorporated some key pedagogical principles (e.g. Creating relevance by highlighting links to life experiences; nurturing reflective thinking; discerning wisdom through dialogue in community…), their orientation was primarily towards the nurturing of a 'faith encounter' and, as such, did not advocate a clear, integrated pedagogical platform. Hence, whilst some of the teaching methodology had intrinsic value, the lack of coherent pedagogical framework resulted in teachers:

- uncritically following planning cycles (Malone, 1997; Ryan, 1999);
- reverting from constructivist learning approaches when dealing with 'life experiences' to more didactic transmission models when presenting the 'faith tradition' (Malone & Ryan, 1994; Spurling-Janes, 1995);
- not empowering students to critique their religious tradition (Lovat, 1989; Raduntz, 1995); and
- not allowing for the individualised learning needs of the student cohort (Malone & Ryan, 1996).

The incorporation of a pedagogical framework could significantly enhance the planning and delivery of catechetically oriented religious education programs. This study develops and critically reflects on such a framework for the primary religious education classroom.

## Curriculum Framework:

Originally, an overview of the literature would suggest that what has been termed as the 'Curriculum Framework' in this chapter may have been more broadly referred to as an 'Educational Framework'. However, it is the contention of this research that as an emphasis on the educational dimension gradually evolved in the critical literature (Rummery, 1977; Rossiter, 1987; Smart 1989; Lovat, 1989), it tended to assume a narrower focus which concentrated heavily on curriculum structures and issues in contrast to the actual pedagogical practices of the teachers who were directly supporting learning in the classroom. To articulate an authentic educational perspective, it is necessary to incorporate both the learning processes (pedagogy) and the scaffolding of content (curriculum). Hence, sub-dividing the educational dimension into a Curriculum Framework and a Pedagogical Framework is ultimately beneficial for this discussion.

In response to concerns surrounding a catechetical orientation to religious education, especially with regards to making assumptions about the relative degrees of 'shared beliefs' in the classroom, the lack of academic challenge and an overemphasis on the affective domain lead educators to begin exploring a curriculum framework. Hackett (1995) suggested that, from the mid-seventies the focus of inquiry in religious education had begun to shift from a primarily catechetical structure to a more educationally oriented methodology. Malone and Ryan (1996) concur by noting throughout the 1980's and into the 1990's a realisation grew that schools and classrooms were specific educational contexts with their own demands, limitations and possibilities. This notion was supported in the 1980's by the work of Crawford and Rossiter (1987) who argued for the need of an academically rigorous curriculum that explored the meaning of religion and allowed for reflection on contemporary religious and social issues.

Crawford and Rossiter (1987) also stressed religious education needed to clarify its educational paradigm. They argued for an 'educational rationalist' approach where a clear delineation occurs between what happens to religious instruction in the classroom ('education in religion') and the religious experiences generated in more relaxed, less formal settings such as retreats and liturgies ('education in faith'). This concept was acknowledged in the Vatican document, *'The Religious Dimension of Education in a Catholic School,'* which distinguished the Catholic school's role in catechesis, or fostering faith, from that of teaching an academically responsible religion program. The Congregation for Catholic Education (1988, #55) described 'the aim of catechesis, or handing on the

Gospel message, is maturity: spiritual, liturgical, sacramental and apostolic; this happens most especially in a local Church community. The aim of the school, however is knowledge.'

The emerging duality within the field of religious education has been noted by Moran (1991) who postulated religious education is composed of two sharply contrasting processes: teaching people religion and teaching people to be religious in a particular way. Moran particularly highlighted this dual process requires a critical understanding and appreciation of one's own tradition as well as an empathetic understanding of the religious ways of others. Grimmitt (1987) concurred with Moran and he further sub-divided the notion of 'education in religion' to distinguish between learning 'About Religion' in a structured, dispassionate manner and learning 'From Religion' through which the individual is called upon to process, dialogue and critique religious insights from both a communal and personal perspective.

With the evolution of more educationally oriented frameworks, the concept of learning 'About religion' gained some precedence. Rummery (1977) differentiated between catechesis and religious education, proposing a schema that acknowledged the basis for religious education should be one that is relevant to the pluralist nature of Australian society. Similarly, Moore and Habel (1982) developed a typological approach to religious education that in combination with Smart's (1989) work, in developing phenomenological models, began to underpin a number of senior secondary curriculum frameworks.

From an educational perspective, the 'learning about' religion approaches articulated a descriptive and comparative slant to the study of religion that did not presume a confessional commitment. According to Ryan (1999), the process enabled teachers and students to become dispassionate 'searchers', seeking to gather information and understanding about religious concepts. Ryan notes a positive aspect to the phenomenological approach in that it resists the reduction of religious education solely to the domain of 'Church' matters. He also contends that this approach contributes strongly to an ultimate goal of assisting people to think, feel, imagine, act and grow religiously in an intelligent manner. From a contradictory viewpoint, the narrowing of focus to a more curriculum-oriented model led Murray (1993) to comment that 'an education in religion' approach promotes a narrow view of intellect which marginalizes the importance of inductive processes in classroom teaching and downplays the affective domain. Groome (1992) concurs, observing too much stress on rational argument would become dry and unengaging for students.

As time has progressed theorists have endeavoured to bridge the gap between catechetical models and curriculum models. Noting the value of utilising typological models, which were developed for educational rather than theological reasons, Lovat (1989) endeavoured to blend the critical and reflective dimensions of praxis with the academic focus of a phenomenological perspective. Lovat's

'Critical Model' proposed a pedagogical sequence of engagement that involved the selection and identification of data, sustained processes of exploration and comparison, interpretation and critical appraisal resulting ultimately in understanding and adaptation into personal frameworks. Lovat noted ultimately the question being asked is not merely 'what does this mean?' but 'what does this mean to me?'. Whilst suggesting a useful link between content and process, Lovat did not proceed to enunciate the nature of the teaching/learning experiences that would accomplish these goals, apart from simply outlining an eclectic array of strategies that would be evident in any classroom.

A major drawback of relying on a curriculum orientation identified by Malone (1990) is that many teachers do not use a curriculum or a catechetical framework when planning religion lessons. Further, there is the lack of appreciation by teachers that what is being 'taught' to the whole class may be substantively different to what is being 'learnt' in the minds of each individual child. As Grimmitt (2000) notes, the process of teaching pupils about an item of religious content can never result in some uniform, unequivocal meaning being conveyed to each pupil so that all share a common understanding.

An additional insight offered by de Souza's (2000) research suggests teachers' perceptions towards the learning programs of senior secondary students were markedly different to that of the students. Overall, teachers were generally positive about their religious education programs, whilst the majority of students did not find classroom programs interesting, challenging, meaningful or relevant, and displayed negative attitudes towards them. De Souza concluded that teachers over emphasised the cognitive dimensions of their programs, were not always clear in discerning the levels of student knowledge and understandings, nor were they overly positive about implementing pedagogical practices in the affective domain. Yet, by way of contrast, the learning experiences most favoured by the students (class discussions, reflections, guest speakers and retreats) drew heavily on the affective dimension. By placing greater emphasis on affective strategies, de Souza asserts not only will students interest and participation levels rise, their involvement, commitment and the personal search for meaning will be emphasised.

Another development within the broad curriculum framework during the 1990s was the incorporation of outcomes into syllabus documentation. In line with the desire to promote 'academic rigour' and to parallel developments in other key learning areas, writers of religious education syllabus documents adopted an outcomes based approach to curriculum design. According to Crotty and O'Grady (1999), outcomes are developed as integrated statements of values and attitudes, knowledge and skills. They suggest outcomes enable the teaching/learning process to focus on students and what they will learn. Ryan (1998), whilst expressing reservations about an 'outcomes-based approach', acknowledges a precise description of learning outcomes can contribute to a teacher's capacity to plan, teach and assess their religious education lesson.

The capacity of outcomes to support assessment practices was noted as a particular strength, as Ryan (1998) comments within the context of a wider critique, an outcomes approach allows for the possibility of comparing results between two or more groups. Dwyer (2000) also noted, that unlike in a catechetical approach, an outcomes orientation is more able to respect diversity amongst students. This was supported by Wurst and Crotty (2001) who contend the current societal context of Australia demands a model of religious education which acknowledges religious pluralism and nurtures and supports diversity.

However, the adoption of an 'outcomes-based' approach also has a number of limitations. Eisner (1995) argues outcomes distract educators from paying attention to the importance of building a culture of schooling that is genuinely intellectual in character, that values questions and ideas at least as much as achieving the correct answers. Barry's (1998) concern with an outcomes approach was that teachers could easily lose sight of the benefits of an experiential approach to religious education. Similarly, White and Borg (2002) observe, from a primary context, many teachers opt to focus on the more easily assessable content outcomes in preference to grappling with the higher order thinking requirements of the more complex 'integrating' outcomes. Essentially, in the desire to align religious education so that it is viewed as being no different to other key learning areas, it has sometimes been overlooked that in its essence, religious education is not just about facilitating understanding but is about evoking commitment and deriving personal meaning.

Whilst the curriculum perspective has brought a sense of academic rigour and focus to religious education programs, this researcher concurs with Rossiter (1999, p 12) who asserts most Catholic Diocesan religion syllabus documents are 'too tame'. Rossiter suggests students consider the content of programs are too concerned with institutional maintenance and not enough with what they see as the spiritual dimension of people's lives. So, whilst a challenging academic study may provide an appropriate context for the pursuit of relevance and personalism in the classroom, the issues presented by many documents are not related to the lives of students.

Extending this argument further, it is the contention of this study that a major failing of most Diocesan programs is that they present the various units of study as a 'topic' to be studied, rather than a 'problem' to be solved. A synthesis of insights from the study of brain theory[11] (Wolfe & Brandt, 1998; Walsh, 2000) suggest the brain is constantly seeking to construct meaning out of every experience and responds more readily to an open-ended problem that requires 'solving' than to the processing of information that simply needs to be retained. Hence, altering the focus of the topic from a statement of content to a question to be addressed or a problem to be solved could substantively enhance many curriculum units.

11 Cf. Chapter 4

This theme was reinforced by de Souza's (1999) research on Year 12 students who discerned there was a general lack of interest in learning about the role of religion and other religions in particular. De Souza concludes an effective religious education program needs to concentrate more on the content that caters for the developmental needs and interests of students, if it is to increase its potential to have meaning and relevance. Rossiter (1995) further believes curriculum should give access to, and familiarity with, a student's religious tradition but concurrently should try to make connections with the ways in which they search for personal meaning. He suggests possibly two interacting curriculum frameworks should be developed. The first is a structural model that systematically lists concepts in areas such as Catholic Scripture, Theology and Morality, whilst the second model is an implementation syllabus that is more 'issues oriented' and translates the overarching framework into action.

Whilst relevancy of the curriculum is significant, it is arguable relying primarily on curriculum models to generate meaning for students is, in itself, a limited paradigm. In the hands of a skilful teacher, almost any conceptual framework can be 'brought to life' if the content is underpinned by coherent pedagogical practices. Whereas curriculum documents can point to conceptual links and opportunities for integration, the capacity of students to deconstruct data, make authentic connections in their learning and reconstruct personal meaning is often a function of quality learning processes.

## Pedagogical Framework:

With the firm establishment of religious education as a credible field of enquiry within the broader curriculum framework of Catholic schools, the stage has now been set for theorists to begin to more actively explore what insights learning theory has for religious education. In this context, the concept of pedagogy refers particularly to the art and science of teaching religious education, especially as it has been informed by understandings of how students 'best learn'.

Overall, at this stage of development of religious education in Australia, little research or commentary is available that draws direct links between the broad field of learning theory and its pedagogical application to the religious education classroom. Crawford and Rossiter (1985) noted judgments concerning the effectiveness of religious education programs focused on content issues in contrast to analysing their pedagogical intent. Similarly Hackett's (1995) literature overview highlighted the distinct absence of any critical review of pedagogical methodology in comparison to an emphasis on the treatment of subject matter. This notion is exemplified by an analysis of Moore's (1991) comprehensive curriculum design overview for the planning of school-based religious education programs. Whilst his guiding principles note the need to outline teaching/learning strategies, almost the entire body of the document focuses on structuring and sequencing content outcomes. His only

significant observation on pedagogy, suggests whilst it is legitimate to adopt a single teaching model (e.g. Concept attainment), it is just as valid to adopt a diversity of approaches.

An underlying contention of this thesis is that the integration of a pedagogical perspective will help bridge the criticisms and limitations of both the catechetical and curriculum frameworks when each perspective is critiqued as an individual entity. As Bounds (1997, p 9) asserts, to recapture the cognitive dimension of religious education whilst maintaining its evangelical integrity requires not merely an external conceptualisation but an internal understanding. Such understandings are reached when educators combine sound pedagogical principles with catechetical insights and curriculum content.

Similarly, Flynn (1985) asserts good religious education requires both the challenge of the 'education in religion' perspective and the vision of the 'education in faith' approach. This is a theme highlighted by Murphy (2001) who sensibly cautions, religious education must have integrity in the fields of both religion and education when it adopts learning theories about how understanding is achieved. It needs to appreciate that whilst integrating the cognitive and affective domains, it also embraces an ontological dimension where the action of God is more implicit.

Conceptually, it is arguable religious education should incorporate pedagogical insights that have evolved to support other forms of academic inquiry. As noted previously, Mitchell (1995) asserts there is no empirical research to suggest a person learns religion in a manner that is fundamentally different from the way in which they learn any other form of reality. The document, *Religious Dimension of Education in a Catholic School*, comments: '..it (the school) should make use of the best educational methods available to schools today' (Congregation for Catholic Education, 1988, #70). Similarly, the *General Directory of Catechesis* argues that religious education must have both good content (religious curriculum) and good teaching processes (pedagogy). (Congregation for the Clergy, 1997, #73).

A significant rationale for placing greater emphasis on pedagogy in the religious education classroom is the need to address significant weaknesses within the existing curriculum paradigm, especially with regards to repetition, relevancy and rigour. Even a cursory overview of many diocesan 'Scope and Sequence' charts will highlight the repetitive nature of key conceptual themes. Rossiter (1995) notes, if curriculum is dominated by frequently presented, descriptive content (e.g. Sacraments, Marian Theology), students can come to perceive the content as boring and irrelevant. In a pedagogical approach, assessment would drive the learning process (White & Borg, 2002), consequently, if the content had been mastered previously it wouldn't be continually repeated. Through the prior assessment of knowledge and skills, conscious decisions can be made regarding the specific outcomes to be emphasised as well as incorporating the issues and questions relevant to the students.

In terms of applying various learning theories to pedagogical practice, Mageean (1995, p 9) believes religious education has often suffered from being packaged in ways 'that are not about what it is about'. He argues that, from the 16th century, there has been an attempt to teach religious education as a 'compelling and comprehensive' system of logic and that many recent attempts to reform the process has only resulted in repackaging an old schema in a new guise. Mageean suggests that the religious dimension is not being attended to, until students learn to see it 'in and within' their own activity as learners. In terms of pedagogical principles, he notes religious activities should be transformative experiences that involve intelligent grappling with the problems of a dynamic world in a discursive and fluid manner. Essentially, according to Mageean, meaning arises from setting up a model, testing it and modifying the model in light of experience. Holohan (1999) concurs by suggesting a combined inductive-deductive pedagogy is required to help understand the meaning of significant religious experiences and truths.

Elliott (1998, p 26) in his research adds further insight, by asserting the religious education syllabi lack differentiation for high ability students and have been 'dumbed-down', especially in terms of difficulty levels and repetition. Fundamentally, he suggests, curriculum design is often oriented to the 'lowest common denominator'. Elliott's (1999) further research with more capable students was particularly critical of current pedagogical practices in religious education. Over ninety percent of talented pupils found religion lessons 'boring' and nearly three quarters of respondents felt religion classes didn't 'open their minds' nor challenge them to 'try new things'.

Similarly, Brennan and Ryan (1996) observed primary students are capable of much more in terms of content and learning processes and are often not as challenged in religious education as they are in other key learning areas. Adding to the critique has been the classroom observations of Spurling-Janes (1995) who noted, when following established curriculum units, teachers tended to teach lesson ideas from the program as distinct elements, with little or no connection between lesson activities through cognitive or catechetical linkages. In particular, she asserts, the 'Life Experience' elements were rarely connected to religious concepts in an explicit fashion.

Within the context of the formal classroom curriculum, Ryan, Brennan and Willmett (1996, p 4) recognise, as well as the explicit curriculum being taught, the 'Null' curriculum (what is not being taught) is also significant. Apart from specific content, they especially highlight the absence of key pedagogical approaches in areas such as critical thinking; problem solving and open debate convey a significant message. If students are not empowered to discover for themselves the truth and wisdom contained within any discipline, their capacity to respond to the subject must be impaired. Mudge (1999) advocates the incorporation of de Bono's 'Lateral Thinking' strategies into religious education pedagogy. Drawing parallels between the qualities of parabolic thinking (i.e. multiple meanings,

'ambush of the unexpected' and disruptions to the comfort zone) and lateral (CoRT) thinking activities (e.g. resisting simplistic, monological interpretations; foster suspension of judgment; polar reversals), Mudge asserts the promotion of divergent thinking modes embraces the need to assist students to challenge their prejudices, avoid unwarranted conclusions and provide worthwhile challenges as they seek to discern meaning.

Complementing the cognitive thinking dimension, de Souza (2001) contends learning strategies need to engage the affective and reflective/intuitive thinking of students. Teachers need to look beyond merely promoting an interest in the subject and eliciting initial responses. She argues educators should recognise that rational thought is rarely unaffected by emotion and the interaction of the two processes have the potential to develop inner reflection which can lead to transformed outer action.

In arguing for greater emphasis to be placed on the pedagogical dimension of religious education, it is worth noting Rossiter's (1999, p 9) contention that the quest for relevance and personalism are the most important issues currently confronting Catholic religious education. He noted, from the 'vantage point of time', that when the personalised formula, which evolved in some catechetical models proved unsuccessful, it was not the desire to generate personal relevancy that was problematic, rather it was the inappropriateness of the methodology. Rossiter highlighted, too much informality combined with inappropriate assumptions about personalism combined to make many activities ineffective, even if they were enjoyable. A sound pedagogy needs to be able to embrace the need for students to find personal and communal relevancy whilst concurrently maintaining cognitive rigour.

A concern with the adaptation of 'outcomes-based' curriculum models is that learning could revert to a 'jug and mug' metaphor where it is simply perceived as a change in the knowledge level of the student. However, as Bounds (1997) highlights, learning is far more multi-faceted. For Bounds, learning involves personal growth that allows the individual to interact more effectively with, and interpret, the world. It is essentially about finding new ways of intelligently working within a person's environment. From a similar perspective Glass and Muthu (1999) add that learning only arises by combining the multitude of perceptions of external reality so as to produce meaningful understandings of it. Marton and Ramsden (1988) assert learning should be viewed as a qualitative change in a person's way of seeing, experiencing and conceptualising the real world, rather than as a quantitative change in the amount of knowledge someone possesses. Gardner (1991) extends this concept by articulating the notion that learning is inextricably linked with understanding. He proposes that real learning involves the capacity to represent a problem in multiple ways and to approach its solution from a number of vantage points. Murphy (2001) agrees by commenting when something is meaningfully understood, it is not only retained but is versatile in its application, facilitating creativity and further understandings.

By way of application to religious education, it would appear sound pedagogical approaches would need to enable students construct multiple interpretations of reality. Equally, learning models need to take into account the observation learners and teachers in the same classroom do not experience the same world. This has profound implications for religious education. The differential prior experience of learners directly influences the message being received. Hence, any pedagogical practice needs to explicitly incorporate feedback loops to allow all members of the learning community to stay in touch with the different evolving conceptualisations that are emerging across the classroom. Murphy (2001) observes, the religious educator's approach to religion should not be the reproduction of static truths (knowledge) but the pursuit of understandings that have no end points.

Rossiter (2001) maintains that the ultimate purpose of nurturing understandings in students is to allow them to construct their own meaning. Meaning for Rossiter has a number of dimensions, involving a complex mixture of values, beliefs and cognitive ideas, as well as emotional and unconscious responses. He suggests meaning exhibits a variety of nuances beyond simply making sense of one's personal experience. Rossiter would view meaning as: a set of values; religious beliefs; interpretations of outside culture; justifications; a 'master' story'; life goals; and the point of intersection between understanding and emotion. Meaning, to Rossiter, has to do with the overall integration of rational and non-rational understandings. He argues, individuals know they have meaning for their lives when their understandings of what they are doing provides an explanation they find satisfying.

From a pedagogical orientation, it is crucial teachers not only appreciate that the learning process is oriented towards 'meaning making' but they also must have a clear mental model as to how meaning may evolve in a classroom setting. In both the learning and religious education literature, a number of meaning-making models have been proposed. The purpose of human reasoning is to consider available information in an attempt to 'fit' incoming data into existing personal beliefs and theories. The objective is for the thinker to avoid inconsistency or contradiction between sensory data and beliefs and theories about the world (Price, 1997). A synthesis of the key concepts (Mageean, 1995; Price, 1997; and Lonergan as cited in Groome, 1998) suggest the search for meaning evolves through a series of interconnected (though not necessarily linear) steps:

(i) Initial Sense Making – categorising whether or not incoming information is recognised as belonging to an existing category.

(ii) Test of fit – questioning whether the new data fits with existing theories.

(iii) Reasoned judgment – if there is a mismatch, what is the cause, noting especially that mismatches are the potential stimulus for new learning, leaving the learner the choice between modifying personal beliefs and theories or rejecting the data itself.

(iv) Assimilation, accommodation or rejection of new data:

- New information simply assimilated into existing theories thereby tending to reinforce or strengthen the belief structure;
- Accommodated – modifies beliefs so that new information doesn't cause conflict or inconsistencies; and
- Reject the new information which removes conflict with existing beliefs and theories.

Hence, from a pedagogical perspective, good teaching in religious education involves providing structured, sustained and focused opportunities for students to generate their own religious meanings informed by their Catholic tradition and relevant life experiences. Part of the challenge is to create a climate in which students can suspend 'disbelief', by putting aside some of their personal theories whilst critically examining new ideas and concepts. This is a key point for religious education. The definitive nature of a belief structure (e.g. The 'real' presence of Christ in the Eucharist) can generate great mental tension, rather than modify or accommodate beliefs, if there is no processing pedagogy older students may be prone to summarily reject incoming data.

Rossiter (1999) would suggest, a sound pedagogy involves the interplay between content, challenging processes for teaching, researching and learning and the subtle place for personal freedom. As Price (1997, p 12) comments, when instructional programs do not promote the development of appropriate ways of understanding, students 'invent' their own ways of understanding. Equally, it is worth noting Murphy's (2001) caution, understanding should not merely be the reproduction of a teacher's understanding but an integration of what is relevant into the student's conceptual framework. Religious education pedagogy must allow students to scaffold their own thinking, manipulate theories in response to new experiences and construct meaning or they simply, uncritically invent their own meanings.

The empowerment of the student learner to critically think for themselves is problematic for some religious educators who have been immersed in traditional, magisterial models of church. Bounds (1997) argues for a balanced pedagogical approach. Whilst broadly acknowledging the need to respect religious freedom, Bounds suggests teaching in religious education should involve an ongoing process of discerning levels of understanding and intervening in the learning activity to modify conceptions where the understanding of students is incomplete or mistaken. If understanding is about seeking truth then there must be some checks to differentiate between misunderstandings and different degrees of understanding before assimilation and integration occurs. Essentially, this is the contention of White and Borg (2002), who advocate a major purpose of the assessment process is to 'drive the learning' to the next stage of development. Similarly the emphasis in the collaborative learning literature (Johnson

& Johnson, 1989; Kagan, 1994) on students and teachers functioning in partnership, as 'co-learners', is significant in this context.

Overall, sound pedagogy needs to balance the 'instructional goals' of the religious tradition with the evolving search of the individual learner. A potential point of intersection between these two dynamics is the concept that education happens at the dynamic point of contact between the poles of 'knowledge' and 'knowing'. Rossiter (1998) speculates that theorists, who expand on the notion of knowing, may offer material that promotes a richer understanding of the aims, processes and outcomes of religious education. Rossiter suggests a concept of 'knowing' may help teachers link the knowledge and skills component of a curriculum model with the more affectively oriented religious experiences of the catechetical domain.

From a pedagogical perspective, Varengo (1993, p 6) notes, it is not sufficient to educate people to simply think about their religion. There is a need to foster a critical attitude of 'thinking about thinking' (meta-cognition), which stands at the core of the intellectual dimension of religious education. Varengo extends the concept of 'knowing' to suggest that 'knowing' one's religion implies a radical shift from a technical rationality of how it works, to an engagement in a unique holistic synthesis between theology, experience and spirituality. This is supported by Boys' (1989) observation, 'human knowing' transcends the verifiable and rational. Knowing is not only an intellectual or rational concern.

The concept of 'knowing' was further extended by Mudge (2002, p 3) who distinguished between 'separate knowing' and 'connected knowing'. For Mudge, 'connected knowers' find ways of gaining access to other people's knowledge that links with or challenges their own insights, whilst 'separate knowers' hold themselves aloof from the object they are trying to analyse. Connected knowing is seen to be personal, with an emphasis on dialogue, empathetic role-taking and contextual analysis. Essentially, Mudge suggests connected knowers seek understanding rather than proof.

To promote connected knowing from a curriculum perspective, Mudge (2002) suggests a 'Whole-part-whole' meta-approach. Teachers, in preference to becoming trapped by the minor details of a vast unit, engage students in discerning a broad overview of the topic, followed by reference to specific detail that is subsequently linked back to the overarching conceptual themes. Such a holistic approach would be supported by Keating (2000) who states, students have to see what they are doing first of all and then try to picture what they are dealing with, before they can analyse it.

Drawing more on a pedagogical approach Mudge (2002) contends that 'disconnection is necessary for true connection'. Influenced by the parabolic teachings of Christ, Mudge argues humans need to undergo healthy and natural disconnection in order to experience life giving connected knowing.

Citing the provocative and disruptive nature of the parable stories, he suggests that students need to be disconnected from current mental frameworks before they will embrace new conceptualisations.

Writing from a catechetical orientation, Groome (1998) draws on biblical images to suggest that the foundational sources of human knowing are everyday experiences, relationships and efforts to live the covenant and do God's will. In essence, all knowing and knowledge is ultimately directed to enabling humans to love God, themselves and others, as God first loved us. Expanding on his theme, Groome cites the writings of Plato who insisted 'all knowing should serve human well being and that knowledge ought to promote happiness by helping people realise what is true, choose what is good and create what is beautiful.' (Groome, 1998, p 275)

Groome (1998), relying heavily on feminist epistemology, suggests there are five key principles that would nurture an authentic approach to knowing:

(i) Engage the whole person and all people: emphasises the need to engage all aspects of the human person (spiritual, intellectual, emotional, creative, social).

(ii) Engage in conversation and partnership in community: express an opinion to others in order to know it better and listen to responses.

(iii) Reflect on and value personal perspectives whilst being open to others: highlights the need to have an opinion, know its validity and limitations and being open to other opinions.

(iv) Accept responsibility and favour relationships in ethical decision-making: humans need to maintain integrity between what they know and how they live.

(v) Think beyond dualism: rather than emphasise the differences between points of view, look for inclusion and integration.

Ultimately, a conceptual framework in religious education that integrates 'ways of knowing' as an underpinning paradigm addresses what Rossiter (2001) describes as the central role of religion, providing meaning and purpose in life. According to Rossiter, religion provides an overarching spiritual framework for life and gives direction to a moral life as well as fostering religious practices. He contends religion gives a sense of ultimate meaning not only to life but also to the universe, by seeing it as a complex creation of God.

In terms of pedagogy, Rossiter (2001) contends personal meaning is generated through: reflection; openness to change; interaction with culture; evaluation of meanings; and judging what meaning to

adopt. He acknowledges, in a post-modern era there has been a move from notions of 'absolute truth' to valuing interpretations that increasingly approximate the truth. Consequently, Rossiter would assert a religious pedagogy that did not address contemporary spiritual and moral issues utilising critical interpretation and open ended research methods would reinforce the view of many young people that religion is not relevant to meaning in life today.

Flowing from this analysis, it is proposed that a brain-based constructivist theory of learning may provide an acceptable basis for the development of pedagogical procedures and principles that will help bridge the concerns surrounding the curriculum and catechetical frameworks. Constructivism is best viewed as a meta-theory about knowledge and learning that incorporates several different philosophical positions. According to Grimmitt (2000), at its core, constructivism identifies knowledge as a human construct that is a consequence of the way in which individuals and communities order their experiences. Essentially, constructivist theorists argue that human knowledge is subject to multiple interpretations and is problematic by nature. Brain-based constructivist learning theory builds on this premise by endeavouring to articulate a rationale for pedagogical practice, based on insights gained from the study of brain functioning and the role the brain plays in the construction of meaning.

Of particular value to religious education, brain-based constructivism emphasises the importance of encouraging students to explore ideas and issues for themselves and to arrive at their own conclusions. By enabling pupils to participate consciously and critically in the process of meaning-making, students not only encounter their tradition, they have the human freedom to interact with it in a relevant and personalised way. As noted by the Congregation for Catholic Education (1988, #63) 'the entire process of education therefore, is a service to the individual students, helping each one to achieve the most complete formation'

Grimmitt (2000) also argues that a constructivist approach enables students to make connections between content and their own feelings, acts and experiences, thereby facilitating an interpretative process that supports the formulation of personal faith. It must be equally noted, however, a constructivist orientation to learning in religious education does not in any way dilute church traditions or absolute claims to truth. Rather it highlights the importance of objective classroom presentations so students can discern there is no 'hidden agenda' and they can appreciate that the learning process is not endeavouring to manipulate unquestioning acceptance. In advocating a brain-based constructivist orientation in religious education, there is a need to maintain a pragmatic balance between the presentation of content and the search for new understandings. As in all key-learning areas, it must be recognised there is a content component that has found a high level of credence across the learning community and would be generally accepted as objective, external knowledge.

It is also worth noting, when utilising a brain-based constructivist direction in religious education, there is still potential for a mismatch to occur between the student's view of the actual teaching-learning process and that of teachers. Students need to understand the rationale behind a constructivist approach otherwise they may still attach little or no value to rich learning tasks[12]. This is particularly the case in a secondary school context where students may perceive a 'transfer' model is more efficient to achieve short-term assessment goals and may in fact, be resistant to learning for themselves.

In response to some of the criticisms afforded to the Shared Christian Praxis model, a pedagogical approach based on brain-based constructivist principles would acknowledge the diversity of learners. It would allow students greater freedom to take 'risks' with their learning and so not feel as pressured into formulating responses that are entirely in harmony with the Christian story. Similarly, such a learning model would enable the generation of thoughtful responses to key issues without necessarily committing students to a personal response or call to 'action'. Whilst being in alignment with the overall meta-methodology of Shared Christian Praxis, the greater flexibility of a brain-based constructivist pedagogical framework would allow teachers to approach content areas differently when the need presents. For example, instructional activities for a unit of work on Church History (research, historical analysis, web quests) may alter markedly to the pedagogical strategies employed to develop a Morality unit (simulations, class debates, empathy tasks).

## Conclusion:

At the intersection of each of the major frameworks is an awareness that classroom religious education is endeavouring to provide an experience which enables each individual to encounter their faith tradition and, in the process, construct their individual understandings and relationships with God. No framework can meaningfully exist in isolation; it is the interaction between the catechetical insights, curriculum directions and pedagogical practices that ensures a balanced approach to classroom programs.

Flowing from the above analysis, it is the contention of this dissertation that the development and evaluation of a pedagogical approach, which has been informed by the insights generated across each of the three educational frameworks, is beneficial to religious educators. Subsequent chapters integrate insights from recent pedagogical developments in Australia and constructivist brain-based learning theory, with the various principles emerging from the three major intersecting frameworks that have influenced the development of religious education. These insights, synthesised within a conceptual

12 'Rich' tasks are multi-dimensional extended learning experiences that represent 'real' learning on the part of students (Education Queensland, 2000b)

pedagogical framework, combine to generate an appropriate model for the critique and evaluation of teaching programs and lesson strategies in the primary religious education classroom.

# *Chapter Three*

## Pedagogy: A National Concern

## *'An Overview of Pedagogical Developments within the Australian Context'*

### Introduction:

In order to provide a linkage between the conceptual fields of religious education in Australia and the pedagogical implications of brain-based learning, this chapter provides a brief synopsis of relevant key themes currently underpinning pedagogical development in the broader national context. The chapter presents a concise overview of developments in pedagogy in the Australian milieu with regard to trends across curriculum frameworks in Australian states and diocesan religious education programs. Reference is also made to a limited number of research projects that have recently explored pedagogical issues relevant to this research. The chapter is not intended as an exhaustive exploration of the field but rather a contextual orientation that situates constructivist theory and brain-based learning within the Australian educational environment.

### Australian Syllabus Documents:

Within the context of broader curriculum development in Australia, there has been a gradual realisation that the alignment of curriculum content with pedagogical frameworks will potentially produce better learning outcomes for students. Notably, the curriculum frameworks of Western Australia (Curriculum Council, 1998), South Australia (Dept. of Education, Training & Employment, S.A., 1999) and Queensland (Education Queensland, 2000a) and most recently Tasmania (Department of Education, Tasmania, 2002) have stressed constructivist learning paradigms should underpin the content statement of syllabus documents. Cole (2001) notes, curriculum authorities in these states have commenced the task of re-conceptualising the nature of curriculum experiences to enable students to function more effectively in future society. The emphasis has shifted from listing curriculum content to exploring new ways of packaging and delivering (pedagogy) learning experiences to students. This

contrasts with the larger Australian states, New South Wales and Victoria, who have yet to grapple with the issue of pedagogy in an integrated, holistic manner across all syllabus documents.

In the late 1990's the education departments of both the Western Australian and South Australian governments embarked on a process of reviewing their syllabus frameworks. A fundamental paradigm shift that emerged in both States was a need to balance content statements with a clearly articulated approach to pedagogy. The Western Australian (Curriculum Council, 1998) approach, highlighted a framework that incorporated thirteen essential, overarching learning outcomes. Prominent among these were a number of outcomes that could only be successfully addressed through an emphasis on pedagogical issues. Such outcomes included, for example:

- Students visualise consequences, think laterally, recognise opportunity and potential and are prepared to test options;
- Students value and implement practices that promote personal growth and well being; and
- Students are self-motivated and confident in their approach to learning and are able to work individually and collaboratively.

Similarly, the South Australian framework (SACSA, 1999) argues that, whilst any curriculum should allow for a variety of approaches to learning and teaching, it is important that the pedagogy be consistent and be supported by a coherent, integrated philosophy. The philosophical stance advocated, was based on constructivist learning theory. The South Australian approach views students as active learners who learn at different rates, need diverse and multiple challenges, require support in making connections and need to develop responsibility for their own learning.

According to Barrett (2001), the Department of Education in Queensland has extended the process of re-modelling its curriculum by including an interrelated conceptual triad that includes: a content overview of what is taught with an emphasis on citizenship, life pathways, multi-literacies and environments ('New Basics'); multi-dimensional extended learning tasks which represent student learning (Rich Tasks); and a comprehensive pedagogical statement that places an emphasis on how concepts are actually taught (Productive Pedagogies). Education Queensland (2000a) suggests improved student outcomes require a systematic, principled and practical coordination of the message systems of curriculum, pedagogy and assessment.

Closely aligned with the philosophical orientation of this research, Education Queensland (2000c) discerned that an emphasis on improving pedagogy should be at the heart of their educational agenda. Consequently, the productive pedagogy approach emphasises the interrelated dimensions of relevance, social support, recognition of differences and promotion of intellectual quality. The concept of 'productive pedagogies' that has emerged is not advocated as a new theoretical model but, according

to Khoo (2002), is rather a focusing exercise on what are considered to be vital elements in student learning.

From a Tasmanian perspective, which has particular relevance to this study, a strong constructivist approach is again evident. This philosophical orientation has been formally conceptualised in the Tasmanian Department of Education's (2002) 'Essential Learnings Framework'. The five 'essential learnings' articulated in Tasmania include: Personal Futures; Social Responsibility; World Futures; Communicating; and Thinking. With close parallels to the Queensland model, the Tasmanian approach emphasises the interconnections and interrelationships of knowledge, skills and dispositions across and within the essential areas of learning. 'Essential Learnings' highlights the need to focus on pedagogy in order to engage all learners to come to a deeper appreciation of important, life related matters. The Tasmanian approach has placed inquiry and reflective thinking at the centre of the 'Essential Learnings' Framework. The pedagogical principles stress a focus on *DEEP* knowing, understanding, rigour and depth.

Deep knowledge and understanding results when relatively complex connections are established to central concepts, allowing for the development of systematic, integrated or holistic understandings. Johnston (2001) adds, deep learning occurs when students are personally involved in the task and aim to understand relationships between the immediate task and other tasks or contexts. This is in contrast to shallow or superficial knowledge, which covers large quantities of fragmented ideas and bits of information that are disconnected from other knowledge and does not allow the student to make clear distinctions, formulate arguments or solve problems. As Johnston comments, a surface approach occurs when students simply see learning as a means to achieve an end and are motivated to do the minimum requirements to pass an assessment hurdle. This is a theme echoed by Burford's (2002, p 5) concern that defining learning in terms of measurable assessments has led to the 'death' of meaningful pedagogy and learning for meaning.

## Pedagogical Research and Models in Australia:

Of particular interest to this research project is the ongoing longitudinal study being conducted by the Education Queensland (2000c) in association with the 'productive pedagogies' initiative. Citing evidence from their investigation of over 600 coded lessons across 24 schools, it was found that the levels of 'intellectual quality' and 'relevance' were generally very low and this translated into poor quality work samples as evidenced by the moderated judgments of a range of English and Social Science teachers. The research project concluded that improvement in classroom performance should focus on such matters as analytic depth; intellectual challenge; critical thinking; higher order analysis and dialogue. The researchers also suggested that the curriculum should be more connected to problem-based learning, citizenship and the worlds of work.

In a Queensland based research project, Johnston (2001) observed that there is widespread support for a *DEEP* approach to learning on the part of teachers. Whilst an orientation to holistic, *DEEP* learning is often recorded in school mission statements, Johnston asserts there is a marked difference between espoused goals and reality. He contends that surface thinking and the transmission of factual knowledge occupies more time than the fostering of deeper critical levels of thinking. With clear links to brain-based learning (Sylwester, 1995; Wolfe, 2001) Johnston ultimately suggests there is a need to recognise that effective recall depends on how the knowledge is structured in the long-term memory.

Drawing on a Victorian perspective, Dusting (2002) investigated pedagogical practice in secondary schools. He concluded students, in general, were relatively passive learners who regularly displayed poor learning tendencies. In particular, he discerned superficial attention, inappropriate application, non-retrieval of existing knowledge and the lack of internal reflective thinking were significant concerns. In developing the 'PEEL' framework (Project for Enhancing Effective Learning), Dusting advocated the development of teaching strategies that nurtured linkages (connecting ideas with each other, previous lessons, the real world…), understandings (personal interpretations, generalisations, communication….) and monitoring (performance against intent and instructions).

From a primary orientation, another Victorian project, the CLaSS literacy strategy (Archdiocese of Melbourne, 1999), also highlighted some key underlying pedagogical principles. The CLaSS researchers stressed the importance of 'engaged' learning time, high expectations of student achievement and structured teaching focused on the learning needs of students. Of particular relevance to this research process was the articulation of the 'engaged' teaching process summarised by the 'To, With & By' framework. Essentially, the contention is that the learning process is scaffolded through a series of levels. Hence, if a new concept, processing skill or thinking strategy is being introduced, the teacher explicitly teaches or models the idea ('**To** the class'); followed by a process of joint construction where the activity is performed jointly ('**With** the class'); whilst finally students, in small learning teams, operate independently ('**By** themselves') to construct meaning and develop their skill base. This concept is reinforced by brain-based theorists (Caine & Caine, 1994; Scherer, 2001) who advocate the deconstruction of a process by breaking it down into small parts, modelling how it is accomplished and walking through it with the learning group prior to instigating independent performance.

In association with broad developments in curriculum over recent years, many Australian states have also begun to articulate the need to place greater emphasis on citizenship education. This is exemplified by the inclusion of 'social responsibility' in the Tasmanian 'Essential Learnings' framework and the incorporation of 'citizenship' in the Queensland 'New Basics' curriculum map. With clear parallels to religious education, Hunter and Jimenez (1998) note that such civics programs

should not simply be an elaboration of the knowledge base, but rather emphasise the necessity of values and the relevance of knowledge. In proposing a need for a strong constructivist pedagogy, Hunter and Jimenez (1998) reflect on the dilemma facing many institutions (government, church..) caught between wanting an education process that makes children 'fit the system' whilst concurrently wanting to help students 'remake the system to fit them.'

Hunter and Jimenez (1998) argue, if students are passive learners during the formative stages of learning about citizenship, then their potential to operate as active citizens in the future is limited. A very similar principle could be applied to religious education. If students are not actively involved in constructing their own value systems and discerning personal religious understandings it would be hardly surprising if they were not equally passive adults with regards to their involvement in the life of the faith community. In religious terms, if students become convinced authority rests in knowledge and that control over knowledge lies outside of their domain, little impetus exists for students to do other than acquiesce or reject the knowledge given to them.

A further pedagogical development of significant relevance to this study that has risen to prominence, especially in primary schools across Australia, is the notion of 'cooperative learning'. The concept draws heavily on the work of Vygotsky (1978) who argued cognitive development does not proceed through innate age-based development thresholds but is the product of social and cultural interaction. He proposed there is a distinction between the problem-solving ability and learning achieved by an individual and what could be possible, given social interaction. It is the 'rubbing of minds together' that leads, in Vygotsky's view, to the generation of appropriate questions and clues to lead a learner to the next level of understanding. Vygotsky asserts that learning occurs in a zone of proximal development, which is the difference between what a child can do independently and what a student can accomplish with assistance. It is within this proximal zone teachers need to utilise pedagogies that scaffold learning. This would allow collaborating mentors to initiate and lead less experienced learners into deeper understandings and higher levels of skill development.

In its essence, cooperative learning is best described as a learning environment where 'everyone learns from everyone else' (O'Brien & White, 2001, p 32). Cooperative learning is evidenced when there is a positive relationship between students' goal attainments. It is most effective when students perceive they can reach their personal learning goals more readily if peers also accomplish their goals. The development of learning communities has been a particular focus of the cooperative learning literature (Johnson & Johnson, 1989; Kagan, 1994). This approach to learning is not an end in itself, but rather an underpinning pedagogy designed to generate a classroom culture that maximises the learning opportunities of all students.

Research on cooperative learning suggests:

- students achieve more in cooperative interaction than in competitive or individualistic interaction (Johnson, Johnson & Holubec, 1987);
- there is a negative correlation between achievement and competitiveness over a range of studies (Johnson, Johnson & Smith, 1991);
- due to 'cognitive rehearsal' students of all ability levels enhance their short and long term memory as well as their critical thinking skills (Bellanca & Fogarty, 1994);
- meta-analysis studies highlighted the more complex the outcomes (higher order information processing & problem solving) the greater the benefits that arose from cooperative learning (Kearney, 1993);
- more efficient and effective exchange and processing of information takes place in cooperative situations (Johnson, Johnson & Smith, 1991); and
- students from diverse cultural and linguistic backgrounds benefit academically more from cooperative learning than from transmission modes of instruction (Adams & Hamm, 1994).

From an Australian perspective, a review by the ACT Schools Authority concluded, cooperative learning improves the performance of all but the brightest students, and in the case of the latter, makes no real difference (Kearney, 1993).

A rationale for incorporating cooperative learning into the religious education classroom was presented by Wedge (2002). She highlighted that human beings do not function as isolated individuals and it is through interdependent relationships developed within the faith community that the image of God in each person flourishes. Wedge argues it is by using cooperative learning strategies that the process of socialisation in the Catholic tradition occurs. Whilst acknowledging formal instruction is also important, she suggests catechesis is nurtured by allowing students to discuss and share their faith through dialogue and reflection. Cooperative learning is a framework that would enable religious educators to address the balance, advocated by Rossiter (1988), between the duty to impart knowledge and the need to recognise the affective dimension of the learner.

## Pedagogical developments in Religious Education Syllabus Documents across Australia:

As outlined in Chapter Two, the development of religious education syllabi have progressively evolved through a number of phases. On the whole, up until recent times, these documents have been relatively 'silent' with regards to articulating coherent philosophies regarding teaching and learning. Whilst it must be acknowledged the various catechetical ('Four-point plan; 'Shared Christian Praxis') and curriculum ('Phenomenological' & 'Typological' approaches) models contained inherent pedagogical principles (e.g. drawing connections and relevance from 'life experiences'; engaging in reflective processes, assessing against conceptual outcomes….), these were generally at the 'meta'

level, influencing the flow and balance of a unit of work, rather than focusing on learning processes within the context of specific lesson activities.

Over the last ten years many Australian dioceses have developed comprehensive syllabus documents in the area of religious education (e.g. Sydney, Adelaide). As observed in the previous chapter, such documents reflect a solid blend of catechetical and curriculum principles. The archdiocesan program for Sydney: *'Celebrating Our Journey'* (Archdiocese of Sydney, 1991), for example, retained a strong catechetical framework by tracing the 'movements of the Emmaus[13] story', whilst concurrently moving to emphasise a rigorous, assessable outcomes based curriculum model without articulating a definitive pedagogical rationale.

Other dioceses (e.g. Bathurst, Newcastle) have supported syllabus documentation with a comprehensive array of teaching units. Incorporated in these units have been broad philosophical statements on how students 'best learn' and a diverse collection of contemporary pedagogical strategies. The Bathurst diocese complemented *'The Christ We Proclaim'* series (CEO, Bathurst, 1995) with the publication of a support text of teaching strategies. The text, *'Breathing Life into the RE Classroom'* (White, 1997), whilst broadly mirroring the VAK learning style model[14] (Ward & Daley, 1993), did not explicitly endeavour to express an integrated approach to pedagogy.

Reflecting the educational developments at the national level since the commencement of this century, there has been a gradual, yet notable shift in the emphasis being placed on pedagogy within religious education documentation produced in Australian dioceses.

Of recent times, the Archdiocese of Melbourne has introduced a religious education program based on the textbook series '*To Know, Worship and Love'* (Elliott, 2000). Primary texts utilise two main pedagogical orientations (Healy & Kidd, 2002). For younger children the 'Good Shepherd Experience' embodied Montessori elements of play, creative story-telling and reflective wonder, especially through the use of concrete 'pedagogical instruments'. Senior classes followed a three-phase learning and teaching process, highlighting orientation, development and synthesis. Teachers are encouraged to shape teaching and learning processes to accommodate the needs of their students and their preferred styles of learning (Archdiocese of Melbourne, 2001, p. 20).

The *'To Know, Worship and Love'* series highlighted the value of flexibility and creativity within a framework of 'good' teaching practice. It stressed the importance of relevance and encourages teachers to utilise brain-based strategies that are common to other key learning areas (e.g. De Bono's (1992) Thinking Hats; Gardner's (1991) Multiple Intelligences theory). Whilst acknowledging the

13 Luke 24: 13 - 35

14 The VAK model refers to Visual, Auditory and Kinaesthetic styles of learning

increased emphasis on pedagogy, this researcher contends the *'To Know, Worship and Love'* series continues to lack a coherent, detailed rationale which could assist teachers in the pedagogical decision making process.

By way of contrast, building on a content oriented syllabus produced in 1997, the Archdiocese of Brisbane is currently updating curriculum resources and professional development models to reflect a more coherent pedagogical emphasis. Stimulated by broader developments in the Queensland context (noted earlier), the diocese proposes to redesign the way 'religious educators go about their work in terms of productive pedagogies, drawing on the best contemporary educational research, particularly in areas of critical literacy and dispositional learning' (Barry, Elliott & Rush, 2003: p 1).

Influenced by Luke and Freebody's (1999) 'Four Resources Model', the Brisbane Archdiocese is applying contemporary literacy approaches within the context of religious education. The pedagogical intent is to promote 'religious literacy' through the four phases of 'code breaking', 'meaning making', 'text usage' and 'text analysis'. Concurrent with this approach, an emphasis was also placed on dispositional learning, a frequently exhibited pattern of behaviour, constituting a habit of mind that is intentional and oriented to broad goals (Barry et al., 2003). With clear links to brain-based learning theory, a number of learning dispositions were identified (e.g. curiosity; inventing; relating; producing….) that support clear transformational outcomes (e.g. active investigator; designer and creator; effective communicator; quality producer….). Ultimately, it was acknowledged that for transformational religious education to occur, the learning process needs to incorporate the four elements of knowledge, skills, dispositions and feelings (Barry et al., 2003: p 7).

With noteworthy relevance to this study[15], in an endeavour to address some of the perceived deficits of both the catechetical and curriculum frameworks, the Parramatta diocese has sought to integrate a comprehensive, brain-based pedagogical framework within its newly revised *'Sharing Our Story'* (SOS) (CEO, Parramatta, 2000) curriculum guidelines. In the national context this is particularly significant since over one third of Australian dioceses have adopted or modified the curriculum for implementation within their schools. The SOS document observes human learning is deepened and amplified by integrating multiple ways of knowing so as enable students to construct personal meanings in as comprehensive a manner as possible. Effective educators teach to engage and integrate all modes of processing regardless of personal thinking styles (SOS p 73). Whilst still incorporating the Shared Christian Praxis model as an overarching catechetical framework and providing a curriculum structure firmly linked to 'outcomes-based' methodology, the Parramatta diocese adopted a 'brain-based' learning model entitled 'Integral Learning' (Atkin, 2000).

15 In 2003, the joint inter-diocesan religious education curriculum working party discerned Parramatta's *'Sharing Our Story'* syllabus would be one of the seminal documents for the new Hobart Archdiocesan program.

Atkin (2000) transposed Herrmann's (1996) 'Whole Brain' thinking theory into the religious education arena. By integrating Kolb's (1984) experiential model (learning is facilitated by experiencing, reflecting, constructing mental maps of experience and active experimentation) with the explicit thinking categories of Herrmann (Analytic, Organised, Personalised and Synthesised), Atkin developed the Integral Learning Model. Essentially the model acknowledges the diversity of thinking and learning patterns in students and proposes pedagogy should reflect a 'Whole Brain' approach to learning. This concept provided a schema to organise and balance suggested teaching activities, contained within SOS support units, into four separate categories aligned with the quadrants in the 'Whole Brain' model.

In terms of applying 'Integral Learning' to religious education, Atkin (2000) emphasises learning is deepened and amplified by integrating multiple ways of knowing. In contrast to models that rely simply on varying the teaching strategies across various learning styles, Atkin holds that teachers should engage and integrate all modes of processing regardless of personal thinking styles. Whilst acknowledging the importance of this overriding pedagogical principle, anecdotal evidence[16] suggests, that teachers, at their current stage of professional development, are primarily utilising the 'whole brain' schema as a smorgasbord of teaching strategies without fully appreciating the value of connecting and integrating activities in a holistic fashion. Malone (2002) also noted the potential for teachers to inadvertently generate a 'disconnected' learning environment. She comments, whilst resources for teacher planning in religious education are of prime importance, teachers lack the knowledge necessary to make curriculum choices and responsible decisions about the learning and teaching processes.

In essence, it is the exploration of the manner in which teachers are empowered to make 'responsible decisions' about their pedagogical practice that lies at the heart of this research project. The challenge for religious educators is to develop learning experiences that form connections between both the doctrinal content and the thinking processes of students in a manner that nurtures a truly authentic search for meaning within the faith tradition.

## Conclusion:

An overview of the 'educational renewal' initiatives across a number of Australian states and dioceses clearly demonstrates that key questions have been raised concerning the appropriateness of teaching and learning processes which have been promoted through content driven curriculum frameworks. It is apparent these new models are no longer silent with regards to pedagogy in the belief that approaches to teaching are best decided at the classroom level. General syllabus development in many states and

16 The researcher was a senior leader in the Parramatta diocese during the development and initial implementation phases of *'Sharing Our Story'* (1998 – 2002)

dioceses, including Tasmania, now place pedagogy at the core of its concern and calls on teachers to implement a coherent, constructivist orientation to the instructional process. Inspired by the philosophies being articulated in the dioceses of Parramatta and Brisbane, the challenge for dioceses across Australia is to continue to incorporate coherent pedagogical approaches within their religious education curriculum statements. It is hoped that insights generated by an analysis of brain-based learning theory explored in the next chapter will assist in formulating such a pedagogical framework for the religious education classroom.

# *Chapter Four*

## Brain-based Learning Theory: A Pedagogical Stepping Stone?

## *'A critical analysis of Brain-based learning theory and implications for pedagogical practice in religious education'*

### Introduction:

Over the past decade educational theorists have become increasingly interested in the implications of neurological research for the learning process. Key elements of 'brain-based' learning theory have informed the development of a number of constructivist learning models (McCarthy, 1990; Gardner, 1991; Herrmann, 1996; Atkin, 2000). The purpose of this chapter is to critically explore the literature surrounding 'Brain-based learning' and discern the implications it holds for pedagogical practice, particularly in the area of religious education. In many cases, the specific implications of brain-based learning theory will not be 'new' to religious educators. However, in combination with the catechetical and curriculum frameworks (cf. Ch 2), it is proposed brain-based learning theory may further inform the development of a coherent pedagogical rationale for the religious education classroom.

In order to meaningfully explore the nature of brain-based learning theory and its implications for pedagogy, the literature review is organised into seven key themes. Each theme is explored in terms of its implications for learning, in general, and for pedagogical practice in religious education, in particular.

### Theme One: Neuronal Connections

Central to many brain-based learning theories is an appreciation of the role of neuronal functioning. According to Wolfe (1998, p 22), "Every thought we think, every move we make, every word we say is based in the electrical and chemical communication between neurons." Each neuron is a single nerve cell with one or more axons that transmit signals and a series of receptors called dendrites. Swerdlow (1995) states that when an axonal terminal is stimulated, chemicals called neurotransmitters are released which cross the minute space between the sending cell and the receiving cell.

What is seen to be significant for brain-based learning is the development of the synaptic connections. Peterson (2000) notes the neurons make connection with other cells at the synapses. A typical brain cell gets 'wires' from about 1000 cells and connects to about 1000 other cells. Neurons produce an electrical current by the rapid inter-cellular exchange of sodium and potassium ions. The resulting energy causes a chemical neurotransmitter to be released from a neighbouring neuron onto the receptor of the next nerve (Armstrong, 1998). Once neurons make connections the brain surrounds and insulates the nerve cells with a fatty substance called myelin, which allows the conduction of electrical and chemical energy to proceed much faster.

The development of synaptic connections appears to be a function of both genetic and environmental factors. Armstrong (1998) notes many factors associated with diet, drugs and environmental influences (heavy metals) may alter the effectiveness of inter-neuronal connections. It has been generally postulated (Wolfe & Brandt, 1998, Armstrong, 1998) no further significant neuronal cells are produced after birth and damaged cells cannot be replaced[17].

Peterson (2000) outlines three phases of neuronal development. Initially, genetic coding influences neuronal formation and induces the neurons to send out pathways. As the embryo and the infant become more active, the neurons begin sending electrochemical activity down the 'wires'. Finally, a stage is reached when patterned (meaning making) activity is needed to stimulate neuronal connections and to precisely wire the brain's response to the environment. From a classroom perspective it is arguably the scope and nature of the meaning making process in the third phase of development that is of importance to the learning process in religious education. Pedagogical practice needs to both stimulate connections and engage the brain in patterning activities. The following concepts of acquisition, elaboration and encoding are critical to appreciating the patterning processes most beneficial to learning.

### *Acquisition:*

Brain theory maintains that what the brain stores is a record of the neural activity that takes place in the learner's sensory and motor systems as it interacts with the environment. Jensen (1998a) claims the acquisition of knowledge is directly related to the formation of new synaptic connections. These connections are formed when the experiences are both novel and coherent. Alternatively, he suggests, if the experiences are incoherent, it is possible that no learning will result. As Wolfe (2001, p 79) notes, ninety-nine percent of all sensory information is discarded almost immediately upon entering the brain, many synaptic connections are often temporary and the brain only builds and maintains the

17 Recent research suggests that this position is not conclusive; Jensen (2001) cites two studies that indicate some neuron growth is possible under very specific conditions.

pathways that are relevant to its ongoing 'survival'. As Wolfe and Brandt (1998, p 9) comment, the brain hasn't evolved by simply absorbing a whole array of disjointed data, it needs to process and make sense of the experiences it is encountering. Essentially pedagogical experiences need to emphasise the importance of creating patterns and discerning meaning.

The learning process requires the brain to be focused on the information that is being accessed at any particular moment. Perry (2000) draws attention to the fact that the neural system fatigues relatively quickly. Three to five minutes of sustained activity will result in the neurons becoming less responsive. He contends that, when a neuronal pathway is stimulated in a continuous, sustained manner, it is not as efficient as when it is receiving patterned, repetitive stimuli over a series of intervals. Perry furthermore notes the recovery period for neurons is also relatively brief. Consequently, if after a short period of time, the learning is directed down an alternative pathway, more effective learning will occur.

Jensen (1998a) and Perry (2000) both highlight the importance of variety in the acquisition process. When a student is in a familiar, emotionally safe environment, such as the classroom, the brain will seek 'novelty' after about four to eight minutes. If variety isn't provided by the nature of the learning encounter, the brain will seek alternative stimuli elsewhere. Similarly, the brain requires the challenge of figuring out a pattern. According to Walsh (2000), if there were no challenges the brain would find it difficult to engage in a learning experience.

Perry (2000) observes it is the inter-relationship between neural systems that is vital. Students are seen to learn more completely (i.e. create meaning and memory), if they weave backwards and forwards between the neural systems. If the experiences are simply familiar or repetitive, existing individual connections may be strengthened without developing new interconnections across the neuronal network that would facilitate deeper learning and understanding.

Jensen (1998b) highlights the importance of incidental learning in the overall learning cycle. He suggests that much of what the brain learns comes to it in an incidental fashion. Whilst formal instruction is significant, an over reliance on constantly holding a student's attention with direct input negates the fact that much learning comes from indirect acquisition, notably peer discussion and environmental stimuli. Jensen (1998a) further suggests in a brain compatible classroom, teachers should only engage the learner's direct attention for twenty to forty percent of the time. Specific instructional processes should only occur in short bursts, relative to the age of the learner. Learning sessions should incorporate instruction, processing, encoding and neural rest.

### *Elaboration:*

Jensen (1998a) contends 'elaboration' plays a crucial role in the functional development of the brain. In order to ensure that the brain maintains important connections, learners need elaboration and encoding to strengthen original contacts. According to Jensen elaboration is the sorting, shifting, analysing and testing of data that deepens the learning experience by strengthening the contact between the new data and the knowledge already stored in the various systems of the brain. Elaboration is an interactive process that requires feedback from a multitude of sources, notably the peer group as well as the teacher. This theme is reinforced by Caine and Caine (1995) who contend the brain is innately social and collaborative. Accordingly, neuronal connections are strengthened when pedagogical practice provides the student with the opportunity to think aloud, bounce ideas off others and produce collaborative learning tasks.

A valuable distinction made by Lowery (1998, p 29) is the difference in the elaboration process between 'practice' and 'rehearsals' in developing synaptic connections. Practice involves the repetition of the same conceptual item over and over again, such as learning the 'Ten Commandments'. Rehearsal on the other hand involves building on and extending concepts by doing something similar but not in an identical manner (applying the 'Commandments' to moral and ethical dilemmas). Rehearsals reinforce learning whilst adding something new. Hence, practice strengthens individual neuronal pathways, whilst rehearsals enable the brain to develop a series of branching, interrelated pathways. This view is supported by Jones (1996) who notes information is easier to remember if it can be explicitly linked to something already stored in the memory bank. The concepts of 'practice' and 'rehearsal' provide significant challenges for teachers of religious education. Traditional transmission modes of instruction have tended to emphasise the repetition of the same conceptual notion without providing students with the opportunity to elaborate on their knowledge base.

### *Encoding:*

Another important contention of brain-based theory, that has significant pedagogical implications, is the notion of encoding. Encoding refers to the memory traces that are ultimately retrievable at a future date. The encoding process is influenced by a variety of factors including emotional intensity, relevance, nutrition and the quantity of associations. The extensiveness of neuronal connections is essential in formulating an appreciation of the manner in which the encoding processes or memory systems operate in the brain. Lowery (1998) suggests each record or 'memory trace' represents a pattern of connections amongst the brain cells that can be reactivated to recreate components of the experience. According to Lowery, reactivation links material involved in the experience with other characteristics of the event. When learners place an image in their mind, they store its components in many different places (e.g. shapes in one place, colour in another, scent in a third…). Pathways are

constructed between the different storage areas and are activated when the brain endeavours to recall an experience.

Leamnson (2000, p 1) contends the things we remember are 'reconstructed' in the brain at the instant of remembering. This process of reconstruction is repeated at each and every moment of remembering. Unlike a photographic image, each reconstruction is not identical to the previous memory. Leamnson proposed a metaphor that memory resembles reproductions of a hand drawn sketch, which will exhibit changes with each successive replication. Basically his contention is that if something cannot be reconstructed it cannot be said to have been learnt. In terms of pedagogy, students need to be challenged to explicitly reconstruct their learning in contrast to teachers simply assuming that what has been taught has indeed been learnt.

When discussing the concept of memory in an educational context, it is worth noting the encoding process extends beyond simply 'recalling' information. Peterson (2000), citing classic research from epilepsy patients who have had brain surgery, suggests there are multiple dimensions to memory. The explicit or declarative memory, based in the medial temporal lobes, involves the conscious recall of specific information (e.g. yesterday's breakfast), whilst the procedural or implicit memory results from iterative learning or skill development (e.g. typing). Caine (1992) refers to the 'taxon' memory system that essentially stores information and the 'locale' system that personalises concepts and makes connections between data that is being accessed by the sensory system. Hence, pedagogical practice in religious education needs to not only allow students to 'reconstruct' learning but provide opportunities for learning to be demonstrated in different modalities.

A key component of the encoding process is the opportunity for reflection in order for the brain to transfer learning and construct meaning. Given (2000), notes the main difficulty of thinking is confusion. When the brain attempts to do too much at once, confusion results. By slowing down and focusing the thought process, more effective learning takes place. Caine & Caine (1995) observe such learning does not just occur in fixed structured time periods, rather the brain needs 'actual' time to explore a point of view or master a specific skill. Reflective practice is crucial to the learning process: it allows the brain to make learning personal; purposeful; meaningful; and relevant (Fogarty, 1998).

Linked to the concept of reflective practice is the notion that the brain needs 'wait time' to think and make connections. Pattern seeking processes strive to make sense out of chaos. It is important to give the brain some 'down time' in order to 'play around' with the information, which is essential to detect patterns. Ben-Hur (1998, p 663) asserts that the average teacher only pauses for two to three seconds after asking a question prior to seeking a response. If no answer is forthcoming, teachers reframe the question at a lower level of intellectual functioning. Teachers need to be patient and allow 'wait time' for answers, whilst students need to be encouraged to 'think aloud' without necessarily having the

complete answer. Consequently, an enriched learning environment not only provides a variety of stimulatory inputs but also allows time for processing and reflection. Similarly, content knowledge is not by itself the main goal; content is a means to reach the goal (Ben-Hur, 1998).

From the perspective of the Religious Education classroom some pedagogical implications of neuronal patterning and interaction can be summarised as:

(i) The learner needs a variety of stimuli both in terms of content and process in order to keep the brain focused. (Perry, 2000; Jensen, 1998a). Religious education lessons need to recognise the potential of neuronal fatigue and recovery periods. Sustained activities (four to eight minutes) should alternate with brief, less intense recovery sessions.

(ii) Incidental learning from the community of peer learners is just as significant as formal instruction (Jensen, 1998b). The incorporation of interactive peer dialogue combined with critical and lateral thinking processes is needed to balance formal theological and scriptural inputs.

(iii) Learning experiences are strengthened if opportunities are provided for students to elaborate upon and apply religious concepts in alternative contexts, in contrast to simply replicating the concept as presented to the student (Jones, 1996; Lowery, 1998).

(iv) Each student will encode and remember religious concepts in a unique manner, utilising different dimensions of the memory system (Caine, 1992; Lowery, 1998; Peterson, 2000). Ultimately, until religious concepts are capable of being reconstructed in a meaningful manner, they cannot be said to be 'learnt' (Leamnson, 2000). Assessment processes in religious education need to be incorporated into the learning cycle and be comprised of substantive, diverse and challenging activities.

(v) Reflective practice is crucial if acquisition, encoding and elaboration are to occur. In religious education classrooms the instructional input needs to be 'slowed down' so as to enable 'think time' and periods of reflection.

## Theme Two: Synaptic Density and Environmental Influences

A second theme to emerge from the brain-based literature is the notion of synaptic density and its relationship with the surrounding educational environment. This concept has particular pedagogical relevance, as the 'art and science' of teaching in religious education is continually geared to generating a classroom climate that engenders learning and is responsive to faith tradition.

Synaptic density refers to the contention that, if the establishment of connections between neurons is vitally significant to the learning process then, logically, the greater the density of connections the more effectively the brain will learn. D'Arcangelo (1998) infers intelligence is related in some degree to the number of connections that exist between the nerve cells. The degree to which neurons interact by sending out branching dendrites that are stimulated into action influences the thinking capacity of each person. Wolfe & Brandt (1998) note from birth to about ten years of age the number of synaptic connections rise rapidly, plateauing through the mid teens and gradually declining into adulthood. Bruer (1998) observed, over time, it appears that, concurrent with new synaptic connections being formed, a pruning process occurs in the brain that results in the gradual atrophy of dendrites and axons that are not being used. Similarly, Armstrong (1998) found if specific areas of the brain were not utilised they were 'cannibalised' by neighbouring modules. That is to say that other sections of the cortex are capable, with the appropriate stimulation, of taking over some aspects of brain functioning even if they are not the natural 'first preference' of the brain.

Whilst stimulating an increase in synaptic density may enhance a student's learning capacity, Bruer (1999) observes most learning occurs after synaptic densities begin to decline, thus arguing a direct relationship between intelligence and synaptic density is questionable. Bruer noted, whilst synaptic development increases rapidly in infants during the first twelve months of life and short-term memory begins to develop, performance on memory tasks doesn't reach adult levels until puberty when synaptic density has already begun to decrease.

Peterson (2000) attempts to address the paradox as to why more effective learning occurs after the formation of synaptic connections has begun to decline. He reasons if stimulating maximum synaptic growth is such a critical learning factor than logically learning would be maximised during periods of sustained synaptic development.

Peterson suggests the brain initially overgrows synapses so it can prune the inappropriate ones that are not carrying useful information for the 'long haul'. He contends one way we refine our brain is not just by maintaining or growing new synapses but also by retracting and eliminating inappropriate connections and selecting appropriate ones. Learning is just not simply a process of 'firing' and 'strengthening' synaptic connections through the acquisition of data, rather it is a longer term phenomena that involves patterning, the linking of previous experiences and ultimately the construction of new insights and meaning. Consequently, the multiplication and strengthening of synaptic connections may be important to data acquisition, but are not in themselves the only determinant in the learning process. From a pedagogical viewpoint learning tasks in religious education should not simply focus on adding to a database of acquired knowledge. Rather, provision

should be made for students to make connections (strengthen) and challenge (prune) existing ideas and conceptualisations.

Flowing from the research on synaptic density, Leamnson (2000) advocates a learning model premised on the concept of 'synaptic stabilization'. Whilst acknowledging the importance of hands on experiences, he asserts that physically completing a range of activities is not sufficient to nurture meaning. Learning, Leamnson argues, is a consequence of reflecting on the purpose of the activities. In support of his contention, Leamnson (2000) cites brain-imaging research, which indicates the brain modules that are activated by novel and physical activities are distinctly separated from the brain modules involved in problem solving or other higher modes of cognition. However Hardimann (2001), whilst recognising the distinct areas of brain functioning, asserts experiential learning activates the area of the brain responsible for higher order thinking. Hardimann stresses the need to pair physical activity with problem solving tasks to connect the acting module of the brain (the motor cortex) with the thinking modules of the frontal lobe. Learning experiences in religious education need to be designed to facilitate the interconnection between the various modules of the brain. Activities should be designed that blend kinaesthetic movement, affective stimulation and high order thinking tasks into an integrated learning encounter.

According to Wolfe & Brandt (1998), the environment in which a brain operates determines, to a large degree, the functioning ability of that brain. Citing research from Ramsey & Ramsey (1996), Wolfe & Brandt noted how intervention programs for impoverished children significantly lifted (15 – 30%) intelligence test scores. Wolfe (1998) supported this view by commenting, in an enriched environment, new neuronal connections are constantly reinforced. Alternatively, Peterson (2000) suggests there is some evidence that indicates an impoverished environment will cause an over retraction of synapses and without appropriate stimulation, dendrites could wither from the lack of use.

Jensen (2000a) contends an enriched environment is far more than simply incorporating structural elements such as colour, music and access to equipment into pedagogical practice. Rather it is about challenge, feedback, novelty, coherence and reflection time. Wolfe (1998) argues enriched environments allow for the greater likelihood of two neurons being 'fired together' for a second time, thereby becoming more efficient and able to fire more readily in the future. Hence, in religious education, simplistic 'artistic' activities that characterised transmission modes of instruction need to be enhanced by challenging, higher order thinking tasks that 'push' aesthetic responses to a deeper level of understanding.

It is postulated by Diamond & Hopson (as cited in Wolfe & Brandt, 1998) that, as nerve cells become stimulated they grow new dendrites, which further enhance their capacity to receive and process

information. The capacity of the brain to change its structure and chemistry in response to the environment is called neural plasticity. Whilst the level of neuron growth is extremely limited, dendrites are capable of growing at any time over a person's life span. Bruer (1998) reports on studies that have shown the capacity of adult brains to be highly plastic and capable of extensive reorganisation throughout life. Leamnson (2000) concurs by noting the more times a synapse passes a signal, the larger it grows and the more securely it links two neuron cells. With sufficient use a synapse stabilises and can be conceptualised as being 'hard wired' for life. Hence, in terms of learning in religious education, a concept introduced in one setting and reinforced in another has a greater chance of being embedded in long-term memory because the neural pathways have been established. Equally, the generation of religious education classroom environments that are both stimulating in terms of human interaction and physical characteristics, are vital elements in nurturing brain development.

From the perspective of the religious education classroom some pedagogical implications of synaptic density and the impact of the surrounding environment can be summarised as:

(i) The concept of synaptic density highlights the importance of maintaining a sustained, coherent program of religious instruction. The notion that: the firing and strengthening of synaptic connections is an extended process (Peterson, 2000); the need for an enriched surrounding environment to reinforce new connections learning (Wolfe, 1998, Leamnson, 2000); the appreciation that an impoverished environment will cause a retraction of synapse connections (Peterson, 2000); and the responsiveness (plasticity) of the brain to be able to constantly reorganise thinking processes when appropriately stimulated (Bruer, 1998), all point to the importance of regular, focused religious education lessons if synaptic connections are to be made and maintained.

(ii) Religious concepts need to be introduced in one setting and reinforced in another in order to facilitate the embedding in long-term memory (Wolfe, 1998; Leamnson, 2000).

(iii) The diversity of religious education activities designed to reinforce synaptic density need to incorporate more than just a variety of structural and physical elements (music, drama …), pedagogical strategies need to incorporate intellectual challenge, novelty, feedback and reflection time (Jensen, 2000a; Leamnson, 2000).

## Theme Three: Brain Systems and the Role of Emotion

Woven throughout the brain-based literature is the impact various brain systems have on learning. From a pedagogical perspective, the articulation of simplified physiological models of the brain has

helped educators develop a rudimentary understanding of the role of emotion in brain functioning and consequently has led to adjustments in pedagogical practice.

Conceptually there are several basic physiological models of the brain that assist researchers develop an understanding of brain functioning. One such model, developed by MacLean (1978), was the 'Triune Brain' based on human evolution. MacLean proposed that the human brain represents three main evolutionary levels. The innermost layer, the primitive 'reptilian brain', is driven by instinct. Typically located in the Brain Stem, the 'reptilian brain' controls bodily functions such as respiration and heart rates as well as basic human drives – survival, reproduction and security.

The second phase of development was the middle layer of the brain, commonly known as the Limbic System. This is the most chemically active section of the brain. The limbic system deals with emotion, form and sequence. In combination with the hippocampus it also establishes the filing system by which the brain keeps track of memories. Consequently, it plays a key role in memory transformation and information retrieval, hence having a major impact on learning. According to MacLean (1978), the final part of the brain to evolve was the cerebral cortex. This is a distinctively human development. The processes that take place in the cerebral portion of the brain are cognitive. It is the neocortex (cerebral) brain that enables humans to think, perceive, speak and act. It enables people to learn new ways of adapting and coping.

Within the broad context of MacLean's model, the concept of gating has particular significance for pedagogical practice. According to Leamnson (2000), the frontal lobes of the brain play a major role in organising the brain's cerebral activity. The frontal lobes create gating systems that track input, calculate importance and prioritise things so that the brain concerns itself with what it most needs to be focusing upon. Leamnson (2000) also observes that hands on/active learning doesn't guarantee learning. Citing research based on Functional Magnetic Resonance Imaging, brain modules that are stimulated by novel physical activity are displaced from the areas of the brain involved in problem solving and higher modes of cognition. For both the physical and cognitive systems to be engaged at once requires gating signals that link the modules and eliminate distracting stimuli. According to Leamnson these gating signals are effectively linked by the limbic system

Walsh (2000, p 76) noted, traditionally, it was perceived that the rational cerebral cortex was generally 'in charge' of brain functioning which, in the face of a perceived threat, responded by 'downshifting' to lower, non-rational emotional and survival regions. However, the work of Goleman (1996) suggests our emotional limbic system plays a far greater role in linking an individual's thought processes to the stimulus being provided by the outside world. Goleman proposes it is the limbic system that allows the brain to discern any perceived threats prior to 'upshifting' to any form of reflective activity or 'downshifting' to a survival response.

Both Given (2000) and Wolfe (2001), whilst noting that the brain 'modules' are totally interconnected with columns of neurons reaching across all layers of the cortex and into all parts of the brain, essentially concur with Goleman (1996). They consider the emotionally oriented limbic systems plays a dominant role in brain functioning. Of particular relevance to Given (2000, p 72) is the capacity of the brain to produce serotonin, a 'feel good' chemical and neurotransmitter. When all systems are in a state of 'relaxed alertness', naturally produced serotonin and opioids are incorporated into biological tissues and drive the brain's continued production of these chemicals. These chemicals subsequently generate a positive energy and orientation to the learning experience being encountered by a student.

Alternatively, when confronted with emotional trauma, fear, intimidation and negative feelings of self worth, the chemical balance of the limbic system is altered and learning is inhibited. Tomlinson & Kalbfleishch (1998, p 52) report, emotional stress results in an overproduction of noradrenaline that leads the brain to focus attention on self-protection in preference to learning. Learners develop either a 'fight' or 'flight' response resulting in misbehaviour or withdrawal from the learning context.

Brandt (2000) and Gibbs (2001) express a similar concept, by postulating that, when it comes to regulating impulsiveness, humans appear to have 'fast' and 'slow' response systems. The slower 'reflective' system seeks to solve challenges, which permit a rational consideration of alternative responses. The faster 'reflexive system' emerges to deal with dangers and opportunities that are clearly immediate and demand quick action. The level of emotional intensity directly influences the choice of brain system.

The dual role that emotion plays in the learning process is further highlighted by Wolfe & Brandt (1998, p 12). They suggest the stronger the emotion connected with the experience, the stronger the memory will be of the experience. However, if the emotional influence is overwhelming, downshifting occurs and there is a corresponding decrease in the efficiency of rational thinking.

In much the same vein, Tomlinson & Kalbfleishch (1998) draw attention to the impact on the limbic system of the degree of challenge or complexity of a learning task. If a learning experience is beyond the degree of readiness for a particular student, stress results and the brain produces key neurotransmitters that impede learning. On the other hand, if the learning appears as redundant to the student, the brain is not inclined to engage or respond and consequently does not release dopamine and noradrenaline needed for optimal learning. A position supported by Jensen (2000a) who proposes, in general, a moderate level of stress optimises learning.

Tomlinson & Kalbfleishch (1998, p 52) also observed how students with different learning and thinking styles might have quite contrasting emotional responses to essentially the same stimuli. This

is a thought echoed by Jensen (1998b) who noted, a learning experience involving any diverse array of students would ultimately ensure at least some degree of emotional and personal 'baggage' would be brought to the learning experience. Religious educators need to assume there will always be some students who are emotionally vulnerable either due to their personal situations, learning capacity or preferred modes of learning. Hence, a pedagogical response should acknowledge tasks need to be structured in a manner that allows the more emotionally vulnerable students to be able to make 'a start' whilst allowing the more secure and capable learners the flexibility and freedom to pursue the 'upper limits' of learning.

In terms of religious education, an awareness of brain systems has a number of pedagogical implications:

(i) The role of emotion in the learning process has not been fully recognised in religious education. Whilst there has been some appreciation for the need to access the affective domain in order to engage student involvement (de Sousa, 1999), the 'gating' function of the limbic system has not been explored. A heightened awareness of the factors that stimulate 'relaxed alertness' (Given, 2000) or generate 'emotional stress' (Tomlinson & Kalbfeishch, 1998) is critical.

(ii) By its nature, the religious education classroom is constantly blending catechetical and curriculum outcomes. The personalised nature of evoking 'faith responses' will produce a continuum of emotional reactions. Pedagogical practices in the religious education classroom need to acknowledge and embrace the diversity of emotional response by generating safe, non-threatening learning contexts.

(iii) The degree to which the challenge or complexity of an activity in religious education impacts on the limbic system is notable. The lack of rigour (Elliott, 1998) and the repetitious nature of many religious education programs (Rossiter, 1995) indicate that a deficit of emotional stimuli may be impeding the learning process in religious education.

## Theme Four: Bicameral Brain

From a biological perspective, a predominant thesis that has infused the brain-based literature has been the concept of the bicameral brain. As early as the fourth century BC, Greek philosophers speculated that the anatomically distinct hemispheres of the brain implied specialisation of function. Of more recent times the seminal work of Sperry (1968) developed the notion that the respective brain hemispheres play significantly different roles in the learning process. His contention was that the left and right hemispheres of the brain actually function independently of each other whilst being linked by specialized connecting tissue known as the corpus callosum.

Sperry (1968) maintained the left hemisphere of the brain dealt with analytical processing, with its functioning being characterised by linear and orderly thought processes. The information processing of the 'left brain' was viewed as verbal, rational and logical. The 'left brain' endeavours to organise new information by connecting it to previous knowledge patterns, categories and schemas. Sousa (1995) concurs and suggests the left hemisphere is effective in evaluating factual material and can understand the literal interpretation of words. Sousa conceptualises the 'left brain' as a 'serial processor', capable of tracking time and sequences and recognising words, letters and numbers.

'Right brain' processing, on the other hand, according to Sperry (1968), tends to be more integrating and is capable of absorbing great chunks of information simultaneously. Essentially, Sperry would argue, the 'right brain' is more visual, spatial and aesthetic in its information processing. The right hemisphere of the brain is viewed as being capable of great leaps of insight and has the capacity to invent ideas that do not fit into previous patterns of understanding. Once again, Sousa (1995) agrees with Sperry and notes the right brain is particularly adept at gathering information from images in contrast to the spoken word. Sousa views the right hemisphere as a 'parallel processor', well suited to pattern recognition and spatial reasoning as well as possessing the capability to recognise faces, places and objects. Caine (1992, p 8) summarised the dichotomy by asserting, the left hemisphere processes the 'parts' and the right hemisphere processes the 'wholes'.

Larsen (2000, p 14), in a summary of the biological literature relevant to religious education, observes some brain functions are controlled from one side of the brain without being mirrored in the alternative side. Broadly, he concludes the left cortex is linked to verbal/logical functions (e.g. the language functions of the Broca and Wernicke areas), whilst the right cortex is more aligned to visual/spatial reasoning. Larsen believes individuals rely more on one information processing mode than the other when they approach new learning. However, he concurrently acknowledges both hemispheres are equally important in terms of processing religious concepts.

This theme was echoed by McCarthy (1990) who reasoned, when the left brain mode of thinking engages in analysis by breaking down information into parts, the right brain is concurrently seizing upon the character of the whole, seeking patterns and deriving understanding from the experience. Hence, there is a need to honour both modes of processing in the educative process and engage the whole brain when developing pedagogical strategies.

Whilst the concept of brain laterality is often cited in the literature, Armstrong (1998) and Bruer (1999) sound useful notes of caution. Whilst conceding that experimental research points to some differences in the information processing abilities of both hemispheres, both writers suggest that some of the generalised characteristics referred to by Sperry (1968) and Sousa (1995), need to be defined

more specifically. For example Bruer (1999, p 650) cites 'split brain' research that indicates visual imagery (often assumed to be aligned to the 'right hemisphere') has five distinct mental sub-components located in different parts of the brain. Similarly, he notes even the simple skill of comparing numbers requires two mental processes. The 'left brain' may process the recognition of number names whilst the 'right brain' is activated to compare the magnitude of value. Armstrong (1998) suggests the reading process is especially complex requiring a large number of neurological activities in a variety of specific locations in the brain.

Hence, from a learning perspective relying on simple generalisations about laterality to justify the selection of pedagogical strategies requires further analysis. Armstrong (1998) stresses it is impossible to educate one hemisphere of the brain at a time. He contends the whole brain works synchronously to contribute to the uniqueness and individuality of each learner. This view was strongly supported by Herrmann (1996) who believed the dichotomy of simply separating brain functioning into two categories fell well short of actually describing the differences in intellectual reasoning. Caine & Caine (1995) concur by maintaining the significance of laterality for brain-based education is that the brain processes parts and wholes simultaneously, supporting and enriching each other.

In terms of religious education, the insights gained from the bicameral model significantly influenced the development of pedagogy in the original version of the Parramatta Diocesan 'Sharing Our Story' (Diocese of Parramatta, 1988) program. Whilst functioning within the broad Shared Christian Praxis framework, both the syllabus document and accompanying support units emphasised the need to plan activities from both left and right brain modalities. The emphasis on 'right brain' oriented strategies such as clowning, drama, mediation and liturgical movement was particularly evident in many of the various support materials.

Overall the concept of the 'Bicameral Brain' is a seminal concept that challenges religious educators to balance their pedagogical repertoire across both the rational and affective domains. The emphasis on concurrently processing the parts and the wholes (Caine & Caine, 1995), challenges teachers to ensure discrete elements of content have the capacity to be combined into meaningful religious understandings.

## Theme Five: Brain-based Learning Frameworks

Building upon the concept of the bicameral brain, over the last three decades a number of more sophisticated brain-based learning frameworks have emerged. These models have been designed to assist educators to better understand the implications of differential learning preferences and to plan teaching activities to cater for diversity in the classroom. These learning frameworks are conceptualised as stable attitudes, preferences or habitual strategies determining a person's typical mode of perceiving, remembering, thinking and problem solving (Elliott, 1998, p 24).

More precisely brain-based learning frameworks can be sub-divided into two main categories (McLoughlin, 1999):

(i) Learning styles - the consistent modes of acquiring or imparting knowledge through study, experience or teaching. Essentially the manner in which people prefer to access or express their learning.

(ii) Cognitive styles - the systematic and habitual mode of organising and processing information. Cognitive models indicate each individual's preferred way of categorising and dealing with what is seen, remembered or thought about within the inner context of the brain.

In an analysis of a number of learning style models, Whitefield (2001, p 3) identified five major stimuli that may influence student learning: Biological makeup (hearing, sight…); Emotional (anxiety, confidence…); Sociological (comfort levels when working alone, in groups…); Physical (auditory, tactile, visual…); and Psychological (personality type…). It is suggested that, over time, the interrelated functioning of these stimuli combine to shape distinct preferences in the way people learn.

A foundational principle of learning style theory is that an enriched educative experience should be more geared towards a student's particular style of learning in preference to traditional intellectual ability. It suggests educators shouldn't simply ask 'Is this student smart?', but rather 'How is this student smart?'. O'Neil (1990, p 4) asserts 'at risk' students have the most to gain from teachers matching learning activities to preferred styles as traditional lecture/text book methodology does not suit many slow learners.

In terms of how the brain prefers to input data, the 'VAK' model (Ward & Daley, 1993) has been significant in the learning style literature. This model contends students tend to access learning through one of three perceptual modes: Visual, Auditory or Kinaesthetic. Proponents argue students initially will be more engaged in the learning experience if the activities are presented from the viewpoint of preferred modalities. The VAK model stresses the need for pedagogical approaches to reflect a balance of visual, auditory and kinaesthetic activities, noting especially that the needs of kinaesthetic learners are often overlooked.

Applied to religious education, the VAK process was utilised as an underpinning paradigm in the development of teaching and learning activities in the Diocese of Bathurst's (1995) secondary religious education program, *'The Christ We Proclaim'*. In particular, the resource book designed to support the program (White, 1997) outlined suggested teaching strategies which were organised with specific reference to the VAK model.

In terms of applying learning styles to religious education, Francis & Fearn (2001) explored the implications of the Felder & Silverman index with senior students in the United Kingdom. Applying the index of learning styles to students who voluntarily chose religious studies, they initially found these students exhibited a balanced variety of learning styles with no particular style dominating. Utilising a restricted array of instructive strategies, they produced limited data to suggest students with specific learning styles preferred differing pedagogical approaches. For example, 'global' learners found the discussion of issues and illustration points through poetry or literature more engaging than sequential learners. Similarly, 'verbal' learners, as one may expect, preferred lecture style input and being read to by the teacher, while 'reflective' learners had a distinct dislike for whole class and group discussions.

Francis & Fearn (2001) argued, some students may be disadvantaged by teachers who systematically under employ the pedagogical methods best suited to the students preferred learning styles. In fact, a major insight from brain-based learning theory relevant to religious education is that teachers have a real tendency to teach from their preferred style and need to be encouraged to plan activities with several broad styles in mind (McCarthy, 1990).

By recognising learning preferences, McCarthy (1990) suggests educators are better placed to assist students who rely more on one information-processing mode than others so as to access learning, especially when they approach new learning experiences. However, as the concept of learning styles has developed, an appreciation has also emerged that students not only need to encounter concepts from their own preferred style, but they needed to consolidate learning by processing concepts in less preferred modes. O'Neil (1990) highlights teaching to a student's strengths is not sufficient, emphasis should be placed on addressing weaknesses. O'Neil asserts it is valuable to provide instruction on difficult, new information through preferred styles, but it also helps to 'stretch' student thinking by utilising alternative styles. McCarthy (1990) concurs when he stresses, in reality, students need to approach learning with their whole minds, with rationality, intuition, subjectivity and beliefs all intact.

Another approach in the field of differential cognitive styles that has gained particular attention is Gardner's (1991) 'Multiple Intelligence' framework. Gardner broadened contemporary notions of intelligence to extend beyond the traditional left-brained orientations of verbal and numeric abilities. By applying specific criteria for the classification of forms of cognitive ability (e.g. comparative ability; problem solving capacity; the potency of one intelligence to operate independently from other intelligences; the origin in specific areas of the brain) Gardner expanded on the notions incorporated in the VAK model (Ward & Daley, 1993) to discern seven distinct cognitive functions[18]: Linguistic; Logical/Mathematical; Spatial; Musical; Bodily/Kinaesthetic; Interpersonal; and Intrapersonal.

18 In more recent writings Gardner (1999) is exploring additional 'intelligences', notably Naturalist and Spiritual

Gardner envisaged the articulation of intelligences would serve both as the context for the instructional program and as a medium of instruction (i.e. pedagogy).

In terms of religious education, Larsen (2000) drew heavily on the 'multiple intelligence' approach in developing a pedagogical rationale for religious instruction. Larsen contends that the dominant approach to religious thinking has been in the linguistic and logical domains. Applying Gardner's work to the religious education classroom, he suggests, to develop spiritually, students need to gain access to experiences and thinking across all dimensions of cognitive functioning.

In a similar vein, Scherer (2001, p 5) observes that, in contrast to models of learning which suggest students learn in a linear, step-by-step fashion, brain-based learning theory emphasises the cyclic nature of learning. The brain develops in an integrated fashion over time. Specific skills (e.g. talking, walking, tying shoe laces) don't appear in some lock step fashion, rather a whole raft of skills and understandings develop simultaneously. Scherer suggests that the metaphor of a learning web is a useful concept. When confronted with new learning a person often moves down to lower levels in order to build higher skill levels and shuttles backwards and forth until new understandings are embedded in consciousness. From a religious education perspective, the cyclic, integrated nature of learning indicates the importance of conceptually spiralling curriculum models that enable new concepts to be scaffolded upon existing knowledge bases.

From the viewpoint of how the brain internally manages the thinking process, educators have developed a range of cognitive processing continuums building on insights from the various personality models (e.g. Myers Briggs). Notably Kolb's (1984) continuums on perception (Sensing/Feeling v/s Thinking) and processing (Doing v/s Watching) and Price, Dunn & Dunn's (1991) conceptualisation of concrete v/s abstract and sequential v/s random learning patterns have been significant. The conceptual intersection of these continuums encouraged some educators (Herrmann, 1988; McCarthy, 1990) to conceive of cognitive models within a four-quadrant framework.

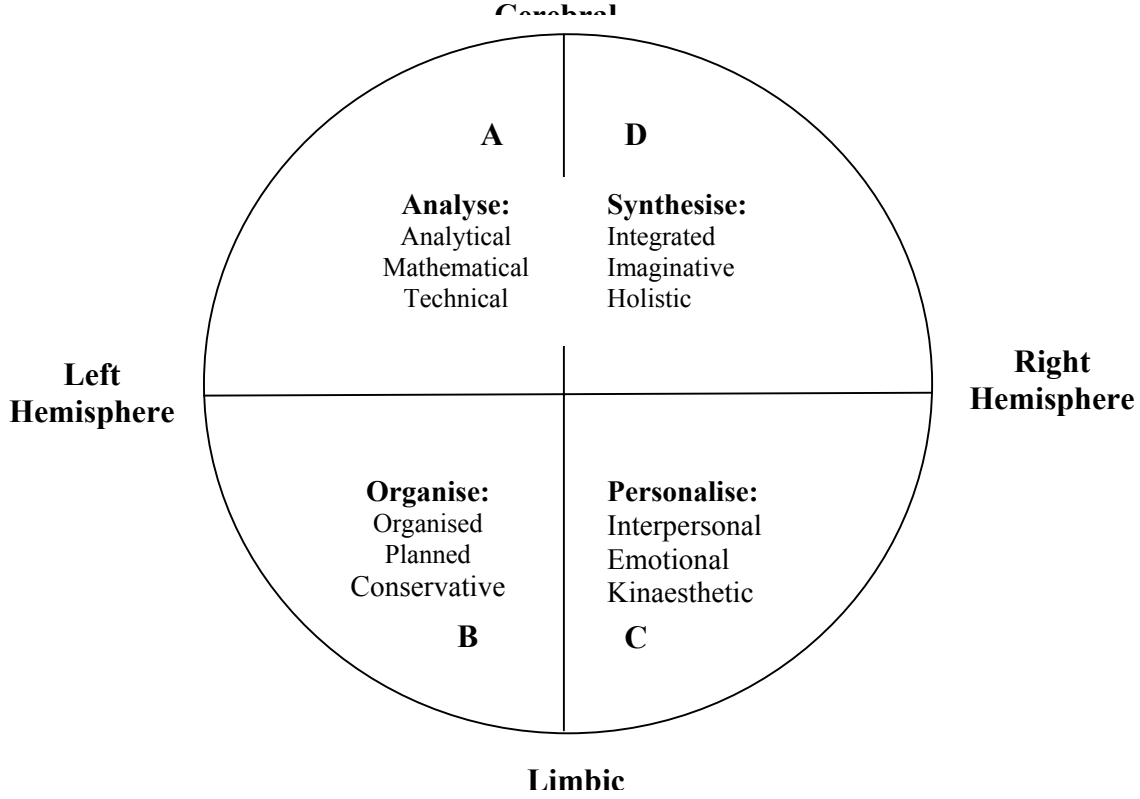
One brain-based learning model, of particular significance to this study[19,] which utilised a four-quadrant schema is Herrmann's (1988) 'Whole Brain' thinking model. Focusing on cognitive style, Herrmann sought to expand on the concept of brain laterality by incorporating the research of MacLean (1978) on the Triune Brain and Sperry's (1968) left brain/right brain functioning. Herrmann developed an image of the human brain with twin-paired structures: the two halves of the cerebral system and the two halves of the limbic system.

19 The selection and balance of teaching strategies used during the fieldwork component of the study (cf. Ch 5) was influenced by Herrmann's (1988) 'Whole Brain' model.

Essentially, Herrmann (1988) developed a metaphorical model that suggested the brain could be sub-divided into four 'thinking' quadrants (cf. Fig 2). The upper (cerebral) left 'quadrant A' mode of thinking could be described as analytical, mathematical, technical and problem solving. The lower (limbic) 'quadrant B' mode could be thought of as controlled, conservative, planned, organised and administrative in nature. The lower (limbic) right 'quadrant C' is interpersonal, emotional, musical, spiritual and the talker modes, and the upper (cerebral) right 'quadrant D' is imaginative, synthesising, artistic, holistic and conceptual. This concept allows researchers and educationalists to differentiate between both the left and right brain as well as between the cognitive intellectual brain preference (cerebral) and the visceral, structured and emotional preference (limbic).

A key element of Herrmann's (1988) discourse is that the 'whole brain' model doesn't endeavour to accurately represent the physiological structures of the brain, rather his purpose is to present a framework that acknowledges the unique thinking preferences of individuals. Herrmann's (1996) international research on over 113,000 participants illustrated most people display distinct preferences in their thinking styles. He also recognised the interactive nature of thinking. Herrmann argued within any learning style there was still a propensity towards wholeness and, even when developing learning strategies that catered especially for one domain, opportunities should be generated to engage all thinking quadrants. He further noted that, because individuals use a combination of mental preferences involving all four 'brain' quadrants, they typically shuttle back and forth between different quadrants when faced with constructing new meaning.

*Figure 2: A modified representation of Herrmann's 'Whole Brain' Model* (O'Brien & White, 2001)



Atkin (2000) adapted Herrmann's (1988) thinking into her 'Integral Learning' model (cf. Ch 3). She suggests, whilst individuals show preferences for the way in which they think about an object or issue, it is likely most people employ a combination of different processing modes in a repetitive fashion. Hence, it is hypothesised that, regardless of preferred processing styles, learning occurs most readily and effectively when whole brain processing is engaged. In particular, Atkin contends, thinking is enhanced when the learning process moves from experience, to reflection on experience (so that a 'pattern' or framework allows the learner to grasp the meaning of the learning in the mind's eye) then finally, to the facility in the brain that uses language, rules and laws. Essentially, the process is about utilising all the modes of thinking, which Atkin labels as the 'Four Ways of Knowing'. The challenge for religious educators is to develop learning experiences that form connections both between the content and the 'Four Ways of Knowing' in such a manner that nurtures a truly authentic search for meaning within the faith tradition.

To date, little research has been conducted on the Integral Learning model in general and there has been no study on its application to religious education. One limited Australian case study (Gardner & Williamson, 1994) provided anecdotal data that suggested teachers who were immersed in a professional development program consciously incorporating principles of Integral Learning (e.g. providing higher degrees of freedom so as to promote ownership of learning, emotional involvement in learning…) were significantly more positive about the learning climate subsequently generated. In terms of pedagogy, Gardner & Williamson (1994) found that teachers particularly valued visualisation, association and concept mapping strategies as they endeavoured to incorporate mental processes that concurrently promoted skill development and generated meaning. Teachers interviewed also viewed the concept of differentiating cognitive styles as a useful diagnostic tool that prompted a better understanding of students with learning problems. However, apart from visualisation strategies improving spelling outcomes, a comparative study between 'matched' classes provided little data to suggest the deliberate use of strategies to cater for all learning styles produced any discernable difference in learning outcomes. Overall, Gardner & Williamson (1994) concluded, the innovation (Integral Learning) made explicit what effective teachers knew intuitively.

Whilst the incorporation of various brain-based learning style theories have the potential to 'enrich' the pedagogical framework of the religious education classroom, a significant limitation of educational interventions based on learning styles according to Curry (1990) has been the inability of practitioners to accurately identify individual learning preferences and precisely match instructional regimes to learning needs. However, this critique displays only a limited appreciation of how learning style theory may impact in the classroom. As O'Neil (1990) notes, it is not enough to identify style without diagnosing other aspects of learning (prior knowledge, skill levels and interest levels). Similarly, in terms of broader curriculum development, brain-based learning theories emphasise the need to balance

instruction across the course of a religious education unit, rather than specifically targeting individual student learning styles.

## Theme Six: Neurotheology

The concept of neurotheology was explored in order to discern if it has any insights to offer in connecting brain-based theories to religious education. Chismar (2001) simply defines neurotheology as the neurobiological study of religion and spirituality. Begley (2001) extends the concept to include the pinpointing of brain areas involved in spiritual experiences and tracing how such experiences arise. In this regard research insights include:

- noting during intense prayer/meditation the region of the brain that controls a person's spatial orientation becomes a zone of quiet inactivity (d'Aquili & Newberg, 2001);
- focused bursts of electrical energy called 'temporal lobe transients' may be connected to mystical experiences (Persinger, 1996); and
- people who are prone to epileptic seizures in the left temporal lobe of the brain report a much greater than usual tendency to have profound spiritual experiences (Ramachandran & Blakeslee,1998).

The research in neurotheology has led some researchers (Alper, 1998; Zohar & Marshall, 2000; Trull, 2001) to tentatively propose that the existence of a certain area of the brain (notably in the front temporal lobe region) is especially susceptible to religious experiences. However, a number of researchers (Pribram, 1998; Rudd, as cited in Chismar, 2001; Albright, 2001) have significantly critiqued these findings on the basis of conclusions being drawn from an extremely limited database and the tendency of some writers to draw causal inferences from correlated data.

From a broader perspective, other neurotheologians (Ashbrook, 1989; Peterson, 1999; Zohar & Marshall, 2000; Albright, 2001) have endeavoured to explore the field from a more holistic viewpoint. Linking their thinking to broader educational insights, these researchers have postulated:

- that embedded in the limbic level there is a psychodynamic reason inherent in the human search for meaning (Ashbrook, 1996);
- one substrate for religious experience may be the limbic system (MacLean, 1996);
- the connection between ethics and religion has its basis in the empathy that is grounded in the limbic system (Nelson, 1999); and
- the imaginative dimension of right-brain cerebral functioning allows for the conceptualisation and integration of religious thought (Teske, 1996).

Overall this field of inquiry did not present any major pedagogical implications for religious education. However when considered in association with some of the holistic brain-based learning models (Gardner, 1991; Herrmann, 1996; Atkin, 2000), this field of neurotheology reinforced the importance of addressing religious issues in a manner that recognised the role of the limbic and bicameral systems of the brain.

## Theme Seven: Critical Periods

Another field of neurological research that has aroused the interest of educators surrounds the concept of 'Critical Periods'. Bruer (1998) reports a prominent theme in the neurobiological research over the past thirty years has been investigations into critical periods of development for sensory, language and motor skills. It is postulated animals must have certain kinds of experience at specific times in order to fully develop particular skills. Applied to an educational setting, a child's peak learning occurs just as the synapses are forming (Wolfe & Brandt, 1998; Diamond, 1998). The ability to adapt and reorganise relevant stimulation is crucial. Peterson (2000) speaks of a 'sensitive period' for learning. He notes children between the ages of three and twelve are capable of developing an incredible vocabulary of upwards of 100,000 words. This suggests children learn about 50 new words every day.

Bruer (1998) observes critical periods exist for different specific functions. For example the critical period for phonology (learning to speak without an accent) ends in early childhood, whilst the acquisition of grammatical functions doesn't end until 16 years of age. Other commentators (Diamond, 1998) have made similar links with the teaching of music, fine motor skills and the learning of a second language.

Sousa (1995) postulates there is a critical period of brain development in children lasting until approximately ten years of age, when a child learns faster, easier and with more meaning than at other times in their lives. Sousa suggests the critical periods are 'windows of opportunity' when the brain 'demands' certain types of input to create and consolidate neural networks. He contends, whilst later learning is possible, what is learnt during the 'window period' significantly affects what may be efficiently learnt after the 'window closes'. In terms of primary religious education classes this 'window of opportunity' could potentially be linked to a student's immersion within the 'language of the religious tradition', which having been achieved, could facilitate later explorations of the stories and values of the specific tradition.

Whilst the concept of critical periods may have some relevance for religious educators, to date the extent of research evidence specifically related to teaching and learning is extremely limited. Bruer (1998) notes, whilst neuronal systems may rely upon environmental stimuli to fine tune circuitry, nature would generally expect such fine tuning to occur naturally and hence, except in the case of

incredible deprivation, excessive amounts of intervention are unnecessary to assist children reach normal sensory, linguistic and psychomotor milestones. Further, he suggests there is little evidence to confirm that socially transmitted skills, for example reading, and hence, by inference, religious education have critical periods.

## Critique of Brain-Based Learning Theory:

In noting some of the possible educational implications that may arise from brain-based learning research, the limitations of the research base needs also to be fully acknowledged. Writers such as Bruer (1998), Armstrong (1998) and Jensen (2000a) correctly highlight there has been relatively little reliable and valid empirical evidence to support some of the 'claims' of some brain-based theorists. Operating from a positivist framework, Bruer (1999) and Armstrong (1998) both note, much of the research has emanated from a limited range of animal studies. For example, Diamond's (1988) investigation of the synaptic density of rats is regularly cited with little supporting evidence from other studies, yet inferences are being drawn with human behaviour that may or may not be sustainable.

Similarly, the degree of relevant neurological research conducted on humans is not extensive. This is illustrated by the frequency in which Chugani, Phelps & Mazziota's (1987) work on brain imaging is cited also with little or no reference to supporting studies to help reinforce the inferences suggested. The quality of human brain research has been hindered further by small sample sizes and the fact that many subjects were suffering from specific disabilities (tumours, epilepsy…). Ethical constraints, for example, can restrict researchers from chemically tracing blood flows in the brains of healthy subjects.

Bruer (1999) advanced the argument that some writers have 'simplistically' adopted a 'brain-based' approach to learning without critically scrutinising the evidence. For example, as discussed earlier, the notion that the degree of synaptic density is directly linked to learning, has not been reconciled fully with the concept that synaptic density declines in the late teens and adulthood when the brain is learning most efficiently. Wolfe & Brandt (1998) suggest relying on a 'popularist' approach to learning theory based on only a rudimentary understanding of the how the brain operates is, at best, questionable. They further point out that the rapid advances in neurological research is liable to render our 'primitive' understandings of the brain as virtually worthless in the foreseeable future. Nevertheless Wolfe & Brandt (1998, p 8) contend, if educators do not develop a functional understanding of the brain, they will be even more vulnerable to 'pseudoscientific fads, inappropriate generalisations and dubious programs'.

In response to such a critique, a number of writers (Caine & Caine, 1995; D'Arcangelo, 1998; Jensen, 2000a) have acknowledged the importance of striking a balance between the 'myths' that have emerged in the 'brain-based' literature and the genuine inferences that may be drawn by researchers

who have adopted an interpretist approach. Jensen (2000a) in particular, has addressed a number of the myths that have appeared. He contends, whilst brain-based research does not prove anything conclusively about educational practice, its real value is in suggesting particular pathways that could be beneficial to learning.

Potential pathways in this regard for religious education are the emergence of the 'Whole Brain' thinking metaphor (Herrmann, 1996) and subsequently the Integral Learning model (Atkin, 2000). Whilst these models draw on emerging insights from neurological studies, they do not endeavour to replicate the complexity of brain functioning. In contrast, they attempt to simplify the vast diversity of the brain's operation, in such a way that educators can incorporate brain-based principles usefully into curriculum and pedagogical practice.

## Conclusion:

Essentially, this chapter argues the prospective value of brain research for religious education not only affirms the shared wisdom of many common teaching practices, it potentially provides a strong rationale for integrating a range of educational principles into a coherent religious education pedagogy that emphasises learning in its fullest context. The examination and incorporation of insights from the brain-based learning literature into the pedagogy of the religious education classroom should not be seen as an end in itself, rather it should serve as stimulus for refining and enhancing existing pedagogical practices. Ultimately, the value of brain-based research will only emerge if it can be demonstrated the learning outcomes of students improve through the application of brain-based principles in the development of pedagogical strategies employed by religious education teachers.

Utilising a concept mapping methodology subsequent chapters (cf. Ch's 6 & 7) seek to discern the manner in which brain-based learning concepts can be integrated with existing insights from the broader religious education and pedagogical fields. It is suggested the intersection of these fields form the basis for a more holistic, integrated pedagogical framework to Religious Education.

# *Chapter Five*

## Action Research Methodology: Linking Theory and Practice

### *'A rationale and overview of the Action Research process'*

### Introduction:

Within the broad context of an action research methodology, this project was carried out in two major stages. Stage One focused upon the conceptual development of the *DEEP* framework utilising a concept mapping technique (Margulies, 1992; Trochim, 2000). The concept maps discerned key interrelated themes from the domains of religious education, pedagogy and brain-based learning theory. It was anticipated that the interaction between the various fields of enquiry would generate a number of pedagogical principles that could be applied and critiqued during the fieldwork component of the next stage.

Stage Two of the project involved interacting with diocesan primary Religious Education Coordinators (RECs), who were also experienced classroom practitioners, in the development and critique of the emerging *DEEP* pedagogical framework that was discerned from the concept mapping process. The focus of the research in the 'field' was a reflection upon the evaluative merit of the emerging *DEEP* principles as a framework for identifying and critiquing quality pedagogical practice. The cyclic nature of an action research paradigm enabled the researcher and participants to gradually develop and refine key pedagogical principles in light of a constant interaction between 'theory and practice'.

### Methodology Rationale: General Overview of Action Research

Action research refers to a specific investigative approach in which the researcher generates new social knowledge about a social system, while at the same time attempting to change it (Kock, McQueen, & Scott, 2000, p 4). Action research has been described as: a process of collective self-reflective enquiry (Kemmis & McTaggart, 1988); a paradigm that allows for the development of knowledge and understanding as part of practice (Dick & Swepson, 1997); and a professional experience which links practice and the analysis of practice into a single productive and continuously developing sequence (Winter, 1996).

In the context of the current investigation, there are a number of factors that suggest an action research methodology is an appropriate research paradigm. Notable reasons include action research's capacity to:

- draw links between theory and practice (Winter, 1996; McNiff, 1988; Hughes, 2001);
- synthesise meanings and address pluralistic outcomes (McNiff, 1988; Stringer, 1996; Newman, 1999); and
- promote collaborative and interventionist interactions that enhance the organisation being studied (Dick, 1993; Kock, McQueen, & Scott, 2000).

One of the underlying rationales of an Educational Doctorate is the capacity of the researcher to make a direct, positive contribution to their professional environment. The interventionist nature of this paradigm freed the researcher to positively interact with diocesan RECs in a professional development context, whilst concurrently exploring emerging concepts and ideas. The recent emergence of brain-based theory, the growing emphasis on the promotion of constructivist learning principles and the complexity of the primary school learning environment suggested an exploratory style of research was most appropriate. The professional growth of RECs, could also be more usefully explored through a flexible, interpretive and interactive research design.

McNiff (1988, p 2) notes that, in an educational context, when participants wish to improve their educational practices and to concurrently develop deeper understandings of these practices, the action research methodology is especially useful. With special relevance to this study, Rowe (1999) asserts action research is particularly beneficial in the area of cognitive research. He believes it helps educators to adapt instructional concepts to student information processing and comprehension abilities, whilst also analysing how learners comprehend concepts and react to particular strategies, thereby advancing cognitive theory itself.

The capacity of the research design to interconnect theoretical insights (i.e. brain-based learning and the emerging *DEEP* framework) with the reality of classroom practice (i.e. reflected in the evaluation of teaching strategies) was a crucial factor in deciding upon the research paradigm. Additional justifications included:

- the capacity of the methodology to explore related sub-themes (e.g. the potential for the model to contribute to the joint inter-diocesan religious education curriculum project;
- links to the Department of Education, Tasmania (2002) 'Essential Learnings' Curriculum project; and
- to articulate new meanings and clarify existing concepts (Maina, 1999) within the emerging pedagogical framework.

Within the literature, debate has surfaced as to what methodologies may be authentically termed as action research. Kemmis & McTaggart (1988, p 21) have argued strongly that action research is not 'done' on other people, but rather is a collaborative process with all participants actively and 'equally' engaged in critiquing their own work. However, other writers (Wortley, 2000) have acknowledged that whilst the interactive dimension of active research is essential, the nature of the relationship between the participants may vary.

Within this context the researcher has identified three major methodologies (Masters, 2000; Wortley, 2000; Hughes, 2001) that function along a 'design continuum' for action research projects. As summarised in Figure 3 the three methodologies can be described as:

- Technical: The underlying goal being to test a particular intervention based on a pre-specified theoretical framework;
- Participatory: Researchers and participants come together to identify potential problems, underlying causes and possible interventions; and
- Emancipatory: Emphasises empowering participants to identify and make explicit essential problems and potential responses by raising their communal perceptions.

As is indicated in Wortley's (2000) action research continuum (cf. Fig 3), the research roles and focus of the project shift in relationship to the overall orientation of the project. In the case of the current project, the initial orientation is primarily research based hence a more technical methodology is appropriate. As the project evolves a more collaborative, participatory mode emerges that allows the facilitator to alter the research focus to a more developmental, professionalising experience.

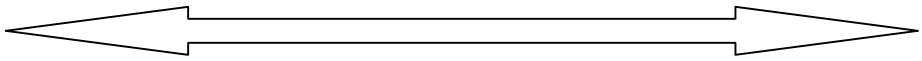
The placement of the current study within the context of the action research continuum suggests a research-oriented doctoral study at a diocesan level, by its very nature, needs to embrace a more technically oriented methodology. This contrasts with what may be possible within an individual school community that has the capacity to engage in a more genuinely collaborative interaction throughout all stages of the problem solving process.

By implementing a technical methodology, this researcher acknowledged it is the idea (i.e. linking brain-based learning concepts to pedagogical practices in religious education) that is the source of power for the action. Hence, since the idea resided with the facilitator, the control of the project inevitably rests in the hands of the researcher (cf. Research Roles: Fig. 3). As the nature of the research project evolved through the various action research cycles, the nature of the methodology and the roles of the participants shifted up the continuum and assumed a more participatory and developmental focus. As the project progressed, the researcher and RECs built a professional relationship and, as the degree of collegiality evolved, RECs generated greater input into the design of

subsequent stages of the research project. This is illustrated in Figure 3 by the shift in the action research focus from concentrating on 'experimental' data, to involving RECs in a 'developmental' and 'professionalising' process.

*Figure 3: Action Research Continuum (Adapted from Wortley, 2000)*

| Orientation | Research Focused | | Action Focused | |
|---|---|---|---|---|
| Methodology | Technical (Stage One) | Participatory (Stage Two) | Emancipatory | |
| Research Roles | Researcher & Respondents | Consultant & Participants | Facilitator & Collaborators | Co-researchers & Change agents |
| Focus of action research | Experimental | Developmental | Professionalising | Empowering |



Action Research Continuum

## Stage One: Technical Action Research: Concept Mapping

Essentially, Stage One of the research project utilises a technical methodology. The researcher employed the strategy of concept mapping to help formulate the initial version of the *DEEP* framework. Concept mapping is a structured process that focuses on constructs of interest (i.e. brain-based learning, general pedagogical insights and religious education), involving data from a multitude of sources, producing an interpretable pictorial view of ideas and concepts along with how they are interrelated (Trochim, 2000).

Based on constructivist learning principles, Novak (1991, p 3) promoted concept mapping by observing meaningful learning involves the assimilation of new concepts and propositions into existing cognitive structures. It is a technique that represents knowledge in a graphic form. Plotnick (1997, p 2) contends 'structural knowledge' provides the conceptual basis for 'why'. It describes how prior knowledge is interconnected, provides an overview of the domain of knowledge and hence allows new conceptualisations to emerge.

According to Lanzing (1997) 'knowledge graphs' embody a network of concepts consisting of nodal points and linkages that represent the relationships between concepts. The linkages can be one-way, two-way or non-directional. Some conceptual links may be categorised. They can simply be associative or sub-divided into categories such as causal or temporal relations. Two important characteristics of concept maps are, firstly, the inclusion of 'cross-links' that enables the perception of how major domains represented on the map are related to each other and, secondly, the arrangement of concepts into some hierarchical format. Novak (2004, p 2) highlights in the creation of new knowledge, cross-links and hierarchical relationships often represent the 'creative leaps' on the part of the knowledge producer.

Concept mapping, by its nature, is not linear or sequential. One of the strengths of a concept mapping process is that it facilitates lateral thinking. Many of the conceptual conclusions articulated in the outline of the *DEEP* Framework (cf. Ch 7), were stimulated by the visual arrangement of concepts without always being explicitly apparent in the concept map. Throughout the research process, a number of maps were constantly reconfigured and redrawn as conceptual insights emerged. By recording how prior knowledge is interconnected, the potential is created for a new conceptualisation to emerge (Plotnick, 1997). In themselves the final concept maps may appear to simply represent, in visual form, an array of interrelated conceptual notations. However, within the context of a 'constructivist' research design, the process of assimilating new concepts and propositions into existing cognitive structures (Novak, 1991) is, in some ways, of greater importance than the 'final product'.

## Stage One: Data Gathering and Analysis

Following a methodological format proposed by Trochim (2000) the 'Concept Mapping' process evolved through four key phases:

**Phase One: Preparation of the database**

This involved extensive reading across the three major fields of interest (cf. Chs. 2 – 4) with a particular focus on the pedagogical insights emerging from the brain-based theory domain together with an analysis of the scope and nature of religious education in Australia, particularly over the last two decades. Detailed summaries and reflective comments were progressively recorded over a two-year period.

**Phase Two: Generation of conceptual data**

Flowing from the literature review, the researcher generated an extensive array of statements that described all of the specific components identified within each field of enquiry. The statements were recorded on individual slips of paper and mounted on a display area. Through a process of analysis

and reflection, individual statements were progressively sorted and re-sorted with a view to grouping overlapping notions, identifying common ideas and discerning the concepts that appeared to be of major significance to the study. The organisational schema adopted for the mapping process involved a hierarchical pattern of linkages corresponding to the following format: Central Theme; Major Concepts; Key Notions; and Significant Ideas.

Preliminary concept maps were formulated that were progressively refined and redrawn as new data emerged from further reading. Additionally, in association with the requirements of the Doctor of Education program the data was processed and critiqued by colleagues within the context of doctoral seminars and further synthesised in a series of written papers. Through out this phase of the research the primary intent was upon recording and integrating the major concepts, key notions and significant ideas that emerged from the literature review. Phase two provided the 'structural knowledge' to underpin the research project. The outcomes of phase 2 are recorded in concept maps 1- 5 (cf. Ch 6).

**Phase Three: Structuring of the Central Themes**

Following the production of concept maps 1 – 5, the array of specific ideas were once again recorded on individual sheets of paper and coloured coded to highlight the domain of enquiry from which they emanated. On the display board, conceptual statements were sorted and re-sorted into various interrelated categories. Cross-linkages across the fields of enquiry were discerned, concepts clustered, hierarchical relationships determined and items deleted that didn't appear to have major relevance. Through an ongoing process of analysis and reflective dialogue with professional colleagues a number of central, overarching themes began to emerge that ultimately lead to the articulation of the *DEEP* framework (cf. Fig. 7: Ch 6). In essence, the focus of attention in phase 3 was to concisely articulate the 'central themes' that could underpin a pedagogical framework in religious education.

**Phase Four: Successive Representations – identification of criteria**

Following the identification of five key central themes (cf. Ch 7) several pictorial representations of the *DEEP* framework were developed. Through successive drafts the conceptual interrelationships were visually represented in the form of a structured graphical map. In particular, there was a progressive rearrangement and rearticulation of the major concepts that sat underneath the central themes, especially as a number of concepts were interrelated and overlapped across more than one theme. The primary focus during this research phase was to identify and categorise specific underlying criteria that would illuminate the broad pedagogical principles.

During phase four the researcher conducted a range of professional development sessions for teachers[20] focusing on pedagogical approaches to religious education. In the workshop sessions, participants articulated pedagogical principles relevant to their practice; critiqued newly developed teaching strategies; and reflected critically on the pedagogical concepts that were emerging from the concept mapping process[21]. The ongoing nature of reflective practice indicated some concepts lacked definition and clarity, whilst others could be better grouped under a different thematic heading. Further detailed reading and synthesis of the source data also lead to successive 'updates' on the emerging concept maps and the revamping of cross linkages and hierarchical patterns. Ultimately this 'dynamic' process led to the formulation the 'static' representation of concept maps 6 – 9 (cf. Ch 6) and the development of the preliminary version of the *DEEP* framework (cf. Fig. 10).

## Stage Two: Participatory Action Research: Fieldwork

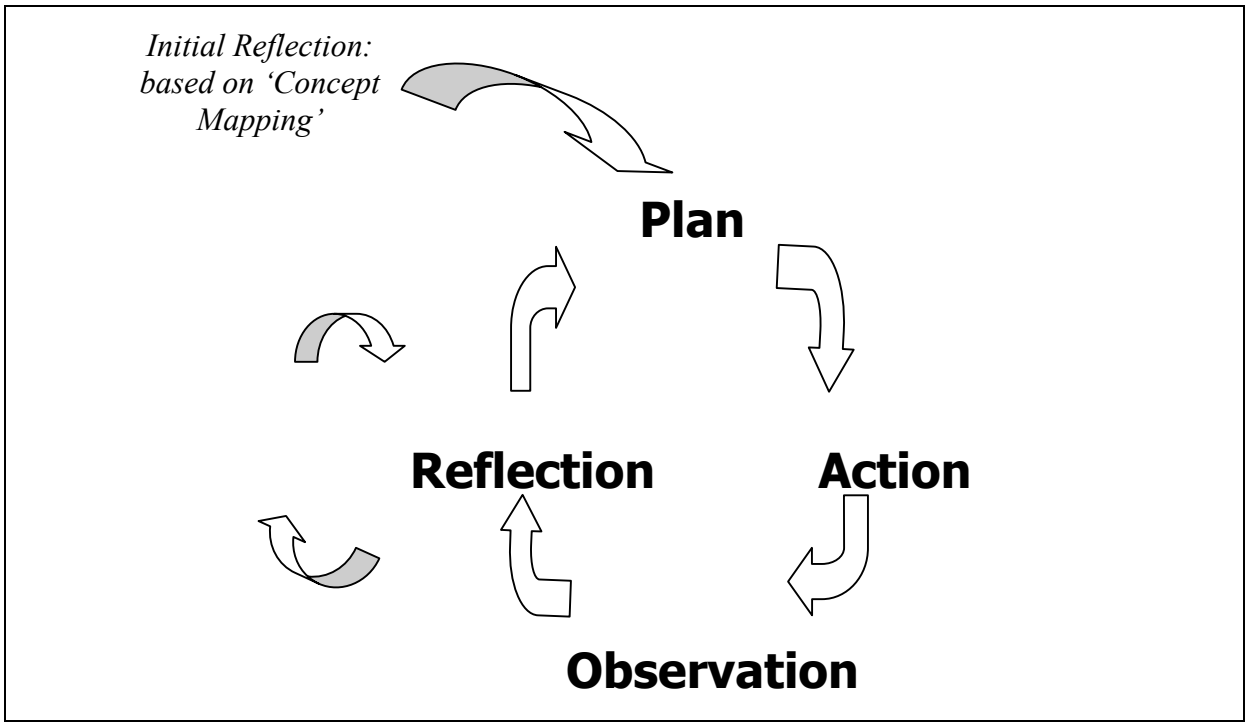
Stage Two of the project involved three phases of 'participatory' fieldwork with Archdiocesan RECs. The fieldwork followed a basic spiralling model of action research (Kemmis & McTaggart, 1988) moving through a four-step cycle: Plan; Action; Observation; and Reflection (cf. Figure 4). The 'spiralling' effect in subsequent phases acknowledges that, during the early stages of the project, some conceptual understandings (especially for participants) are vague and lacking in clarity however through the iterative nature of process, core insights and understandings are able to emerge (Seymour-Rolls & Hughes, 2001). In line with Dick's (1993) premise that the data should decide each subsequent step of the process, the initial framework and evaluation reflection sheets were revised prior to proceeding to phase 3 of the fieldwork.

The nature of the action research methodology ensured data analysis continued to evolve and be articulated throughout the various phases of the project. The reflective dimension of action research, in a collaborative setting, produced significant ongoing insights that influenced successive iterations. Combined with ongoing analysis, the researcher gathered and analysed the assorted documentary data produced as part of a triangulation process (cf. Fig 5). In this regard it was possible to discern and track the emergence of pedagogical insights that built upon the 'concept mapping' format articulated in Stage One of the project.

20 During Stage One the researcher was working primarily in the Diocese of Parramatta and the Sydney Archdiocese in NSW

21 An initial representation of the DEEP framework and the associated teaching strategies were published in the 'Into the Deep' resource (White, O'Brien & Todd, 2003)

*Figure 4: Overview of Stage Two of the Action Research Process*




Adapted from Kemmis & McTaggart (1988)

## Stage Two: Data Gathering and Analysis

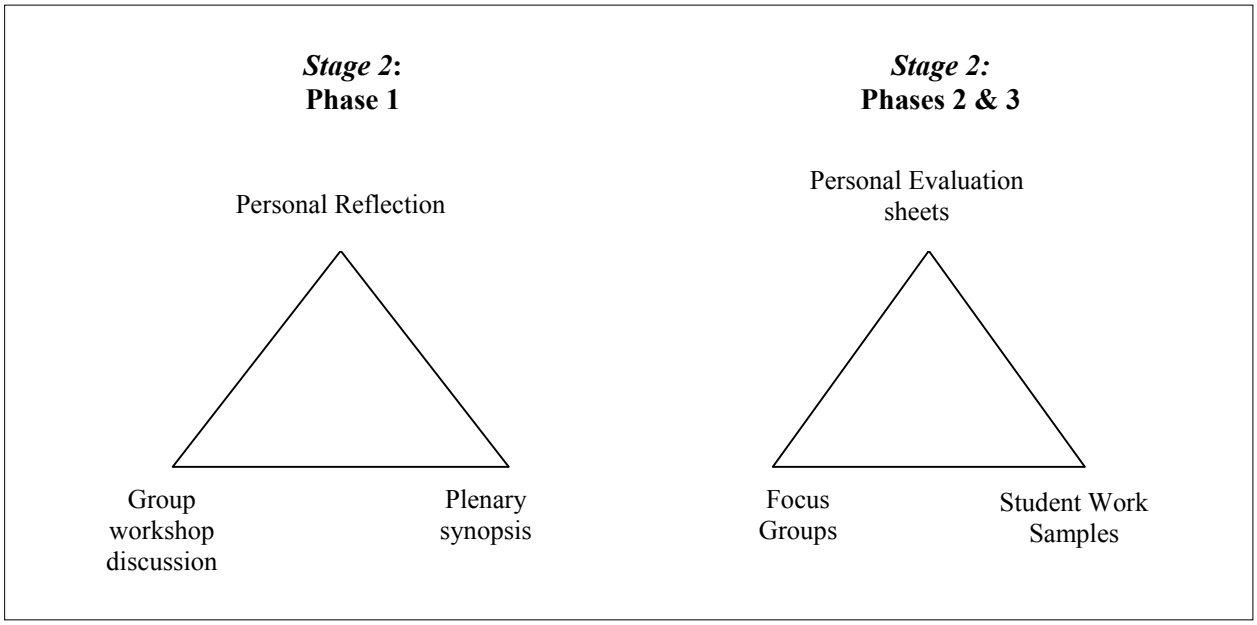
The first phase of Stage Two involved forty-four RECs attending a two-day professional development conference based on the *DEEP* pedagogical framework. The workshop sessions involved an in-depth presentation of the underlying brain-based and religious education theory. A rationale for the *DEEP* framework was also presented, combined with extensive practical workshopping of the associated teaching strategies drawn from '*Into the Deep*'.

Subsequently, phases 2 and 3 of Stage 2 involved the participation of twelve primary school RECs who volunteered to trial strategies and critique the framework within the context of their primary classrooms[22]. The RECs were all experienced primary teachers (ten years plus experience) and taught in grades ranging from Year 2 to Year 6. The spread across the grade levels was fairly even, with three participants teaching multi-age (i.e. a combination of two grade levels) primary classes. The twelve participants were arranged into two reflection teams organised on a geographic basis so as to facilitate focus group discussions. A Diocesan Religious Education Officer ('critical friend') and a secretary from the Catholic Education Office assisted the principal researcher at workshop and reflection sessions.

22 Appropriate approvals were sought and obtained from the Australian Catholic University's Human Research Ethics Committee (cf. Appendix 11). Information and consent letters are included in Appendices 8, 9 & 10

The process of data gathering reflected the relevant phases of the action research process. The data from each REC was coded, so as to allow information to be processed on both an individual and collective basis. However, subsequent analysis suggested that only the combined data was relevant to the critique of the framework. In order to address issues of validity (Holian, 1999) the data gathering was triangulated in the second stage of the project (See Fig. 5).

*Figure 5: Sources of Data – Stage Two: Triangulation Models*




The primary sources of data were the written reflective evaluations of the participants and focus group discussions. To facilitate data gathering during the later phases of Stage Two, the researcher utilised a 'Focus Group' discussion strategy (Lewis, 1995) (cf. Appendices 5 & 7). This process set out to facilitate a carefully planned discussion around a clearly defined area that potentially allowed for the emergence of a variety of perceptions in a permissive, non-threatening environment. By following a broad pattern of questioning, the process enabled open-ended discussion. Most significantly, focus group dialogue stimulated dialectic theory building (Stringer, 1996), whereby the interconnections and contradictions allowed new meanings to emerge as divergent views were compared and contrasted. A secondary data source consisted of a cross-section of work samples provided by children for each of the trialled activities. The student material was used simply for illustrative purposes during focus group dialogue and was not analysed in any detail as part of the study.

During phase 1, all workshop data was kept for analysis. As part of phases 2 and 3, RECs were provided with a reflection sheet for each activity (cf. Appendices 4 & 6). Portfolio folders were provided to facilitate the collection of student work samples. The focus group discussions were recorded, in appropriately designed booklets (cf. Appendices 5 & 7), by the researcher, the 'critical

friend' and an experienced 'minute-taking' secretary who focused on recording the flow of the discussion. The secretarial assistant objectively collated the combined 'minutes' of the focus group dialogues.

**Phase One: Professional Dialogue and Development (July, 2003)**

During conference workshops RECs were engaged in reflecting on their current understandings of what constituted good pedagogy. This established baseline data with regards to what the RECs viewed as key pedagogical principles in religious education. The reflective process included personal reflection, workshops conducted in reflection teams and 'summarising' workshops involving all participants. Specific workshop activities included 'Somersault Questions' (cf. Appendix 1) and 'Talk, Listen & Record' (cf. Appendix 2).

Throughout the conference the RECs began critiquing the preliminary *DEEP* framework (cf. Fig. 10) that was based on the Stage One concept mapping process. Three higher order thinking strategies were modelled and processed (cf. Appendix 3). At the conclusion of each activity, learning teams engaged in a process of reflective practice whereby the modelled strategy was evaluated using the *DEEP* framework (cf. Appendix 4). Groups were encouraged to articulate possible inclusions and variations to the proposed pedagogical framework.

Following the conclusion of phase 1 all workshop data was collated and analysed. In particular, the baseline data was synthesised and matched against the *DEEP* framework (cf. Ch 8: Table 1). Evaluation sheets were also collated to discern the frequency in which specific criteria were identified (cf. Table 2) and the degree to which open-ended evaluative comments corresponded to the *DEEP* criteria (cf. Table 3).

The researcher also began systematically recording reflective comments both in terms of the overall framework and the specific criteria as they emerged from the evaluation sheets. Particular note was taken of suggestions for additions and modifications to the framework that could be 'tested' in subsequent iterations and in focus group dialogue. At the conclusion of the fieldwork process, the open-ended comments from all three phases were collated and analysed for consistent themes and insights. Where appropriate, this data is embedded in the discussion in Chapter 9.

**Phase Two: Critiquing the initial framework (Term 2, 2003)**

A total of twelve[23] RECs nominated themselves to be involved in the more intensive analysis of the framework. Each REC was requested to teach and critique four 'brain-based' teaching strategies from the *'Into the Deep*' resource book across the course of an appropriate unit from the Hobart

23 Due to ill health one REC did not contribute any detailed lesson evaluations, a second participant was unable to contribute to phase three as she assumed the role of Acting Principal.

Archdiocesan religious education program (cf. Appendices 3 & 4). Participants had been 'in-serviced' with regards to the implementation of each strategy during the REC conference.

After conferring, each reflection team arrived at a consensus as to the four strategies to be utilised within their classrooms. Whilst the strategies varied markedly across the two clusters, by design they were balanced across the four 'thinking' quadrants of Herrmann's (1996) Whole Brain model. Individual RECs determined where selected strategies fitted into the 'unit pathways', appropriate to their grade level. Participants were asked to introduce the strategies to their class using the 'To, With, By' framework (cf. Ch 3: Modelling, Joint Construction, Independent Activity). It was possible for RECs to trial the selected strategies in other Key Learning Areas prior to implementation in the religious education unit so as to familiarise themselves and the students with the broad nature of the strategy, however in reality this was rarely done.[24]

The participants taught each of the nominated strategies on one occasion within the course of a normal (3 – 4 week) unit of study. After completing each specified lesson, RECs evaluated the activity, with reference to student generated work samples, using the nominated reflective proforma (cf. Appendix 4). This reflection sheet asked participants to identify the elements of the *DEEP* criteria they found to be explicitly present in the nominated strategy and to formally critique the lesson keeping elements of the *DEEP* model 'in mind'. The reflective process also included an opportunity to suggest possible modifications to the *DEEP* framework. All reflective comments and a cross section of work samples were collected for subsequent analysis and as a validation of the fidelity of participants to the research process. The data from the evaluative reflection sheets was analysed in a similar manner to phase 1 and the relevant statistical insights are recorded in Tables 2 and 3, whilst concurrently the qualitative data continued to be summarised in a systematic manner.

Focus group discussions were held towards the end of the Term 2 (early September) with each cluster group (cf. Appendix 5). During this phase the reflective discussions initially centred on analysing each strategy, in turn, utilising the *DEEP* framework. Whilst a judgment as to the 'quality' of the various lesson strategies was not the ultimate purpose of the research project, it was important during this phase for RECs to develop the skills and confidence to critique a lesson strategy in light of the proposed criteria. Flowing from this experience, participants were better equipped to begin providing meaningful and relevant feedback on the key dimensions and specific criteria of the framework.

Data from the focus group dialogue was recorded 'independently' by each of the research observers (i.e. principal researcher, critical friend and minute secretary) and combined and summarised by the minute secretary. In the focus group dialogue and the ensuing analysis particular attention was paid to

24 With only two exceptions, time constraints meant students had no prior exposure to the lesson strategy in the context of another key learning area.

exploring the rationale behind the evaluative comments that were made. Similarly, in keeping with the nature of focus group discussions, significant observations and evaluative rationale were referred back to focus group participants for validation or further clarification. Whilst the process wasn't designed to generate a consensus view per se, in the final analysis greater weighting was attached to issues around which a consensus emerged. In fact, the focus group sessions concluded with participants summarising the key issues the 'heard in common' over the ninety-minute session (cf. Appendix 5).

The data from the two regional groups was subsequently analysed and categorised under a number of thematic headings. Namely:

- Value and applicability of the broad dimensions of the *DEEP* framework
- Critical/important criteria to the evaluative process
- Clarity of descriptors
- Suggested modifications to the preliminary central themes or specific criteria
- Suggested additions and omissions
- Major issues around which a consensus emerged

Reference to this qualitative data is embedded in the analysis and discussion of the *DEEP* framework in Chapter 9.

**Phase Three: Critiquing revised framework (Term 3, 2003)**

The teaching process in phase 3 replicated the phase 2 process, with RECs trialling another four mutually discerned strategies within the context of a second unit of work, balanced across the four thinking quadrants (cf. Appendix 3). Upon the completion of each of the four 'targeted' religion lessons, the participants were asked to complete a revised evaluative proforma (cf. Appendix 6) and collect appropriate work samples. As with previous phases, a statistical analysis was conducted upon the proformas and the results recorded in Tables 2 and 3.

During phase 3 the emphasis in the reflection sheets shifted significantly from primarily critiquing the effectiveness of the lesson to analysing the usefulness of the *DEEP* framework to the evaluative process. Participants were also asked to apply each of the specific criteria within the evaluative process so as to facilitate discussion at the focus group level around the relevance and applicability of each concept (cf. Appendix 6). This data was also analysed statistically to discern the overall recognition level of each specific item and the frequency with which an item was discerned to be not applicable (N/A) to the evaluative process (cf. Table 4).

The revised reflection sheets also included a number of modified and additional criteria that had emanated from the first two phases of the fieldwork. Notable inclusions were the insertion of explicit references to religious meaning in the discernment dimension, modification to the term reflective

practice (1.5) and the testing of four additional criteria (2.6 – developmental levels; 3.7 – co-constructed learning; 4.5 – time efficient and manageable; and 4.6 – role allocation) (cf. Appendix 6).

Focus group discussions concentrated on critiquing the *DEEP* framework in light of its capacity to inform the evaluative process when reflecting on specific lesson strategies (cf. Appendix 7). Whilst a number of the stimulus questions replicated the pattern of discussion conducted in phase 2, a significant proportion of the dialogue centred on endorsing, modifying or deleting specific criteria. Once again emphasis was placed upon articulating a rationale for responses and an endeavour was made to discern the 'consensus opinion' with regards to specific items.

In terms of data analysis, comments were tracked and synthesised under similar categories as utilised in phase 2. An additional component of the process involved tracking commentary around the specific criteria and analysing the reasons behind the inclusion or deletion of particular items.

## Participants:

Stage Two of the research involved interacting with Religious Education Coordinators (RECs) from the Archdiocese of Hobart. The choice of RECs as participatory researchers was governed by a number of factors:

- By the nature of their selection to the role of REC, participants would be seen to be credible, experienced teachers of religious education. All participants were required to have at least ten years teaching experience, have completed a significant level of formal study in the area of religious education and have fulfilled the role of REC for a period of at least two years.
- As RECs, participants would have a thorough understanding of the current Archdiocesan curriculum units and possess a sound knowledge of the relevant theological content. Hence, from a teaching perspective, they would be better placed to embrace new pedagogical techniques emphasising higher order thinking processes without the concern of deficits in their conceptual base.
- Generally RECs would also have had some experience in supervising and critiquing teaching programs presented by colleagues as well as evaluating commercially produced material. Consequently it was expected that they would be able to articulate a range of evaluative principles and insights relevant to the demands of the research project.
- Given the professional focus of an Educational Doctorate, RECs were seen as pivotal to the process of curriculum renewal that was being undertaken in the Archdiocese. The involvement of RECs was not only designed to utilise and extend their personal professional skill base, but also to empower them as key instructional leaders during the development and implementation of the new religious education syllabus.

## Research Instruments:

The following instruments were utilised to collect data during Stage Two of the project:

*Phase 1:*

(i) Somersault Discussion (O'Brien & White, 2001: Strategy 6.2) (cf. Appendix 1)

(ii) Talk, Listen, Record activity (O'Brien & White, 2001: Strategy 4.4) (cf. Appendix 2)

(iii) Reflective Evaluation Sheet #1 (cf. Appendix 4)

*Phase 2:*

(iv) Reflective Evaluation Sheet #1 (cf. Appendix 4)

(v) Focus Group Discussion Booklet #1 (cf. Appendix 5)

*Phase 3:*

(vi) Reflective Evaluation Sheet #2 (cf. Appendix 6)

(vii) Focus Group Discussion Booklet #2 (cf. Appendix 7)

## Summary of the Research Process:

Overall the research process evolved through two major stages (cf. Fig 6). Stage One utilised technical action research methodology and was accomplished through four developmental phases using a concept mapping technique to draw insights and linkages from the major fields of enquiry. Stage Two shifted along the action research continuum and incorporated a participatory methodology. This stage contained three research phases leading to the practical application and critique of the *DEEP* framework in classroom settings as summarised in Figure 6.

*Fig 6: Overview of Action Research Procedure*

| **Stage One Technical** | **Process Elements** | **Data Sources** | **Key Participants** | **Key Outcomes** |
|---|---|---|---|---|
| Phase One | Preparation of Data Base | Reading across 3 major fields of enquiry | Researcher | Detailed Summaries<br>Reflective Comments<br>Literature Review (cf. Chs 2 – 4) |
| Phase Two | Generation of Conceptual Data | Literature Review | Researcher<br><br>Doctoral colleagues | Structured Knowledge<br><br>Maps 1 - 5 |
| Phase Three | Structuring of Central Themes | Maps 1 - 5 | Researcher<br><br>Professional colleagues | Articulation of overarching themes<br><br>*DEEP* Framework |
| Phase Four | Successive Representations – identification of criteria | Maps 1 – 5<br><br>Professional Development Seminars | Researcher<br><br>Teacher Respondents | Detailed representation of Preliminary *DEEP* criteria<br><br>Maps 6 - 9 |
| **Stage Two Participatory** | | | | |
| Phase One | Professional Dialogue and Development<br><br>Initial Evaluations of Modelled Activities | Somersault Questions<br><br>Talk, Listen & Record<br><br>Evaluation Sheet #1 – based on Maps 6 - 9 | Researcher<br><br>Combined Archdiocesan RECs | Baseline Data – Pedagogical Criteria<br><br>Use and critique of *DEEP* Framework |
| Phase Two | Teaching 4 nominated strategies<br><br>Critiquing initial framework | Evaluation Sheet #1<br><br>Focus Group #1 | 12 Primary RECs | Implementation and critique of *DEEP* Framework<br><br>Revision of Framework |
| Phase Three | Teaching 4 nominated strategies<br><br>Critiquing revised framework | Evaluation Sheet #2<br><br>Focus Group #2 | 12 Primary RECs | Use and critique of revised *DEEP* Framework<br><br>Further revision and validation of Framework |

## Use of Controls:

Action research is not 'controlled' to the extent of more traditional models. As McNiff (1988) observes it is 'principled action' based on rational thought. It is arguable, especially in the context of the current study, controls normally associated with positivist, empirical research are not appropriate when addressing a holistic question in an educational context. The capacity of the research to respond to emerging issues and to develop a functional pedagogical framework would be greatly inhibited. Further the ability of a research methodology to isolate specific pedagogical principles and measure the impact of learning tasks from the fabric of the overall classroom environment would be inherently complex and difficult. This is especially the case given, at this point in time, the lack of rigour evident in the assessment of conceptual development in primary religious education and need to develop assessment tools that provide valid insights into the degree of student learning against meaningful, objective assessment rubrics (White & Borg, 2002).

Notwithstanding the above, the action research model has some design similarities with a quasi-experimental procedure (field experimentation, low in control). Within the present study there were some limited control of variables. Specifically:

- Age range of the students: Restricted to primary age children from Years 2 – 6 (i.e. approximately 7 – 12 years of age)
- Professional experience of participants: Individual participants were all experienced religious education teachers with a minimum of ten years teaching experience. They all held the leadership position of Religious Education Coordinator in their respective schools and had performed in the role for at least two years.
- Exposure to the specific learning tasks: No participants had taught any of the designated tasks prior to the research project. Students 'at best' were exposed to only one 'modelled' activity prior to undertaking the task.
- Prior professional development experience of participants: All participants undertook the same professional formation program and none had had prior experience of workshops involving higher order thinking skills and pedagogical practice in the context of religious education.

Overall, it was recognised that inappropriate controls could have inhibited the insights gained from the project. The rigour for the research emerged from the systematic progression through the range of pre-ordained phases and a reliance on regular 'public critique' both during and after the process to establish its credibility (McNiff, 1988).

## Constraints/Limitations:

The choice of any research methodology is confronted by a number of challenging issues that may ultimately impact on the veracity of the study's findings. The design of this action research project needed to address both a broader critique of the actual methodology as well as the potential challenges inherent in the particular research project.

From the broader perspective key constraints and limitations included:

- Action research's capacity to address the external validity of research findings (Holian, 1999; Newman, 1999);
- the use of multiple iterations to achieve internal validity (Kock et al., 2000); and
- problems of replication and generalisability (McNiff, 1988; Dick and Swepson, 1997).

One of the greatest challenges facing an action research methodology is its capacity to address criticisms around the validity of research findings. In its broadest sense, Holian (1999, p 7) refers to validity as that well-founded notion, which is not only right but also useful or illuminating to the actors. McNiff (1988, p 131) suggests that validity arises from being able to demonstrate in practice that the claims being made can be backed up in a sustained manner. That is to say, does the research really do the things it claims to do and are the results believable?

From the outset some authors defend questions of validity in the context of action research by arguing that the parameters of a positivist paradigm should not be used to judge the legitimacy of another paradigm. Holian (1999) contends that a concept of research based on the accumulation of facts is a notion designed to delineate theory and practice. However action research regards theory and practice as contingent and interdependent (i.e. the evaluation of teaching strategies using *DEEP* criteria was helping shape and clarify the theoretical basis for the framework). Similarly, Newman (1999) believes objective knowledge is not the primary focus in action research, rather discerning what is problematic and raising new questions is significant. She suggests that validity arises from shared discussion and the degree to which ideas generated resonate with a broader audience (i.e. the degree to which RECs accept and utilise the evaluative criteria). Connole, Smith & Wiseman (1993) refer to this concept as face validity, which is achieved by the researcher recycling analysis, categories and conclusions back to the respondents on a regular basis until a consensus of ideas emerge.

Recognising the importance of validity in any research project, Holian (1999) highlights a number of design strategies that would serve to enhance the validity of an action research study. Linked to the notion that validity is derived from 'well-founded' conclusions, the triangulation of data and multiple iterations are perceived to be of pivotal importance. The provision of multiple sources of evidence serve to reinforce validity as they add up to a 'chain of evidence' which can be shown to underpin concept and theory development. In the context of this study, drawing explicit links between the

professional literature, emerging conceptual models and specific research data was crucial. In terms of the data gathering, multiple insights into the same conceptual dimension is vital, whilst specific triangulation strategies were employed during the fieldwork phases (cf. Fig. 5).

However, whilst appreciating the merits of a generalised defence, this researcher suggests it is still critical to appreciate that validity has a number of more specific nuances that need to be considered in the design of this action research project. A fundamental precept of traditional research methods is the capacity for replication. McNiff (1988) observes this approach relies on making predictions based on replicating data under controlled conditions that, if duplicated sufficiently, may contribute to the emergence of theory. Essentially, an 'external observer' style of interaction.

In contrast, action research attempts to understand the world from an internal perspective with researchers attempting to solve their 'own problems' (i.e. what rationale should teachers use to underpin their pedagogical practice in religious education). Hence Kock et al. (2000) observe action research is seen as inappropriate in the production of models with high external validity (i.e. valid outside of the research project). This is invariably because an action research project involves a small number of client organisations with greater emphasis on 'in-depth' studies. Consequently the generalisability of findings across a number of organisations is inhibited.

Dick & Swepson (1997, p 6) extends this issue by commenting, whilst action research may give answers that are specific to a particular situation, the concept of generalisability is over valued. They contend, the level of generalisation emerging from scientific experimentation is difficult to relate to complex social situations. Generalisability might be regarded as having 'global relevance'; however action research is designed to pursue 'local relevance'.

This is particularly the case in the current study where the research findings are intended to impinge directly on the professional development of diocesan teachers and influence the introductory developmental phase of a new Diocesan religious education curriculum. Hence, it is accepted that extensive generalisability may not be possible. Nevertheless, it would be hoped that some of the insights gained could act as a catalyst for religious educators in other diocesan systems to begin exploring alternative pedagogical approaches. As McNiff (1988) reasons, the validity of what is claimed would be the degree to which a concept is useful or relevant in guiding practice for particular RECs and its power to inform and precipitate debate about improving practice in the wider professional community.

In contrast to external validity, Kock et al. (2000) suggest that it is possible to attain a measure of internal validity using an action research paradigm. They contend that the multiple iterations of a cyclic action research model, combined with a rigorous regime of data collection and analysis,

strengthens the research findings. This happens by progressively building upon insights and increasingly aligning (or separating) the researcher's conception of the socio-technical system with the underlying theoretical model. Connole et al. (1993, p 273) concur; they assert that a form of 'construct' validity is generated by the researchers altering their perspectives in light of the logic of the data or by noting how categories in the literature are compatible or incompatible with the categories arising from the language of the respondents.

In this context, it is arguable that the insights being generated by the brain-based learning theory and the subsequent *DEEP* framework were progressively sustained or 'found wanting' as the RECs reflected upon their evaluations of various learning tasks over successive iterations of the action research cycle. As Connole et al. (1993, p 273) observe, it is the processes of self-reflexivity and dialectic theory building that is especially significant. It is necessary to acknowledge the interpretive community creates it own sense of 'reality'. While accepting this 'reality' is still an interpretation, it is, albeit, a more widely shared understanding than the individual researcher's own personal construction.

A further form of validity that has particular relevance for this project is the notion of 'catalytic' validity. Connole et al. (1993) speculate that the degree to which research re-orients, focuses and energises the participants is indicative of a form of catalytic validity. Similarly, Newman (1999) postulates that if action research is to have any validity then it has to show that what the researcher set out to change is indeed changeable, by providing demonstrable evidence that changes in practice have indeed occurred. Holian (1999) extends the notion further by postulating the level of new ideas or emerging possibilities, that surface from the project, add validity to the overall theoretical and practical directions.

In the current research situation, the emergence of the initial *DEEP* framework from the concept mapping process was in itself a significant conceptual outcome. Catalytic validity was further enhanced by the manner in which RECs embraced the teaching and evaluation of learning tasks premised on *DEEP* principles with a high degree of passion and enthusiasm. Inferences regarding catalytic validity could be supported, as Connole et al. (1993) observe, when changes were verified by the triangulated data and not simply by relying on the self-reports of RECs.

In terms of specific design elements within the current project, a number of constraints needed to be identified. As the action research model was oriented to professional growth, the role of the researcher in leading the professional development components of the project (Webb, 1996) and the objectivity of a participant researcher (Welch, 1998; Hughes, 2001) needs to be recognised. As the action research model commenced from the 'technical' end of the continuum (cf. Fig 3), where the researcher had already developed an initial conceptual model, developing shared ownership of the research

problem and goals was a challenge. The 'persuasive' and 'authoritative' articulation of concepts by the researcher, that are to be the subject of later critique, significantly reduces the potential for objective critical responses. This was particularly noteworthy with reference to the articulation of the emerging *DEEP* pedagogical framework and the modelling of potential teaching and learning tasks based upon *DEEP* principles.

Wortley (2000) highlighted the difficulty that exists when power inequities are evident between the researcher and participant. The position of authority[25] of the researcher in relationship to RECs in the Diocese could potentially have resulted in RECs feeling obliged to participate in the project. Similarly, the authority and expert status of the researcher could also have inhibited the extent and veracity of their reflections if they were perceived to be in conflict with the researcher. Furthermore the process of validating the *DEEP* model could be further comprised if the status of the researcher generated, over time, a 'desire to please' response from the RECs. Potentially the combination of the 'training/practice' effect and the willingness to appear 'helpful' could influence participants to affirm the particular point of view the senior authority/researcher is perceived to value. In essence there is an inherent danger that the action research process may validate the effectiveness of the 'training' in contrast to validating the conceptual issues under investigation.

Further constraints include the capacity of co-researchers to accept 'change' and 'be changed' (Hughes, 2001, p 2) and the potential gap that may exist between the needs of the client organisation (i.e. the needs of the classroom) and those of the researcher (i.e. the Archdiocesan professional and curriculum development objectives) (McNiff, 1988; Kock et al., 2000). At any one moment of time, a multitude of factors (e.g. the readiness of the students, changes to class timetable, disruptive students…) can intervene and alter the nature and focus of the proposed learning experience. The research process must recognise that the realities of classroom life can both enhance and inhibit the research goals.

The design response to the majority of these issues rested in recognising and articulating their potential impact. This was exemplified in the pre-briefing of the RECs where the following issues were clearly highlighted and discussed:

- ethical concerns (e.g. potential impact on career; freedom to withdraw …);
- design restraints (e.g. expert status of the researcher, encouragement to present alternate viewpoints …); and
- competing professional needs (e.g. timing of class lessons, demands of school programs …).

25 The researcher is the Diocesan Director, a senior educational leader, responsible for the supervision of schools across the Diocese and would have significant influence over the future career prospects of participants.

The presence of an impartial 'critical friend' and an administrative secretary at all sessions, contributed to generating an objective, structured yet non-threatening environment. Further, the selection of experienced RECs, who had been thoroughly inserviced in the *DEEP* framework, in preference to classroom teachers provided a stronger platform for objective dialogue and reflection.

As the project evolved into a more collaborative project through focus group dialogue, the researcher endeavoured to guard against entering too wholesomely into the reflective discussions in contrast to simply facilitating the process. The involvement of the Diocesan Religious Education Officer as a 'critical friend' and the subsequent independent collation of focus group data by the administrative secretary partially addressed some concerns regarding 'objectivity in hearing key themes' or 'dialogue being shaped to elicit preferred outcomes'. Additionally, the inclusion and collection of triangulated data (reflective evaluation sheets, student work samples), which did not directly involve the researcher, helped validate perceptions discerned in the focus group process.

## Conclusion:

In essence, the choice of utilising an action research methodology was about recognising and accepting a number of conceptual 'trade-offs'. The decision of this researcher to choose an action research paradigm that fostered professional growth and change was indicative of a preference for responsiveness over replicability, local relevance over global relevance and the value of multiple contextual interpretations over discerning universal principles. Additionally, it was a recognition that, at this point in the research cycle, the links between religious education and pedagogical principles stimulated by brain-based learning theory are still only tenuous. The exploratory nature of the paradigm allowed conceptual associations between brain-based theory and religious education to emerge into a pedagogical framework through interaction in a professional setting. Once articulated, the emerging precepts could be further researched under more 'controlled conditions' in subsequent studies.

Nevertheless, the qualifications surrounding the research project, especially with regards the researcher's strong 'professional ownership' of the *DEEP* framework emanating from the concurrent publication of the *'Into the Deep*' resource book, the professional supervisory role of the researcher and his involvement as a participant observer in the project all need to be fully acknowledged.

# *Chapter Six*

## Action Research: Stage One - Conceptual Outcomes

## *'A presentation of the DEEP concept maps'*

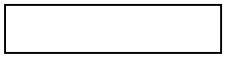
### Introduction:

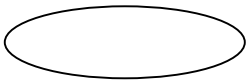
The purpose of this chapter is to present concisely, the diagrammatic data that emerged from Stage One of the action research study. This chapter contains an array of concept maps that serve to underpin the formulation of the initial version of the *DEEP* framework. Associated with the maps are the explanatory notes highlighting the major concepts and key notions linked to each of the nine central themes. The first five maps present a synthesis of literature (cf. Ch's 2 – 4). The final four maps integrate insights from the literature into a coherent pedagogical framework. A detailed analysis and discussion of the *DEEP* framework follows in Chapter 7.

### Action Research Stage One: Concept Mapping

The focus in Stage One of the research project was on discerning the theoretical concepts that would underpin the proposed *DEEP* framework. The emphasis was on identifying interrelated conceptual data through the concept mapping process. As discussed in the methodology, the concept maps evolved utilising Trochim's (2000) process. Following extensive reading across the three main fields of enquiry ('preparation'), the initial series of maps were 'generated' depicting major conceptual themes. Reflecting the fluid nature of the concept mapping process, themes and ideas were arranged and rearranged until a pattern began to emerge.

As a general organization schema the maps were hierarchically 'structured' in the following manner[26]:

Central Theme: 

Major Concepts: 

Key Notions: 

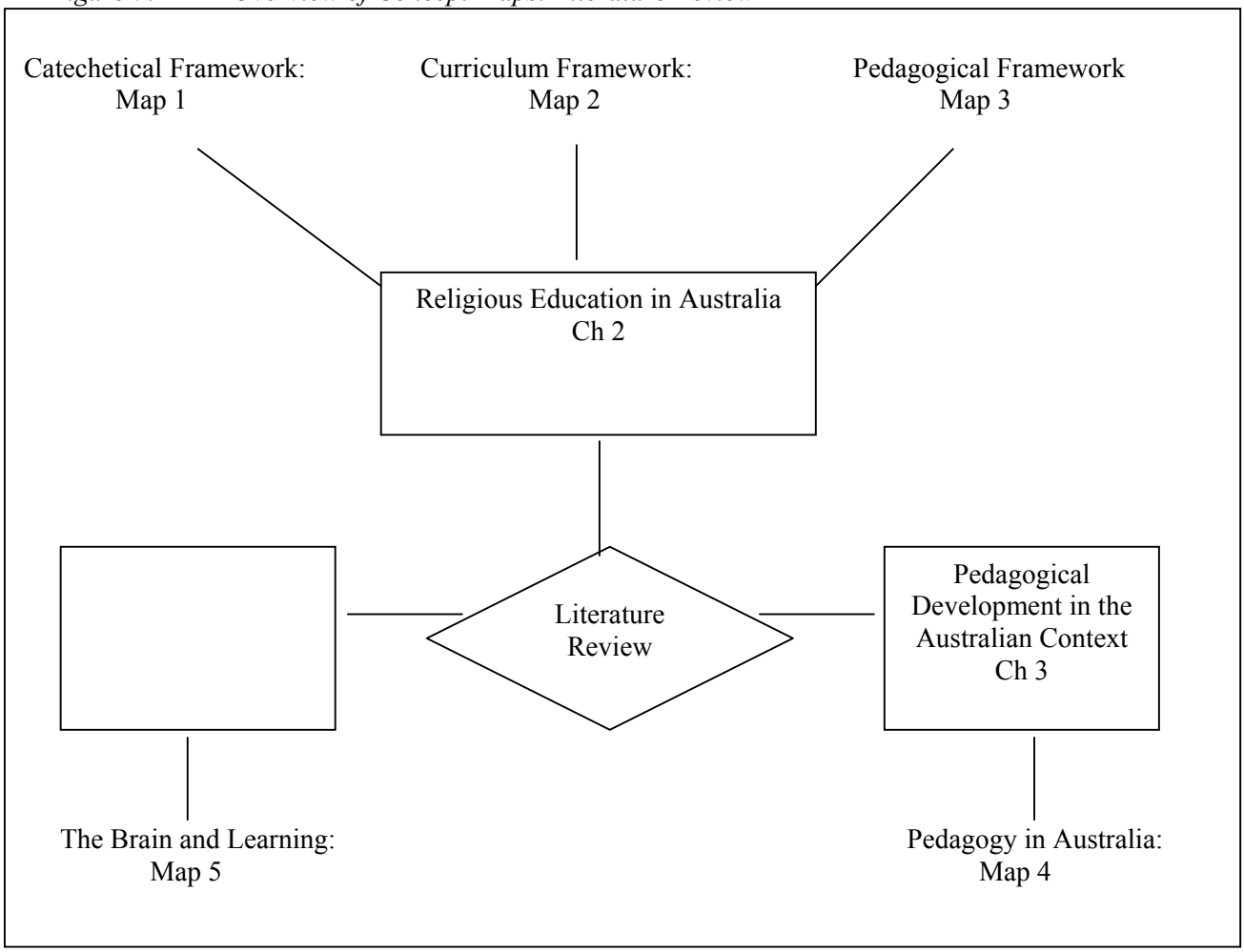
Significant Ideas: 

26 Hand drawn maps were translated onto computer by utilising the 'Inspiration' software program.

The structuring process clustered concepts, demonstrated hierarchical relationships and, where appropriate, highlighted major cross linkages[27]. To assist with the interpretation of the concept maps the data was coded using a graduated numerical sequence. For example, if the central theme was labelled as 1.0, major concepts were accordingly labelled 1.1; 1.2; 1.3….., whilst key notions flowing from the themes were accorded 1.1.1; 1.1.2; 1.1.3 and so on. This coding system, whilst being useful for the purpose of quickly locating and cross-referencing concepts, contains an inherent limitation. As noted in the methodology (cf. Ch 5) the cognitive processing dynamic evident in the mapping process is not linear or sequential, hence the interrelated nature of many concepts is not fully revealed.

The initial set of maps (Maps 1 – 5) represent a conceptual synthesis of the literature review as developed during the technical stage of the action research project (Stage One: Phase Two) as highlighted below (cf. Fig 7):

*Figure 7: Overview of Concept Maps: Literature Review*




27 The interrelated nature of the data (especially within the brain based literature) suggested numerous cross linkages that were not displayed for purposes of visual clarity.

### *Map 1: Catechetical Framework for Religious Education*

Flowing from an analysis of the key conceptual frameworks apparent in the context of Australian Religious Education (cf. Ch 2), this map highlights two major concepts:

(i) The basic orientation of catechesis (1.1), particularly with regards to a search for meaning (1.1.1); its transformative nature (1.1.2); and the shifts in the historical context (1.1.3).

(ii) Contemporary models of catechesis (1.2), with an emphasis on critical reconstruction (1.2.1) and Shared Christian Praxis (1.2.2) that are especially relevant for this study. This map also highlights a detailed critique of the praxis model.

### *Map 2: Curriculum Framework for Religious Education*

This map presents the second of the conceptual frameworks developed in Chapter 2. Following a similar structure, the map draws attention to two major concepts:

(i) The basic curriculum orientation in religious education (2.1), noting particularly, concerns with the catechetical framework (2.1.1) and the nature of the educational paradigm (2.1.2).

(ii) An overview of the major curriculum models (2.2), focusing on a critique of curriculum documents (2.2.1); major limitations of a curriculum focus (2.2.2); and the positive outcomes evident within a curriculum framework (2.2.3).

*Map 1: Catechetical Framework for Religious Education*

*Map 2: Curriculum Framework for Religious Education*

### *Map 3: Pedagogical Framework for Religious Education*

This third map completes the analysis of the Australian Religious Education context (cf. Ch 2). Reflecting its pivotal focus, five major concepts were identified in the mapping process:

(i) The basic pedagogical orientation in the literature (3.1) highlighting: key definitions (3.1.1); absence from the literature (3.1.2); and the capacity of pedagogy to bridge the gap between catechetical and curriculum models (3.1.3).

(ii) Links to constructivist learning theory (3.2) particularly with regards to the core concepts (3.2.1) and cross-linked to ways of knowing (3.2.2).

(iii) An orientation towards wholeness (3.3) containing the key notions of authentic knowing (3.3.1); ways of knowing (3.3.2); and the points of intersection (3.3.3), thereby suggesting a holistic approach to learning may be the unifying element of any pedagogical model.

(iv) Other key focus areas evident in current approaches to pedagogy in religious education (3.4) including: constructing meaning (3.4.1); relevance and personalism (3.4.2); promoting understanding (3.4.3); the affective domain (3.4.4); and the development of thinking skills (3.4.5).

(v) The manner in which a pedagogical approach would address the weaknesses evident within a curriculum framework (3.5). Key notions that are incorporated include: outcomes (3.5.1); rigour (3.5.2); repetition (3.5.3); and relevancy (3.5.4).

*Map 3: Pedagogical Framework for Religious Education*

### *Map 4: Pedagogy in Australia*

This map presents a conceptual overview of contemporary pedagogical developments in the Australian context (cf. Ch 3). Whilst appreciating that, within the context of this study, the literature review reflects only a brief overview of the relevant literature, four major concepts are discerned:

(i) The emerging constructivist orientation of many syllabus documents across Australia (4.1), particularly in Queensland, Western Australia, Tasmania and South Australia.

(ii) Examples of pedagogical models prominent in contemporary practice (4.2). Key notions include an increasing emphasis on critical and lateral thinking (4.2.1); Cooperative learning (4.2.2); the 'To, With, By' instructional model in literacy (4.2.3); and the emergence of approaches to civics education (4.2.4).

(iii) A number of models and syllabus documents have been underpinned by pedagogical research (4.3). Issues that are explored include: *DEEP* Learning (4.3.1); the Victorian 'PEEL' pedagogical project (4.3.2); the Queensland based 'Productive Pedagogies' research (4.3.3); and continuing interest in Cooperative Learning (4.3.4).

(iv) An overview of the pedagogical principles underpinning a number of prominent Australian Diocesan Religious Education curriculum documents (4.4) notably with regards to Melbourne, Brisbane, Parramatta and Sydney.

*Map 4: Pedagogy in Australia*

### *Map 5: The Brain and Learning*

Emerging strongly from the literature review on brain-based learning (cf. Ch 4), this map represents a synthesis of the concepts relevant to pedagogical practice that have evolved from neurological research. By nature of its central role in this study, the map displays a detailed and complex interrelationship of concepts. As noted earlier, for the sake of visual clarity, the mapping process is inadequate to symbolise the web of conceptual interactions that are evident within this field of knowledge. Overall, six major concepts are identified:

(i) The meaning making orientation of the brain (5.1) highlighting the importance of connections (5.1.1); relevance (5.1.2); integration (5.1.3); the need for challenges (5.1.4); patterning (5.1.5) and the individualised nature of the meaning making process (5.1.6).

(ii) Specific neurological research (5.2) identifies a number of relevant key notions. Notably, synaptic connections (5.2.1); environmental stimulation (5.2.2); synaptic density (5.2.3); memory (5.2.4); cognitive processing (5.2.5) and attention span (5.2.6).

(iii) An exploration of neurotheology (5.3) especially with regards to linking spiritual experiences to brain activity (5.3.1) and the holistic nature brain functioning in a spiritual context (5.3.2).

(iv) Research on brain systems (5.4) over time has progressively revealed a number of key pedagogical notions, chiefly: the bicameral brain (5.4.1); the triune brain (5.4.2); the impact of emotion on brain functioning (5.4.3); and the pivotal role of the limbic system (5.4.4).

(v) Reflections on brain-based research have led to the development of a number of constructivist learning principles (5.5). Key notions incorporate insights on intelligence (5.5.1); learning styles (5.5.2); thinking preferences (5.5.3); and cooperative learning (5.5.4).

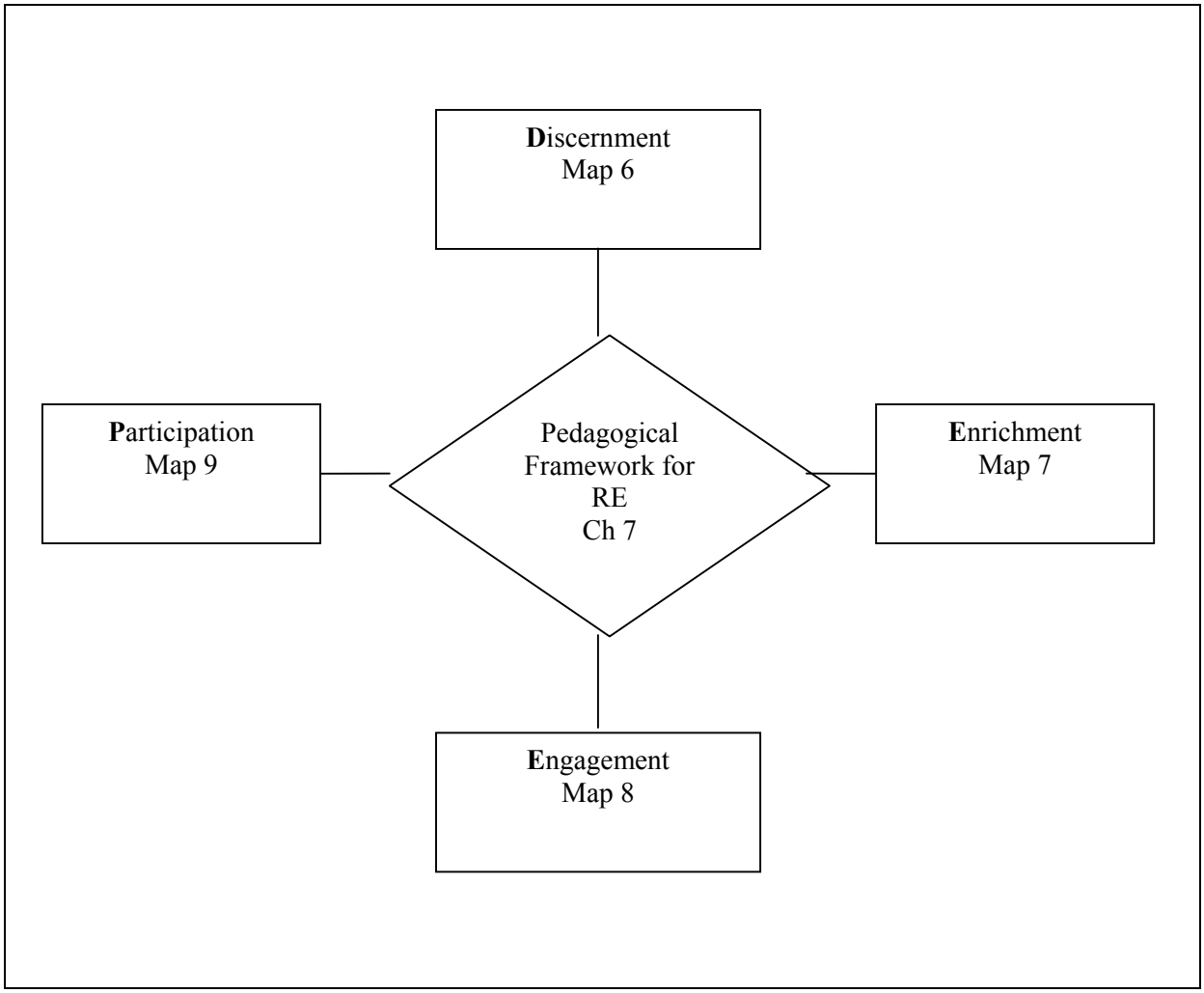
(vi) Balancing the assertions of brain-based learning researchers theoretical limitations and reservations are identified (5.6) so as to temper and refine pedagogical extrapolations, especially in the field of religious education.

*Map 5: The Brain and Learning*

## Concept Maps linked to the *DEEP* Framework:

Of major importance to this study, the second set of concept maps, visually demonstrate the outcomes of analysing the three fields of enquiry (cf. Stage One: Phases Three & Four). It is the discernment and integration of the various pedagogical themes that provide the basis for a comprehensive, coherent pedagogical framework for religious education. These concept maps constitute the organisational structure for the *DEEP* pedagogical framework (cf. Fig. 8), described, in detail, in Chapter 7.

*Figure 8: Overview of Concept Maps leading to the DEEP Framework*



***Map 6: Discernment: The generation of personal meaning and understanding (6.0)***

This map represents the first of the central themes that emerged from the research project, namely the significance of a pedagogical approach that enables the discernment of personal meaning and understanding (6.0). Flowing from this conceptual principle, five major concepts are identified:

(i) Pedagogical practice generates opportunities for meaning to emerge (6.1), noting principally the importance of learners constructing their own meaning (6.1.1); the multi-dimensional nature of the meaning-making process (6.1.2); and the nature of religious meaning stemming from an encounter with the divine (6.1.3).

(ii) The role of elaboration upon known constructs is an important scaffolding process in the construction of personal meaning (6.2). Key notions include understanding memory processes (6.2.1); personal learning styles (6.2.2); the distinction between the repetition and rehearsal of knowledge (6.2.3); the strengthening of synapses (6.2.4); and the role of imagery and metaphors (6.2.5).

(iii) The third concept emphasises the significance of facilitating 'connected knowing' to prior understandings (6.3). This concept integrates the notions of synaptic connections (6.3.1); processing disjointed data (6.3.2); shuttling (6.3.3); the nature of human knowing (6.3.4); connecting traditions with personal transformation (6.3.5); and the need to recognise the parts and the wholes in conceptual development (6.3.6).

(iv) The crucial nature of critical and lateral thinking (6.4) emerges both from the brain-based (Map 5) and the pedagogical literature (Map 4). Issues addressed include: neuronal connections and pruning (6.4.1); the impact of enriched learning environments (6.4.2); the identification of the thinking modules of the brain (6.4.3); the nature of thinking itself (6.4.4); insights from constructivist curriculum paradigms (6.4.5); and the noting of the absence of an emphasis in religious education curriculum documents on the development of thinking processes and skills.

(v) The concept of reflective practice (6.5) extends across all fields of enquiry. Key notions involve: rudimentary theologising (6.5.1); constructing meaning through reflection (6.5.2); the nature of reflection (6.5.3); integrating the transfer of learning (6.5.4); pedagogical practice (6.5.5); and role of reflection in detecting patterns (6.5.6).

*Map 6: Discernment: The Generation of Personal Meaning and Understanding*

### *Map 7: Enrichment: Catering for individualised learning (7.0)*

An appreciation of the role of enrichment, within a coherent pedagogical approach to religious education, is the second central theme to emerge from the concept mapping process. In the context of this study, the term 'enrichment' broadly refers to the manner in which pedagogical processes enhance the learning environment, enrich the quality of the learning experience and cater for the individualised learning needs of students. Five major concepts coalesce around the concept of enrichment:

(i) Emerging strongly from brain-based learning theory (Map 5), the identification and catering for differential learning styles (7.1) is prominent. Key notions include the impact of enriched learning environments (7.1.1) and a synopsis of the various theoretical approaches (7.1.2).

(ii) A closely linked, but distinctly different concept, is the identification of distinctive cognitive processing styles (7.2). With particular relevance to the teaching activities utilised in the study, six notions are highlighted: the bicameral brain (7.2.1); the synchronous nature of thinking (7.2.2); various cognitive models (7.2.3); imagination (7.2.4); inductive and deductive modes of thinking (7.2.5); and the nature of distinct processing models (7.2.6).

(iii) Drawing from the broader pedagogical literature (Map 4), the development of rich learning tasks with a multiple outcome focus (7.3) is emphasised. Related notions include: the nature of integration (7.3.1); a rationale for curriculum planning (7.3.2); and the limitations of a single outcome approach to learning (7.3.3).

(iv) Recognising the diversity and mixed ability of students (7.4) in the religious education classroom is the fourth concept identified. Specific notions include: discerning the appropriate levels of challenge (7.4.1); the impact of emotional vulnerability (7.4.2); syllabus limitations (7.4.3); and appreciating the continuum of beliefs held by the students (7.4.4).

(v) Creating learning experiences that allow for open-ended responses (7.5) emanated from all three fields. Reference is principally made to: the nature and mystery of faith (7.5.1); the multi-dimensional nature of setting open-ended tasks (7.5.2); and the capacity of open-ended tasks to respond to the differential development stages of potential learners (7.5.3).

*Map 7: Enrichment: Catering for Individualised Learning*

### *Map 8: Engagement: Personal choice to be involved in learning (8.0)*

As distinct from enriching the learning context by catering for the individualised needs of a cohort of students, engagement (7.0) focuses principally on those dimensions of the learning process that evoke a personal choice and commitment on the part of the student to actually undertake and be involved in the specific learning experience. Six major concepts are identified as being significant:

(i) Both brain-based learning models (Map 5) and constructivist syllabus documents (Map 4) highlight the importance of generating problem solving opportunities (8.1) to stimulate learning. In particular, key notions include the nature of the challenge (8.1.1) and an appreciation of various critical construction models (8.1.2).

(ii) Allied with problem solving is the importance of the learning experience to be personally relevant (8.2). Interconnecting notions explore personal motivation (8.2.1); differing sources for relevance (8.2.2); and the manner in which religious education curriculum documents evoke relevant personal responses (8.2.3).

(iii) The third concept notes how engagement is fostered when a learning experience is connected with previous teaching activities. This concept focuses principally upon: providing regular feedback (8.3.1); the role of assessment (8.3.2); and the nature of incidental learning.

(iv) A strong and recurrent concept, especially in the brain-based literature (Map 5), is the role of emotion (8.4) in the learning process. Notions developed chiefly relate to: how emotional stimuli actually evoke engagement (8.4.1); the role of emotion in influencing religious thought (8.4.2); and the specific impact of emotion on learning (8.4.3).

(v) Closely intertwined with emotion, the significance of generating risk-taking experiences (8.5) to facilitate engagement is identified. Key notions include: relaxed alertness (8.5.1); the hermeneutics of suspicion (8.5.2); and classroom climate (8.5.2).

(vi) In terms of pedagogical practice, the influence of neural fatigue and recovery (8.6) on the engagement process is recognised. This concept links an array of notions from brain research (8.6.1) with pedagogical practices aligned to reflective practice (8.6.2).

*Map 8: Engagement: Personal Choice to be involved in Learning*

### *Map 9: Participation: The communal dimension of learning (9.0)*

The fourth foundational principle to emerge from the concept mapping process is the theme of participation (9.0). Participation recognises the importance, in religious education, of students being interactive contributors within the context of a faith oriented learning community. In this respect, four major concepts are discerned:

(i) Reflecting insights from across all fields of enquiry, the fundamental premise of recognising and valuing the wisdom of the learning community (9.1) is highlighted. Contributing notions include: the nature and role of cooperative learning (9.1.1); the significance of interacting in a faith community (9.1.2); the impact of incidental learning (9.1.3); and insights regarding the social and collaborative nature of the thinking process (9.1.4).

(ii) The second concept notes the imperative of forming collaborative learning teams (9.2). The mapping process articulates a pedagogical rationale (9.2.1) for students learning in small group contexts and draws attention to the benefits of social interaction (9.2.2).

(iii) In order to underpin a participatory learning culture, the mapping process recognises that collaborative learning practices need to be explicitly developed utilising a combination of modelling, joint construction and independent activities (9.3). Associated notions include: structuring the learning sequence (9.3.1); key elements from brain theory (9.3.2); and instructional models (9.3.3).

(iv) The final concept articulates a key premise of cooperative learning, namely the significance of individual and group accountability (9.4). Issues identified include: changing curriculum expectations (9.4.1), especially with regards to co-constructing learning experiences and addressing passive learning; the key elements underpinning notions of accountability (9.4.2): and the impact of accountability expectations on enhancing the thinking process (9.4.3).

*Map 9: Participation: The Communal Dimension of Learning*

## Conclusion:

This chapter provides the database for the detailed explanation of the *DEEP* Framework in Chapter 7. The major focus of this chapter is on the presentation of the concept maps, which underpin the articulation of a new pedagogical framework for primary religious education. Four of the central themes (i.e. Discernment, Enrichment, Engagement and Participation) contribute directly to the formulation of the *DEEP* acronym. A fifth integrating theme, an orientation towards wholeness, also emerged from the literature (3.3; 5.3.2) and will be discussed in detail in Chapter 7.

# *Chapter Seven*

## The *DEEP* Framework: A pedagogical scaffold for Religious Education

## *'An integration of brain-based learning theory into the field of religious education'*

### Introduction:

The purpose of this chapter is to synthesise the outcomes of Stage One of the action research process. Through an analysis of the concept maps presented in Chapter 6, the theoretical basis for this study was formulated. Emerging from the literature review, links are demonstrated between the various conceptual themes identified in:

- an analysis of contemporary approaches to religious education in Australia (cf. Chapter 2);
- current pedagogical practice evident in syllabus documentation across Australia (cf. Chapter 3); and
- the brain-based learning literature (cf. Chapter 4).

In particular, it argues the holistic integration of a number of selected insights from brain-based learning theory, combined with existing notions surrounding religious education, can substantively contribute to the articulation of a pedagogical model (i.e. the '*DEEP* Framework') that will benefit the teaching of religious education.

### Identification of Overarching Themes:

An examination of the concept maps formulated in response to the literature review (Maps 1 – 5), reveal a number of overarching central themes that underpin the proposed pedagogical framework in religious education. These themes constitute five key, foundational principles (i.e. Discernment;

Enrichment; Engagement; Participation; and an Orientation towards Wholeness) around which a number of supporting pedagogical criteria are developed.

### *1. The role of 'meaning making' in the learning process – Discernment*

Stemming from its constructivist orientation, the initial overarching theme identified in the brain-based literature is a fundamental emphasis on meaning making in the learning process (Map 6). It was apparent from the concept mapping process (5.1)[28], the dominant function of the brain is to discern meaning for each individual. Concepts such as patterning, integration, connectiveness and relevance were highlighted.

Research identified a number of key notions surrounding the manner in which the brain functions. These include how the brain:

- hasn't evolved by absorbing meaningless data;
- needs opportunities to make sense out of what it encounters (5.1.2);
- is essentially curious and must remain so in order to survive and to function effectively (5.1.4); and
- seeks to constantly find connections between the new and the known (5.1.1).

Essentially, brain-based theory contends it is the innate desire of each human being to search for meaning.

Similarly, research from the religious education field (Maps 1 – 3) demonstrates that the ultimate purpose of religious education is to nurture the religious understandings of students in order to allow them to engage with the mystery of their God (1.1.1). Religious education also endeavours to assist students construct meaning around the role and purpose of the Christian tradition within their lives (3.4.1). It acknowledges revelation is a personal communion of knowledge, an interrelationship of God and the individual with a believing community (Moran, 1979).

In the mapping of the catechetical framework, research revealed a basic orientation towards transformation and searching for meaning (1.1.2). Contemporary catechetical models (e.g. Shared Christian Praxis) highlight the importance of relevance, critique and synthesis in the meaning making process. As Miller (2000, p. 203) observes, 'the purpose of education is transformational'. To educate a human being is not merely to make them a knowledgeable, productive member of society (transmission) or an active, engaged citizen (transactional) but also to help each person discover the deeper meaning of life (transformational). Gardner (1991) concurs, commenting intellectual

28 Reference numbers correspond to the coded concepts, themes and notions contained in the concept maps (cf. Ch. 6)

transformation occurs though the creation of new understandings that result from the emergence of new cognitive structures (5.5.3).

Furthermore, the mapping of the pedagogical research in religious education (3.4) revealed meaning and understanding results when relatively complex connections were established with faith concepts that are central to the traditions and doctrines of the Christian community. The linking of these concepts nurtures the development of relatively systematic, integrated and holistic understandings (3.3). Meaning emerges when students are personally involved in the learning experience, aim to understand relationships between the immediate task and other tasks or contexts, then use what they already know about a topic to interpret what they are learning (Marzano, 1992) (3.2.1).

### *2. Catering for the diverse learning needs of individual students - Enrichment*

A second central theme to emerge from the brain-based literature is an awareness that the learning capacity of students is significantly enriched when teachers individualise the learning process to cater for diverse learning needs (Map 7). As Larsen (2000, p 16) comments, 'Each person walks the same ageless path toward meaning but with a unique stride.' Drawing upon the wider educational usage of the term, 'enrichment' also refers to the manner in which pedagogical processes 'broaden and develop a student's knowledge, understanding, application and skills beyond the basic program at a level that is appropriate to the developmental abilities and interests of the student' (CEO, Ballarat, 2004, p 1). An 'enriched' classroom culture is one that caters for as many learning needs and styles as possible.

Map Five highlights how brain-based research has drawn particular attention to the importance and value of 'enriching' the learning context. The research has not only noted differences in the intellectual capacity of the brain, but has also discerned distinct variations in learning styles and thinking patterns (5.4). Learning environments that nurture neural growth and plasticity (Bruer, 1998; Wolfe, 1998; Wolfe & Brandt, 1998; Peterson, 2000) (5.2.2) and result in synaptic stabilisation (Leamnson, 2000) (5.2.3) are enhanced when conceptual input is received through a variety of modalities (5.2.6).

Catering more specifically for the learning needs of individual students was also a dominant theme reflected in the overview of emerging pedagogical practice across Australia (Map 4). The constructivist nature of many new syllabus documents (4.1) (especially in Tasmania), continually stressed the importance of individualising learning. These documents emphasised the importance of rich, challenging multi-dimensional tasks that empowered each individual student to reach their full potential (4.1.1).

Recent developments in Australian diocesan religious education documents (4.4) have also begun to show a movement towards acknowledging and catering for individualised learning needs in a sustained fashion. The Parramatta Diocese introduced the 'Integral' thinking model (4.4.3), the Brisbane Archdiocese emphasised the significance of 'learning dispositions' (4.4.4), whilst the Melbourne Archdiocese has acknowledged the importance of catering for individual learning styles (4.4.5).

From a catechetical perspective, the inability of programs to cater for the diversity of the students and the tendency of syllabus documents to follow a 'locked-step' approach were highlighted (1.2.5). The move towards a curriculum framework (Map 2) and the advent of an 'outcomes' focus, began to address notions of student diversity (in terms of religious backgrounds) and need for academic rigour (2.2.3). However, as indicated in Map Three, the lack of pedagogical perspective in religious education has led to weaknesses in an 'outcomes' based approach being exposed, especially in terms of relevancy, repetition and rigour (3.5).

The religious education experience is enriched when learning strategies cater for the student's particular style of learning as well as their intellectual ability and readiness. Hence, this proposed model argues a greater emphasis on enriching the learning process by catering for individualised learning needs would promote greater personal freedom, understanding and growth (3.4).

Notwithstanding the significance of catering for diversity in religious education, it is important to note that enriching the learning context doesn't imply that every lesson should cater explicitly for the needs of each individual learner. Sound pedagogical practice suggests, over the course of a unit of work, a series of interrelated pedagogical decisions are made that respect the heterogeneous nature of the religious education classroom. Essentially religious concepts need to be introduced in one setting or modality and reinforced in another in order to facilitate the embedding into long-term memory (5.2.4).

### *3. Fostering an openness and personal commitment to learning - Engagement*

The third central theme identified in the research through the concept mapping process is the principle of engagement. Engagement refers to the openness and personal commitment of the individual student to immerse themselves in the learning context. Research in brain functioning (5.2.6) highlights that the brain needs to be engaged as a prerequisite to learning (Bellanca, 1998). The extent of learning is related to interest, prior knowledge and the richness of the environment.

The engagement process appeared to be related to six major concepts: problem solving; relevancy; emotional response; risk taking; feedback; and neural fatigue (Map 8). Engaging the attention of

students needs to: counter balance explicit instruction with appropriate neural rest (5.2.6); consider the role of novelty and variety (5.1.4); and emphasise the importance of relevance (5.1.2).

In Map Five there are two major concepts linked to the process of engagement, namely the impact of emotion (5.4.3) and the importance of relevance (5.1.2). Teachers have a role in helping learners create a sense of felt meaning and a degree of connection with the content (5.1.5), in addition to fostering intellectual understanding and skill development. The brain-based theory identifies the need for teachers to assist learners empathise with the content and relate to it in a personally meaningful manner (5.4.3). Furthermore, the pivotal role of the limbic system in discerning the security of the learning environment and facilitating risk taking was made evident (5.4.4). Equally, the role of emotional responses in terms of upshifting learning to the cerebral system or downshifting into flight or fight mechanisms were also stressed (5.4.4).

The broad pedagogical literature (Map 4) reinforced a number of factors linked to the principle of engagement. Notable observations include: the significance of personal involvement for 'deep learning' (4.3.1); the importance of engaged learning time in the 'To, With, By' instructional model (4.2.3); notions of co-construction and relevance in 'civics education' (4.2.4); and problem-based learning in Queensland's 'Productive Pedagogies' program (4.3.3).

Concepts surrounding engagement were not as apparent in the religious education literature (Maps 1 – 3). Whilst relevancy (or the lack there of) featured prominently, especially in catechetical models (1.2) that featured critical reconstruction and Shared Christian Praxis, other issues such as problem solving, risk taking and neural fatigue were notable by their absence. There has been a growing awareness of the role of formal assessment in religious education (2.2.3). This realisation has not yet evolved fully into the broader notions of formative assessment and structured feedback loops guiding the next phase of learning. There was some recognition in the literature of the value of including pedagogical strategies from the affective domain (3.4.4), however the broad role of emotion in the learning process was rarely explored.

### *4. The Communal Dimension of Learning - Participation*

The fourth central theme discerned from the concept mapping process focused on the notion of participation (Map 9). Participation recognises that quality learning in religious education occurs within the context of both a faith oriented and an educational community. A collaborative learning community involves working together for a common goal with a spirit of shared leadership and co-learning (Cooper & Boyd, 1998) (9.2.2). Learning is essentially a relational endeavour that connects human beings to each other and to the world (Miller, 2000, p 11). In essence, nurturing participation is

a foundational principle that enables other key pedagogical principles (engagement; individualised learning; and meaning making) to be enacted within the learning context.

The principle of participation is prefaced on four major concepts (Map 9): the importance of valuing the wisdom of the community; the manner in which students function in collaborative learning teams; the significance of individual and group accountability; and the instructional models that foster participation.

The participatory theme draws heavily on insights from the brain-based learning field, especially with regards to cooperative learning (Johnson & Johnson, 1989; Kagan, 1994). Cooperative learning highlights the desirability of all participants being actively engaged with their peers in discussion and thinking processes that are conducted in a focused and systematic manner (5.5.4). Cooperative learning focuses on generating the pre-conditions for optimal brain functioning, notably through: emphasising social skill development; scaffolding learning experiences; noting the significance of modelling and joint construction; and articulating accountability processes.

The communal nature of learning was also a recurrent theme in the overview of pedagogical developments across Australia (Map 4). Constructivist learning models (4.2; 4.3) such as 'Productive Pedagogies' (4.3.3), the 'PEEL Project' (4.3.2) and the 'To, With, By' Literacy model (4.2.3), were closely linked to cooperative learning principles. Emphasis was placed on shared goal attainment, identifying proximal learning zones and the importance of shared wisdom ('rubbing minds together') (4.2.2).

In religious education, the theme of participation was particularly prominent within contemporary catechetical models (1.2). The recognition of students interacting within a faith community, drawing on the wisdom of the tradition and dialoguing in community was especially significant. Shared Christian Praxis methodology (1.2.2) highlights the need to: 'share and reflect on life experiences'; 'share in dialogue and critical reflections'; and 'think through personal and communal relationships to the Christian message' (Groome, 1980).

Whilst not overly emphasised from a pedagogical perspective, some recent recognition has been given to actively fostering participation in the religious education classroom. Syllabus material from Parramatta, Brisbane and Melbourne all make reference to actively fostering the communal dimension of learning (4.4). Similarly, the role of cooperative learning in religious education is just emerging in the pedagogical literature (3.4.5). Wedge (2002) highlighted, the participation of students in learning teams gives them the opportunity to actively live out the underlying values of an authentic Christian community whilst engaged in the learning process.

## *5. An Orientation towards Wholeness*

The final theme to emerge strongly from the research (3.3) was an orientation towards wholeness (Herrmann, 1996; Groome, 1998; Atkin, 2000; Larsen, 2000). Whilst an analysis of specific brain functions and the differentiation of learning styles have provided useful insights that would enable educators to refine particular pedagogical practices, the importance of viewing these concepts as part of an integrated pattern is crucial (5.1.3). In essence, it is recognised that the brain has the capacity to almost simultaneously incorporate a diverse range of thought processes in order to construct a coherent whole (5.4.1). This is a premise addressed by Nava (2001) who argued that, often, conventional education doesn't have a multi-dimensional vision. Nava suggests many pedagogical theories of learning only focus on one or two areas (2.2.2). This theme is echoed by Groome (1998) who asserts, the more the whole person is engaged, the more conducive the process will be to wisdom and to becoming wise. Similarly, Larsen (2000) and Zohar and Marshall (2000), both highlight the unitary nature of the brain's thinking process whereby it is constantly, yet often unconsciously, creating meaning for itself (5.3.2).

Brain-based research (Map 5) stresses that the thinking process is essentially the brain's attempt to make sense of the world around it. Thinking alters the information stored in the memory in interesting and diverse ways (5.2.4). Neural connections join new data with information that already has meaning and relevance to the learner (5.2.1). The more closely the new information is aligned with what the learner perceives as interesting, useful or emotionally stimulating, the more likely it is to be integrated and learnt (5.4.4).

The orientation towards a holistic emphasis within any pedagogical approach to learning was particularly made apparent in the area of whole brain learning (5.5.3).

Not only do students have varying 'capacities' to think, each student brings to the learning experience a distinct, preferential thinking mode. An understanding of the unique thinking preferences that may be exhibited across a classroom of students has significant implications for curriculum design and delivery. Concurrently, whilst accommodating the unique differences in thinking styles, there is an awareness that learning is amplified and enhanced when all modes of the thinking process are integrated and engaged.

Ultimately, the research reveals it is the holistic naming, blending and interaction of a range of pedagogical principles that forms the basis for a workable pedagogical framework in religious education. No one pedagogical principle operates in isolation. Whilst it is arguable that the principles of participation and engagement may generate a pre-requisite context to facilitate enrichment and

discernment, authentic learning occurs through the holistic presence of all principles within the lesson context.

## Introduction of the *DEEP* Pedagogical Framework:

Flowing from the various phases of concept mapping, the following *DEEP* pedagogical framework was developed to assist religious educators. The framework is based on linking four of the major interrelated pedagogical principles. It is designed in a manner to highlight how the over arching themes from the concept mapping analysis (Maps 5 – 9) could profitably underpin pedagogical framework for religious education. It also recognises the fifth major theme, an orientation towards wholeness, is the 'glue' that binds the model together.

The four key principles of the *DEEP* acronym framework are summarised as follows:

**Discernment:** The generation of personal meaning and understanding

**Enrichment:** Catering for individualised learning

**Engagement:** Personal choice to be involved in learning

**Participation:** The communal dimension of learning

Whilst the four key principles are designed to accentuate specific pedagogical considerations, it must be recognised there is a mutual reciprocity when these principles are translated into classroom practice. For example, the nature of fostering high levels of collaborative learning (participation) almost intrinsically engenders engagement on the part of the students. However, the main distinction surrounding engagement, in this framework, extends beyond simply gaining the pupil's attention and focuses far more on acquiring an individual commitment from students to immerse themselves in the entire learning experience. Similarly, enriching the learning context by catering for individualised learning will undoubtedly complement the thinking process in the discernment dimension of the framework.

Whilst emphasising the dynamic, interactive manner in which the pedagogical principles interrelate with each other, the *DEEP* framework also acknowledges the potential for a conceptual hierarchy or 'layers of learning' amongst the four major principles. As illustrated in the '*DEEP* Framework' (Fig. 9), the principle of participation is a foundational 'layer' that, if effectively implemented, nurtures a learning environment and culture upon which other pedagogical principles could be developed. Equally, participation in its own right is simply not sufficient. Students may have a wonderful experience interacting with each other and sharing their viewpoints in the religious education classroom, however if they are not drawn to higher 'layers' of thinking and meaning making the learning activity is wasted. Similarly, engaging students' attention and catering for their individualised

learning needs is not adequate if the teaching strategy doesn't ultimately generate the opportunity for the pupil to construct religious meaning.

The utilisation of the acronym '*DEEP*' in the naming of the framework was consciously chosen for a number of significant reasons. A primary goal of this research project is to provide teachers with the tools to engage in meaningful reflection on their pedagogical practice in religious education. The provision of a concise, memorable label enables teachers to, quickly and informally, apply a pedagogical filter in a number of settings. For example, when choosing from an array of alternative lesson ideas, the following five key challenges can be efficiently articulated:

- Does the strategy allow for meaning making? (**D**iscernment);
- Does it individualise the learning? (**E**nrichment);
- Will it engage each individual learner? (**E**ngagement);
- Does the activity encourage collaborative learning? (**P**articipation); and
- Is there a balance in emphasis across the various 'layers of learning'? (An orientation towards wholeness).

The *DEEP* acronym also provides a symbolic link to the scriptural reference from Luke's Gospel where Jesus, prior to calling his disciples to ministry, encouraged his followers to take a risk by pushing their boats further out into the deep water prior to letting down their nets for a catch. (cf. 'Push the boat out further to the deep water, and you and your partners let down your nets for a catch': Lk 5:4).

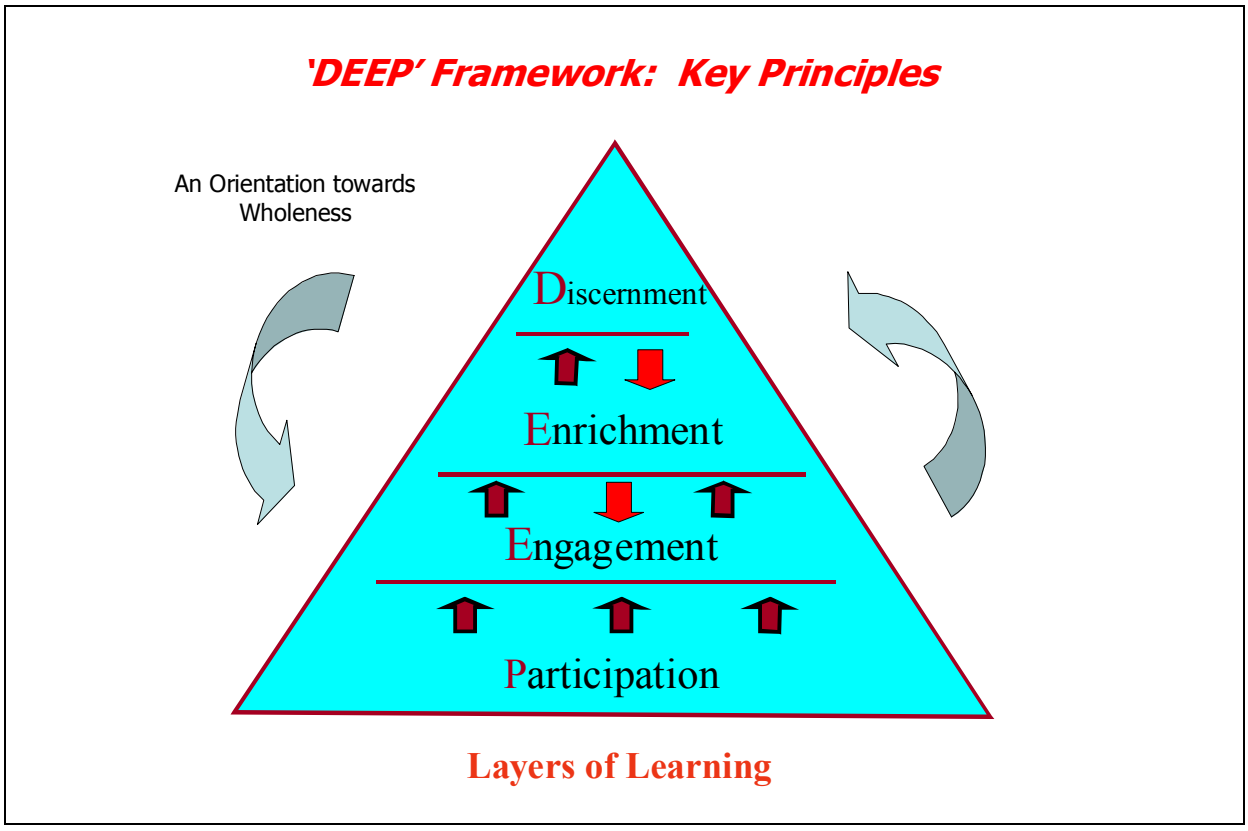
Finally, the term *DEEP* also resonated with a fundamental emphasis in the pedagogical literature (Map 4) whereby teachers are encouraged to move from 'surface' approaches to learning and engage students in 'deep' learning experiences that exhibit higher order analysis, intellectual challenge and analytic depth.

It must also be acknowledged there are inherent limitations in utilising a simple acronym to describe an interactive pedagogical model. Firstly, the terminology may not accurately reflect the full richness of the pedagogical principle. This is particularly evident in the use of the term 'Enrichment' to describe the significance of individualising the learning culture to suit the unique needs of all students. Whilst the label 'enrichment' may appropriately reflect the adjustments made for diverse learning and thinking styles, it does not adequately mirror nuances surrounding multiple learning outcomes and open-ended responses. Furthermore, specific terms may be confused with more generic interpretations in a broader educational setting. The term enrichment, for example, often refers to the manner in which the needs of more capable students are met in contrast to catering for diversity across the entire cohort.

Another major limitation of proclaiming an acronym, especially during Stage Two of the action research process, is that it potentially constricts the framework and doesn't easily allow for new conceptual understandings to emerge. Similarly, as has happened with some catechetical frameworks (e.g. Shared Christian Praxis), there is a danger in applying the model in an 'inflexible, lockstep' manner, thereby negating its interactive, holistic orientation.

On balance, whilst acknowledging potential limitations, it is believed the *DEEP* acronym, and the five key principles (including an orientation towards wholeness) it represents, succinctly and effectively captures the essential philosophies that should underpin a pedagogical religious education framework. A clear, concise pedagogical rationale provides a stimulus for planning professional development experiences and a focal point for reflective practice dialogue.

*Figure 9:* *'DEEP' Framework: Key Principles*




## Specific Pedagogical Criteria Linked to the *DEEP* Framework:

In the absence of a coherent pedagogical framework in religious education, teachers have been denied any systematic criteria to support their critique of pedagogical practice. Having established the broad *DEEP* principles to underpin an emerging framework, the next phase of the concept mapping process revealed a number of interrelated factors that, when combined and applied in a methodical manner, could constitute identifiable criteria for each key principle.

The articulation of specific pedagogical criteria accomplishes four fundamental goals. Initially, the criteria serve to articulate and clarify more precisely the conceptual intent of the overarching principles. Secondly, the criteria led to the identification of particular pedagogical practices (e.g. providing explicit thinking time prior to seeking a response to a question) that beneficially augment the instructional process. Thirdly, teachers are provided with a clear rationale upon which to base the selection of particular lesson activities and, at a broader level, will be able to link a variety of teaching strategies into a coherent pattern of instruction. Finally, clearly defined criteria contribute greatly to reflective practice at both a personal and learning team level.

### *Principle One: Discernment (6.0)*

A synthesis of the literature (cf. Ch's. 2- 4), as presented in Map 6, demonstrated five major concepts coalesced under the broad theme of discernment or 'meaning making'. These concepts formed the basis for the articulation of specific criteria encompassing the discernment principle.

#### (i) Opportunities for meaning to emerge:

The first concept centred on the generation of opportunities for meaning to emerge (6.1). It highlighted students generate religious meaning when they are open to an encounter with an entity that is larger than themselves (Rossiter, 1999), an encounter with the Divine (6.1.3). Meaning is multi-dimensional and incorporates values, religious beliefs, cultural interpretations, justifications, life goals, and an appreciation of a 'master story'(6.1.2). Meaning involves the overall integration of rational and non-rational understandings, which yield for the individual a satisfying explanation of the personal and communal dimensions of their lives (Rossiter, 2001).

One purpose of learning (Murphy, 2001) is for an individual to construct their own meaning and disclose their own understandings of their religious tradition, not just to simply memorise the answers and rearticulate someone else's meaning (6.1.1). The ultimate purpose of nurturing understandings in students is to allow them to construct their own religious meaning (Rossiter, 2001). Whilst valuing the knowledge component of a particular religious tradition, it is important religious education pedagogies focus more on concepts and principles in contrast to simply processing facts. Effective learning is nurtured when students are given the opportunity to think for themselves and not just let their ideas be tied to the teacher's opinion (Mageean, 1995; Price, 1997 (6.1.1).

Students also understand the world by constructing complex patterns of symbolism, metaphors, models, myths, narratives and stories (Wright, 1994). Religious education is not just about facilitating understanding but is also about evoking commitment and deriving personal meaning. Teaching

strategies such as reflective journaling, mind mapping and paired discussions are useful in this context.

**Proposed criterion:**

*1.1 Generates opportunities for meaning to emerge*

**(ii) Elaboration:**

The second major concept shown in Map 6 focused on the role of elaboration in the discernment process (6.2). Emerging strongly from the brain-based literature (5.0), reconstructing learning through elaboration, emphasises how synaptic connections are strengthened and linked to more holistic brain networks when learners are challenged to elaborate upon the content that has been taught, in preference to simply reproducing the acquired information (Jones, 1996; Lowery, 1998) (6.2.4). Elaboration occurs when key concepts are articulated in an alternative context such as with the rewriting of scripture stories set in modern times (6.2.1). Elaboration not only promotes meaningful understandings but also fosters the capacity for versatility and creativity in application, such that further understandings may emerge (Murphy, 2001). Elaboration should focus on 'rehearsals' of learning, not merely repetition (6.2.3).

Learning requires both the acquisition of information and the ability to retrieve and reconstruct that information when necessary (5.2.4). Synaptic density and neuronal pruning is a function not only of the repeated 'firing' of neuronal connections through the acquisition of data but through a longer term phenomena involving patterning, linking previous insights and constructing new insights (Peterson, 2000) (5.1.5).

Transferring learning into a long-term memory process is largely at the mercy of a student's elaborations (King-Friedrichs, 2001). Memories are 'reconstructions' in the brain at the moment of remembering (Leamnson, 2000; Hardiman, 2001). Essentially if something cannot be reconstructed it cannot have said to be learnt (5.2.4). Different sections of the brain store particular parts of memory (eg. colour, scent, shape …) and a variety of stimuli is required to embed or access previous learning (Caine, 1992; Lowery, 1998; Peterson, 2000).

From the perspective of the religious education literature, fostering elaborative experiences recognises that: learning is a multi-faceted endeavour to interpret the world (Bounds, 1997) (3.4.3); students discern religious meaning by combining a multitude of perceptions of external reality (Glass & Muthu, 1999) (3.2.1); and learning is seen as a qualitative change in a person's way of seeing, experiencing

and conceptualising the real world, as distinct from a quantitative change in the amount of religious knowledge someone possesses (Marton & Ramsden, 1988) (3.4.1).

Pedagogical practice should provide a diverse range of opportunities for students to reconstruct their learning experiences in a manner that makes sense to them and, ideally, will reflect their personal learning style. There is specific value in utilising 'whole brain' thinking techniques (Herrmann, 1996; Atkin, 2000; O'Brien & White, 2001) so as to access different dimensions of memory and reconstruct concepts in a meaningful way (3.4.5). Similarly, the use of imagery, analogies and mental pictures are valuable elaborative tools (Marzano, 1992) (6.2.5).

**Proposed criterion:**

*1.2 Reconstructs learning through elaboration*

**(iii) Connected Knowing:**

The third concept that emerged from the discernment dimension was the notion of 'connected knowing'. As illustrated in Map 6, connected knowing brought together insights from brain-based theory, in terms of synaptic connections, processing disjointed data and linking wholes and parts, with the broader philosophical religious nuances of human knowing and transformation (6.3).

Since the brain isn't developed by simply absorbing disjointed data (Wolfe & Brandt, 1998), the acquisition of knowledge is directly related to the formation of new synaptic connections formed when experiences are both novel and coherent (Jensen, 1998a) (5.1.4). When experiences are incoherent, learning is impeded (5.1.5). Neural circuits that are continually activated together become stronger and require less energy to be activated (Peterson, 2000; Wolfe, 2001). The inter-relationships between neural systems are crucial (5.2). Learning is more complete if students weave backwards and forwards between neural systems (Perry, 2000). When confronted with new learning, a person often moves down to lower levels in order to build higher skill levels, then shuttles upwards and back, until new understandings are embedded in consciousness (Scherer, 2001) (5.2.5).

Religious understanding happens when what we experience matches memories that are already arranged in meaningful patterns (Larsen, 2000). Learning, therefore, is a process of active construction that scaffolds new insights onto prior religious knowledge (3.4.3). Learners need an opportunity to reconnect with the content of previous experiences and lessons prior to proceeding to new activities. The provision of strategies that allow the students to initially personalise religious concepts and subsequently relate the issues to a more global, integrated context is significant in this regard. Authentic knowing (3.3.1) emerges from the connections between every day experiences, relationships and efforts to live the covenant and do God's will (Groome, 1998). 'Connected

Knowing' involves students demonstrating connections and discerning patterns within what they have learned and relating this to their life experiences and their awareness of the religious tradition (3.3.3). Connected knowing is seen to be personal, with an emphasis on dialogue, empathetic role-taking and contextual analysis (Mudge, 2002). In essence, the integration of 'ways of knowing' as an underpinning paradigm endeavours to address the central role of religion, providing meaning and purpose in life (Atkin, 2000; Rossiter, 2001) (3.3.2).

Effective pedagogy in religious education is about making the intrinsic connections between traditions and transformation (Boys, 1989) (1.1.2). Appropriate teaching strategies nurture linkages (connecting ideas with each other, previous lessons, the real world…); promote understandings (personal interpretations, generalisations, communication…) and monitor performance against intent and instructional outcomes (Dusting, 2002). Learners require an opportunity to reconnect with the content of previous religious education lessons prior to proceeding to further activities (3.4.3).

Ideal learning experiences in religious education are based on concepts and principles in contrast to facts (Tomlinson & Kalbfleisch, 1998) (3.3.3). Meaning requires understanding wholes as well as parts and parts must be understood in the context of wholes. Consequently, the learning process should focus on primary religious concepts not isolated facts (Mudge, 2000). Concept based teaching increases the likelihood that each learner can construct and enhance frameworks of meaning, see relationships between the parts and the whole, then relate the subject to their lives and other topics. Subsequently, students will make links to new ideas and concepts that further enhance their learning.

**Proposed criterion:**

*1.3 Nurtures 'connected knowing'*

**(iv) Critical and lateral thinking:**

A recurring concept evident across all concept maps was the need to explicitly emphasise the development of critical and lateral thinking processes[29]. Brain-based learning explored notions of synaptic density and pruning, brain modules and thinking preferences along with enriched learning environments (5.2 & 5.5). In contrast, the religious education literature (3.5.2) particularly noted the absence of an emphasis on critical and lateral thinking. An analysis of the broader Australian pedagogical context (4.2.1) continually reinforced the shift to constructivist learning and the importance of higher order analysis, analytic depth and *DEEP* learning.

29 Critical thinking begins with a readiness to challenge received wisdom, lateral thinking is the opposite of logic; it considers all alternatives and resists mechanistic modes of decision making (Smith, 1990, p 129)

Learning is not just a process of strengthening synaptic connections through data acquisition or participation in 'interesting' learning strategies (5.2). Structured thinking activities are needed to allow students to make connections (strengthen) and challenge (prune) existing ideas and conceptualisations (Peterson, 2000) (5.2.1). Physically completing an array of activities is not sufficient to nurture meaning. Enriched learning environments involve more than incorporating structural elements such as colour, drama and music into lessons (5.2.2). They require challenge, feedback, novelty, coherence and reflection time (Jensen, 2000a). Brain modules that are activated by novel and physical activities are distinctly separate from the modules involved in problem solving and higher modes of cognition (Leamnson, 2000). There is a need to pair physical activity with problem solving tasks to connect the acting modules of the motor cortex to the thinking modules of the front lobe (Hardimann, 2001). Higher order thinking processes are needed to refine the levels of synaptic density and embed conceptual understanding in the brain (Peterson, 2000) (5.2.3).

The need to incorporate critical and lateral thinking experiences in religious education (3.5.2) recognises that many students are not as challenged in this area as in other key learning areas (Brennan & Ryan, 1996); the religious syllabus has been 'dumbed-down' in terms of difficulty levels and repetition (Elliott, 1998); pedagogical practice in religious education hasn't 'opened the minds' or challenged more capable students to try new things (Elliott, 1999); and there is a distinct absence of higher order thinking and problem solving skills in many religious programs (Ryan, Brennan & Willmett, 1996; Mudge, 1999).

'Constructivistly oriented' curriculum documents have all emphasised the crucial importance of fostering thinking skills (4.1). Productive pedagogy research (Education Queensland, 2000c) demonstrated that improved classroom performance emanates from a focus on analytic depth, intellectual challenge, critical thinking and higher order analysis (4.3.3). It is critical that pedagogical strategies in religious education overcome a reliance on surface thinking and the transmission of factual knowledge compared to fostering deeper critical levels of thinking (Johnston, 2001).

**Proposed criterion:**

*1.4 Emphasises critical and lateral thinking processes*

**(v) Reflective Practice:**

The final major concept emerging from the discernment map was the significance of reflective practice (6.5). The reflective dimension is seen to be at the heart of the meaning making process allowing for the detection of patterns, transfer of learning and the integration of ideas. Reflection is required to nurture 'theologising' and to create the potential for transformation to occur (1.1.2).

Essentially, the brain requires periods of reflection in order to enable it to transfer learning and construct meaning (5.2.5). Reflective practice is crucial to the learning process. It allows the brain to: make learning personal, purposeful, meaningful and relevant (Fogarty, 1998); overcome confusion (Given, 2000); and provide actual time for the exploration of a concept (Caine & Caine, 1995). Reflective periods give the brain a reason to pay attention, understand and remember. The brain needs 'down time' in order to 'play around' with information and detect patterns (Ben-Hur, 1998) (5.2.6).

By its nature, reflective thinking is a purposeful exploration of the brain's 'experience map' that requires: conscious effort; prior experience; organisation of the experience; and reflections on the relationships within the experience map. (Bull, 1989) (5.1.5). Reflection involves analysing and making judgments about what has happened; it is integral to every aspect of learning. It precedes it, is a part of it and occurs after learning (Wilson & Wing Jan, 1993, p vii). Ultimately, the learner is an active creator of knowledge in contrast to a passive consumer (Bull, 1989, p 7).

Equally, from a catechetical perspective, reflective practice nurtures 'rudimentary theologising' (1.1.2) that forms, informs and transforms (Ryan, 1999); is fundamental to the 'critical reflection' phase of the Shared Christian Praxis process (Groome, 1980) (1.2.2); and underpins Lovat's (1989) 'Critical Model' that attempted to blend a personalised reflective dimension into a phenomenologically oriented curriculum model (1.2.1). In religious education, reflective practice is crucial to enable learners to 'fit' incoming data into existing personal beliefs and theories. The process of reflection underpins the various meaning making models (i.e. initial sense making; test of fit; reasoned judgment; assimilation, accommodation or rejection of new data) and provides structured, sustained and focused opportunities for the generation of meaning (Mageean, 1995; Price, 1997; Lonergan as cited in Groome, 1998) (1.1.1).

Pedagogically (4.3), teaching strategies should incorporate significant 'reflective moments' that empower students to: verbalise insights (Johnson & Johnson, 1989; Kagan, 1994); ascertain other applications of conceptual understandings and thinking skills (O'Brien & White, 2001); and engage in meta-cognition (Varengo, 1993, Wilson & Wing Jan, 1993).

Incidental questioning should also incorporate 'wait time' to allow students time to compose responses rather than reframing questions at lower levels of intellectual functioning (Ben-Hur, 1998). Pedagogical practice needs to recognise that, simply because a course of instruction has been taught, it doesn't necessarily mean learning has been 'achieved' (2.2.2).

**Proposed criterion:**

*1.5 Engages the learner in reflective practice*

*In Summary:*

Flowing from the above discussion, Stage Two of the action research process examined the following five concepts to ascertain their validity as pedagogical criteria for the 'discernment' dimension of the framework.

***Key principle:*** **Discernment:** The generation of personal meaning and understanding

**Distinguishing criteria:** The pedagogical strategy:

1.1 Generates opportunities for meaning to emerge

1.2 Reconstructs learning through elaboration

1.3 Nurtures 'connected knowing'

1.4 Emphasises critical and lateral thinking processes

1.5 Engages the learner in reflective practice

## *Principle Two: Enrichment (7.0)*

The clustering of concepts around the theme of enrichment (7.0) identified another five areas that had the potential to form the basis of specific criteria emphasising the importance of structuring and enriching the learning context to cater for the diverse learning needs of individual students.

### (i) Learning styles:

Flowing primarily from brain-based learning theory (Map 5), the first major concept identified noted the individualised nature of a student's learning style. Learning styles focus primarily on the manner in which students prefer to access incoming sensory data (5.5.2).

Learning style theories (Kolb, 1984; Price, Dunn & Dunn, 1991) have provided a number of pedagogical insights for religious education (7.2), notably: students tend to access learning through one of three preferred perceptual modes: Visual, Auditory or Kinaesthetic (VAK Model) (Ward & Daley, 1993); students may be disadvantaged if teachers systematically under-employ the pedagogical methods that are best suited to students preferred learning styles (Francis & Fearn, 2001); teachers need to avoid a tendency to teach primarily from a preferred learning style and plan with several styles in mind (McCarthy, 1990); students not only need to encounter concepts from their own preferred style, but they need to consolidate learning by processing concepts in less preferred modes (O'Neil, 1990; McCarthy, 1990); and 'at risk' students have most to gain by teachers matching input to preferred learning styles (O'Neil, 1990).

**Proposed criterion:**

*2.1 Inputs data through a variety of learning styles*

**(ii) Cognitive processing styles:**

One the most significant insights identified in the concept mapping process was the emergence of a distinction between how students access learning (i.e. learning styles) (5.5.2) and the manner in which they prefer to think and process information (i.e. cognitive processing styles) (5.5.3). Key aspects of the relevant brain-based research (5.4.1) include: the notion of the twin hemispheres of the bicameral brain (Sperry, 1970); the distinctive functioning of both hemispheres (Sousa, 1995); the organising, analytic properties (serial processing) of the left brain (Sousa, 1995; Larsen, 2000); the integrating, intuitive dimensions (parallel processing) of the right brain (Sousa, 1995; Caine & Caine, 1995); and the need to balance the processing of 'parts' by the left brain with the 'holistic' pattern seeking functions of the right brain (McCarthy, 1990: Caine & Caine, 1995).

Other research (5.5.3) importantly highlighted the synchronous nature of the brain (Herrmann, 1996); that the brain doesn't learn in a linear, step-by-step fashion, rather it develops in an integrated fashion over time (Scherer, 2001); and the brain processes parts and wholes simultaneously, supporting and enriching each dimension of brain functioning (Caine & Caine, 1995; Armstrong, 1998).

Flowing from the above insights, educational theorists formulated a field of research that asserts individuals demonstrate a preferred cognitive style in the manner in which they systematically and habitually organise and process information (5.5.3). Notable contributions include: continuums based on processing and perceptual styles (Kolb, 1984; Price, Dunn & Dunn, 1991); the Multiple Intelligence framework (Gardner, 1991); and a range of 'four-quadrant schemas' such as McCarthy's (1990) 4Mat model, Herrmann's (1988) Whole Brain thinking model and Atkin's (2000) Integral Learning model. Whilst each cognitive schema asserts students may more efficiently access and process new learning from the standpoint of their preferred cognitive modality, the interactive nature of thinking and the propensity of the brain to be oriented towards wholeness, indicate that learning is best supported when opportunities are generated to engage all thinking quadrants (Herrmann, 1996; Atkin, 2000). Learners need to access a combination of mental preferences involving all four 'brain' quadrants to enable them to shuttle between different quadrants when faced with discerning meaning from new data (O'Brien & White, 2001) (7.2.2).

The fostering of a balanced, interactive approach to thinking also has emerged from the concepts maps of the religious education literature (Maps 1 & 3). Key elements include: the need to balance the presentation of concepts from the viewpoint of a 'compelling and comprehensive' system of logic with an approach that involves an intelligent grappling with problems in a discursive and fluid manner (Mageean, 1995) (3.1.3); rational thought is rarely unaffected by emotion and the interaction of the two processes nurtures inner reflection and can lead to outer transformation (de Souza, 2001) (3.4.4); a

combined inductive-deductive pedagogy is required to discern the meaning of significant religious experiences and truths (Holohan, 1999) (1.1.2); and the imaginative dimension of right-brain cerebral functioning allows for the conceptualisation and integration of religious thought (Teske, 1996) (3.4.5)

In terms of pedagogy, when grappling with a new concept, strategies in religious education should be designed to: allow students to most effectively access learning through their preferred cognitive style; reinforce and consolidate learning through accessing other modalities; and develop the capacity to solve problems in a diverse variety of ways.

**Proposed criterion:**

*2.2 Accommodates cognitive processing styles*

**(iii) Multiple Outcomes:**

An analysis of syllabus documents across all key learning areas (KLA's) in Australia suggests the major curriculum paradigm has been the articulation of an outcomes based framework (4.1). From the perspective of religious education (2.2), outcomes have been developed as integrated statements of values and attitudes, knowledge and skills to enable the teaching/learning process to focus on students and what they will learn (Crotty and O'Grady, 1999). Outcomes based programs: allow religious education teachers to clarify their educational paradigm (Crawford and Rossiter, 1987); focus the role of the religious education classroom on the quest for knowledge (Congregation of Catholic Education, 1988); and enable study 'about religion' (Rummery, 1977; Grimmit, 1987; Moore and Habel, 1982; Moran, 1991; Smart, 1989). The precise description of learning outcomes contributes to a teacher's capacity to plan, teach and assess religious education lessons (Ryan, 1998) (2.2.3).

Whilst the precision of outcome statements can help focus the learning context, narrowly concentrating on single outcomes has the potential to limit the scope and diversity of the learning experience (2.2.2). Tightening the teaching focus to isolated outcomes has a number of limitations: teachers become overwhelmed by the sheer number of discrete outcomes to be taught (Eltis Committee, 1995); the tendency for teachers to focus instruction and assessment on the more easily assessable content oriented outcomes in religious education (White & Borg, 2002); greater emphasis paid to achieving correct answers in contrast to building a schooling culture that values questions and ideas (Eisner, 1995); and teachers losing sight of the benefits of the experiential approach to religious education (Barry, 1998).

From a pedagogical perspective (4.1.3), religious educators need to develop learning tasks that address multiple outcomes (Clarke, 2001; Johnson, 2001; Khoo, 2002). Whilst focusing on a key conceptual idea in religious education, pedagogical practice ideally integrates other curriculum areas and exposes

students to multi-dimensional learning experiences. The design of multi-outcomed or 'rich' tasks (7.3) seeks to provide students with a substantive problem solving experience incorporating a number of learning experiences and activities over a period of time. Integrated thematic instruction provides a structure for developing brain compatible curriculum because it provides 'meaningfulness' as its foundational intent (Ellingsen, 1989, p 18). The purpose of an integrated theme is to show the interrelatedness of all things.

**Proposed criterion:**

*2.3 Addresses a range of outcomes in one task*

**(iv) Mixed ability levels:**

The fourth major concept, identified by the mapping process, centres on the realisation that potential learners bring to the classroom differentiated levels of skill, ability and religious background. Map 7 recognises: the need for learning to be challenging within the bounds of one's capacity; the potential impact of setting tasks beyond a student's ability level; the limitations of current syllabus documents in religious education; and the continuum of religious beliefs and orientations that exist within the classroom (7.4).

Catering for mixed abilities and structuring learning experiences relative to individual and group learning needs is essential in religious education. Brain-based theory (5.1.4) holds that each individual brain must experience appropriate levels of challenge, relative to its ability and thinking preferences, before it will engage in a learning experience (Jensen, 1998b). Concepts are presented at a level that is slightly greater than what the brain has already grasped and at a level that is sufficient to arouse curiosity so as to motivate the student to reach the next level (Healy, 1992). There needs to be an awareness that less capable learners are more emotionally vulnerable (Tomlinson & Kalbfleishch, 1998; Jensen, 1998b) and are likely to downshift into a 'fight or flight' response to the religious education learning environment if tasks are structured beyond the level of their capacity (5.4.4). The development of appropriate thinking tasks can allow students to scaffold their learning upon the skills of others (Vygotsky, 1978; Kagan, 1994) (4.2.2). Whilst an individual student may have difficulty in beginning a task, the combined wisdom of the team would at least ensure the task could be commenced (Johnson & Johnson, 1989; Cooper & Boyd, 1998) (5.5.4).

The diversity of learning needs and abilities noted in the religious education literature explored two key themes. Firstly, the need for an acknowledgement that there is a continuum of belief structures within any one classroom (1.2.5). Religious educators: cannot assume a shared belief structure (Malone and Ryan, 1996); they need to acknowledge the pluralist nature of Australian society (Rummery, 1977; Dwyer, 2000; Wurst and Crotty, 2001); and recognise that, at any one stage of

schooling, new learners may be joining the cohort with little or no background in the religious tradition. Secondly, religious syllabus documents (3.5) lack differentiation in terms of difficulty levels and repetition (Elliott, 1999); students are not as challenged in terms of content and learning processes as in other key learning areas (Brennan & Ryan, 1996); and assessed learning needs of students are not driving the next phase of learning (White & Borg, 2002).

The heterogeneous nature of most religious education classrooms makes it essential that teaching practice caters for a diversity of learners. Key pedagogical implications (7.4.4) include: designing learning experiences so that the least capable students (in terms of intellectual capacity or background knowledge in religious education) have the capacity to make a meaningful start to the activity; structuring learning outcomes to a level just beyond the majority of the group so as to provide a genuine intellectual challenge; collaboratively grouping students to allow the scaffolding of learning across ability groups; and incorporating thinking experiences to 'stretch' the more capable students to utilise skills at the upper end of 'Bloom's Taxonomy' (Bloom, 1964).

**Proposed criterion:**

*2.4 Caters for mixed ability levels*

**(v) Open-ended responses:**

The final 'enrichment' concept that was discerned focused on the importance of open-ended pedagogical strategies (7.5). The potential for a learning task to be an enriched, meaningful experience is greatly enhanced when the expressions of learning can be presented in an open-ended manner. Open-ended tasks allow for differentiation both in quantity and complexity allowing all students to reach their full potential (Schniedewind & Davidson, 2000). Real learning involves the capacity to represent a problem in multiple ways and approach solutions from a number of vantage points (Gardner, 1991). Significantly, risk taking is nurtured and the entire learning community may benefit from the 'surprises' that are generated (White, O'Brien & Todd, 2003)(7.5.2).

From the perspective of religious education (3.1.3), fostering open-ended responses allows students the capacity to explore the mystery of their faith; pursue religious understandings that have no 'end-points' in contrast to 'static truths' (Murphy, 2001); and appreciate that religious freedom is respected in the religious education classroom (Rossiter, 1999). Additionally, structuring learning tasks that allow for open-ended responses assists religious educators to acknowledge religious pluralism (Dwyer, 2000); nurture and support a diversity of thinking and ideas (Wurst and Crotty, 2001); and recognise that what is being 'taught' is substantively different to what is being 'learnt' and understood (Grimmitt, 2000; White & Borg, 2002) (3.4.2 & 3.4.3).

Pedagogical practice in religious education that encourages open-ended responses, enables more capable learners to extend their thinking, whilst still empowering less able students to make a contribution. Open-ended tasks, by their nature, need to be structured so that students move from lower order thinking responses (recall, comprehension) to higher order skills of application, analysis and synthesis. Key questions reflect the 'so what'; 'what if'; 'I wonder' genre. For formal, assessable open-ended tasks, the pedagogy incorporates clearly articulated assessment rubrics. This ensures students are aware of the broad parameters of the task and are given guidance towards addressing the key conceptual ideas.

**Proposed criterion:**

*2.5 Allows for open-ended responses*

*In Summary:*

The preceding discussion identifies a range of concepts clustered around the principle of 'enriching' learning pathways to cater for individualised learning needs. The following criteria, so developed, are critiqued during the second stage of the action research project.

***Key principle:*** **Enrichment:** Caters for individualised learning

**Distinguishing criteria:** The pedagogical strategy:

2.1 Inputs data through a variety of learning styles

2.2 Accommodates cognitive processing styles

2.3 Addresses a range of outcomes in one task

2.4 Caters for mixed ability levels

2.5 Allows for open-ended responses

### *Principle Three: Engagement (8.0)*

One of the daily challenges facing any teacher of religious education is how to present their religious education lessons in a manner that effectively engages the attention and involvement of their students. It is not enough for a group of learners to be simply present and participating in a lesson. At some point, teachers seek a real commitment from each individual student to embrace the learning experience in a manner that will stimulate personal growth and transformation. An examination of the concept map (8.0) suggests there are six major concepts clustered around the principle of engagement.

**(i) Problem based:**

A fundamental premise of brain-based learning theory (5.1) is that the brain likes the challenge of figuring out a pattern (meaning); if there is no challenge the brain finds it difficult to engage in a learning activity (Wolfe & Brandt, 1998; Walsh, 2000). If learning is a search for meaning, it must start with the issues around which students are actively trying to construct meaning, by starting with a question not a statement (5.2.6). Problem-based experiential learning activates the area of the brain responsible for higher order thinking (Hardiman, 2001), whilst problem-solving tasks connect the 'acting' modules of the brain (the motor cortex) with the 'thinking' modules of the frontal lobe (Hardiman, 2001).

Pedagogical approaches (4.3.3) have all highlighted the crucial nature of problem solving. Authentic pedagogy focuses on the identification, analysis and resolution of problems in a learner's world. By way of contrast it is noted teachers are responsible for ninety percent of 'classroom talk' whilst students ask only one percent of meaningful questions (Healy, 1992). Hence, in order to foster engagement, students need to be encouraged to co-construct the learning process and pose the questions to which they seek answers (4.2.4).

In religious education (3.2.1), Rossiter (1995) highlighted the importance of promoting a problem solving pedagogy by proposing that religious programs should be more 'Issues' oriented in which students solve problems, develop principles or respond to particular situations. The critical construction models of Amalorpavdass' four-point process (as cited in Ryan, Brennan and Wilmett, 1996) and Groome's (1980) Shared Christian Praxis are consistent with a problem-based approach (1.2).

Applications for religious education pedagogy include the development of hands-on tasks that require students to ask questions, investigate, analyse and solve problems using real world applications. Religious education units can be substantively improved if the key concepts are articulated as problems that engage the interest of the learner. Hence, by altering the focus of a unit from a statement of content (eg. Jesus and the Parables) to a question to be addressed or a problem to be solved (eg. How can the Parables of Jesus contribute to the creation of a more just society in Australia?), students are stimulated to search for patterns and connections that can ultimately enhance the meaning making process. Such a schema is particularly aligned to the thinking processes contained in Herrmann's (1996) 'Whole Brain' learning cycle (3.4.5).

**Proposed criterion:**

*3.1 Is problem based*

**(ii) Personally relevant:**

Posing a problem to students is, in itself, not sufficient. The challenge also needs to be personally meaningful to stimulate the brain to a desired state of alertness (5.1.2). The motivation for learning needs to be externalised to students before they will become engaged in the process (Meyer, 1998). The brain needs to interact with the environment as part of its constant search for relevancy and meaning. Relevance is drawn from three major sources: personal connections to one's life; potential application of the learning; and links to the underlying values of the community (Dalton & Watson, 1997). Effective pedagogy exhibits demonstrable relevance to the student's immediate world and enables them to analyse, theorise and intellectually engage with those worlds (Freire, 1972) (4.1).

The importance of personal relevance has echoed through the religious education literature (Maps 1 – 3). It has been noted that religious syllabus documents are 'too tame', concerned with institutional maintenance and lacking in relevance to students (Rossiter, 1999) (2.2.2); and need to concentrate more on catering for the developmental needs and interests of students (de Souza, 1999). Catechetical models such as Melbourne's 'four-point plan' (Archdiocese of Melbourne, 1984) and Shared Christian Praxis (Groome, 1980) have relied heavily on drawing on 'life experiences' to provide a relevant context for exploring catechetical concepts. The significance of personal relevance also underpinned Lovat's (1989) 'Critical Model', which not only asked the question 'What does this mean?' but also challenged students to discern 'What does this mean to me?'(1.2.4).

In terms of pedagogy, incorporating the 'life experience' element of the 'Shared Christian Praxis' methodology (Groome, 1980) into a cycle of lessons is important. Programs need to incorporate issues related to the lives of students and provide connections with the manner in which they search for personal meaning (Rossiter, 1995) (3.2.4). Equally, it must be noted that relevance does not have to be pre-existing for the student. It can emerge through teacher mediation, especially through the medium of a 'good problem' (Brooks & Brooks, 1993).

**Proposed criterion:**

*3.2 Is personally relevant*

**(iii) Regular feedback:**

For the brain to remain engaged in the learning process (5.2.5), it requires regular feedback that is specific, multi-modal, timely and learner controlled (Jensen, 1998b). New information is presented within the context of what the learner already knows and must be adequately assimilated so that information can be used easily in new situations. Creating environments that provide ongoing feedback and foster incidental learning are also important (5.2.2). Being able to access and reinforce

learning through word banks, concept charts and skill diagrams allows the brain to scaffold learning onto prior concepts.

Feedback in religious education (3.4.3) moves the learner to a new point of knowledge or understanding. Whilst respecting religious freedom, sound pedagogical practice also involves discerning levels of understanding and intervening in the learning process to modify conceptions where understanding is mistaken or incomplete (Bounds, 1997).

Appropriate assessment strategies in religious education (3.5.3) identify the 'where to next' phase of the learning cycle, such that assessment drives the next stage of the learning process (White & Borg, 2002). Assessment methodology is not only ongoing but caters for a range of thinking preferences and honours the manner in which the brain originally accessed the learning experience (White & Borg, 2002). For example, concepts developed extensively through lateral, creative teaching strategies are best not assessed through a rational, multiple-choice paper and pencil examinations.

**Proposed criterion:**

*3.3 Provides learning connections through regular feedback*

**(iv) The role of emotion:**

In terms of engagement, the role of emotion in learning is a recurrent concept. Key observations from brain theory (5.4.3) include: the gating processes activated by the limbic system that 'upshift' learning to the cerebral cortex or 'downshift' to lower, non-rational survival regions (Goleman, 1996; Wolfe, 2001); the relaxed alertness of 'feel good' chemicals (Given, 2000); the impact of stress producing chemicals that impair memory and learning when a person is under too much stress (Tomlinson & Kalbfleishch, 1998; Hardiman, 2001); the dual role of emotion that can stamp vividness onto a learning experience (King-Friedrichs, 2001) or, if overwhelming, decrease the efficiency of rational thinking (Wolfe & Brandt, 1998); and the realisation that the same stimuli will produce a continuum of emotional responses from students (Tomlinson & Kalbfleishch, 1998; Jensen, 1998b).

The neurotheological literature (5.3.2) has postulated the emotional dimension of the limbic system is significant in nurturing religious thought. Notable concepts include: one substrate for religious experience may be the limbic system (MacLean, 1996); the inherent human search for meaning is embedded in the limbic system (Ashbrook, 1996); and the connection between ethics and religion has its basis in the empathy that is grounded in the limbic system (Nelson, 1999). In essence, it is suggested meaning occurs at the point of intersection between emotion and understanding (Rossiter, 2001).

By emphasising affective strategies in religious education (3.4.4), teachers are able to balance the 'disengaging nature' of an over reliance on rational arguments (Groome, 1992); highlight the importance of inductive thinking processes (Murray, 1993); increase student interest and participation levels (de Souza, 2000); and foster and enhance personal involvement in the search for meaning (de Souza, 2000).

In terms of pedagogy, when setting tasks in religious education, teachers need to balance the expectation of achieving the 'right answer' (as per the religious tradition) with encouragement to explore and experiment with ideas (3.4.1). Similarly, if a student perceives the nature of the task is far too difficult or complex, they can easily disengage in learning rather than suffer the embarrassment of failure. Equally, long-term memory is cemented if emotional stimuli are connected to learning. In terms of the 'whole brain' model (Herrmann, 1996), strategies in quadrants C & D (e.g. dramatisation, humour, movement and the arts) are especially useful to arouse the emotional system and stimulate maximum engagement in learning (3.4.5).

Religious Education lessons need to: provide a non-threatening environment allowing learners the freedom to 'sleuth about' without the stress of negative emotions; link into emotive experiences at the commencement of lessons that evoke empathy with the topic and positively stimulate emotive memory connections; allow students to reconnect with each other and debrief emotional responses prior to commencing a lesson; and provide an outlet for emotional expression through discussion, illustration or reflection.

**Proposed criterion:**

*3.4 Acknowledges the role of emotion in learning*

**(v) Risk taking:**

Coupled with the role of emotion in learning, there is a need to foster relaxed alertness (8.5.1) by trying to eliminate fear in learners, whilst maintaining a highly challenging environment (Jensen, 1998b). As indicated in Map Five, the natural capacity of the brain is to question, probe and critique (Wolfe, 2001). The brain needs to be encouraged to actively take risks in a supportive environment (Caine & Caine, 1995) (5.4.4). The learning context must reflect a sense of coherence and orderliness in order to foster the sort of safety that naturally engenders risk taking (Sylwester, 1995). Equally, the brain must be given opportunities for choice. When students are allowed options in the learning context, they naturally gravitate towards those modalities or learning styles with which they feel most comfortable and successful (Ellingsen, 1989) (5.5).

Religious Education classes, in particular, need to create a climate whereby personal ideas and opinions are respected and a student's faltering attempts to articulate their sense of meaning are encouraged (3.2.1). When setting tasks in religious education, teachers need to overcome a tendency for conveying an expectation to 'do it right' or expecting the 'right answer' (as per the religious tradition) in preference to exploring and experimenting with ideas. As noted in the Declaration on Religious Liberty, each person has the right and freedom to search for God in their own way (ed. Flannery, 1996) and as Groome (1991) asserts, teaching strategies should engage students in a 'hermeneutics of suspicion' in the context of the Christian tradition (1.2.4). Content does need to be presented in a systematic manner, but once the brain has received the input, students should be allowed some choice as to the most effective way for them to process that input, as ultimately conceptual ownership and meaning comes from choice.

Similarly, the challenge exists to create a climate in which students can suspend 'disbelief', and put aside their personal theories whilst critically examining alternative concepts. As noted previously, if students are passive thinkers when grappling with value-laden concepts (citizenship, ethics, religion…) they are most likely to become passive adult citizens (Hunter & Jimenez, 1998). If the control of knowledge lies outside the domain of students, little impetus exists for students to do other than acquiesce or reject knowledge given to them (4.2.4).

Pedagogical practice in religious education (3.2) needs to recognise the creative tension between the definitive belief structures of a religious tradition and the need for the brain to assimilate, accommodate or reject new data (Sylwester, 1995). If students are not empowered to take risks with their learning through utilising a diverse array of thinking strategies, they may be prone to simply reject incoming data. In particular, students should be provided with choices as to how a task might be accomplished. The potential to release higher order critical and lateral thinking is significantly augmented if students are given 'permission' to address the problem by selecting from a variety of methods or approaches. By providing students with choice, motivation to engage in an activity is enhanced and learning responses will reflect the preferred learning and cognitive styles, thereby leading to potentially higher quality learning outcomes.

**Proposed criterion:**

*3.5 Encourages risk taking*

**(vi) Neural fatigue and recovery:**

Brain-based research (5.2.6) suggests neural systems fatigue relatively quickly, but recover after a short period of time (Perry, 2000). The brain functions best when it is engaged in constant activity

rather than when passively absorbing information. Further research indicators include: students can only absorb effectively about five to seven minutes of formal input before their brains need to be 'given a rest' and allowed to process the information they have encountered (Jensen, 1998b); information only remains in the working memory for 15 – 20 seconds (Wolfe, 2001); and the brain seeks 'novelty' after four to eight minutes and functions best when it is engaged in a constant variety of activities rather than passively absorbing information (Jensen, 2000a; Perry, 2000) (5.2.4 & 5.2.5).

Pedagogical implications of neural fatigue for religious education indicate that concepts should be presented in relatively short bursts and consolidated by engaging other neural pathways, prior to returning to formal input (Caine & Caine, 1994). When the brain slows down and focuses on the thinking process, effective learning takes place. The brain needs 'wait time' to think and make connections. Learning does not just occur in fixed structured time periods, rather the brain requires actual 'down time' time to explore a point of view or master a specific skill. Essentially, 'Slow Thinking' time gives the brain a reason to pay attention, understand and remember.

**Proposed criterion:**
*3.6 Allows for neural fatigue and recovery*

*In Summary:*
In light of the above discussion, the second stage of the action research project critiques the following six concepts as potential criteria to underpin the overarching principle of Engagement.

***Key principle:*** **Engagement:** Personal choice to be involved in learning

**Distinguishing criteria:** The pedagogical strategy:
3.1 Is problem based
3.2 Is personally relevant
3.3 Provides learning connections through regular feedback
3.4 Acknowledges the role of emotion in learning
3.5 Encourages risk taking
3.6 Allows for neural fatigue and recovery

### *Principle Four: Participation (9.0)*

The communal dimension of learning is viewed as an underlying principle upon which other dimensions of the learning culture are founded. The concept mapping analysis identifies four conceptual clusters that may serve as explanatory criteria for the principle of participation (9.0).

**(i) The 'wisdom' of the community:**

Acknowledging and respecting the wisdom derived from communal interaction was a dominant concept in brain-based learning theory (5.5.4). The brain is innately social and collaborative (Caine & Caine, 1995). The 'community in itself is more important to learning than any other method or technique' (Peterson, 1992, p 2). Human beings are 'wired' to respond in certain ways to their environment. They are social beings who have a 'compulsive craving' to engage with others and they learn best in groups (Hyerle, 1996) (5.2.2). Neuronal connections are reinforced when the pedagogy provides students with the opportunity to think aloud, bounce ideas off others and complete collaborative learning tasks (5.1.1).

Contemporary pedagogical practice (4.2) highlighted how valuing the wisdom of the community through the nurturing of interactive strategies is vital in the development of higher order thinking skills. Other research (4.3) noted that there should be regular opportunities for learners to directly 'rub and polish' their brains with fellow students (Vygotsky, 1978); students need to listen to how others interpret their meaning in order to deepen their own understandings (Peterson, 1992); and incidental learning from indirect acquisition, notably peer discussion and environmental stimuli, is as equally important as direct instruction (Jensen, 1998a). Pedagogical models (4.2) note how pupils need to 'control the talk', remain actively engaged, focus on the discussion and use the ideas of others in order to scaffold their own reasoning processes. The teacher's role has changed from one who directs the entire discussion to one who sets the context, facilitates the process and helps draw the threads together towards the conclusion.

The value of communal participation was also affirmed from a religious education perspective (Maps 1 & 3). Prominent concepts include: revelation emerges within the context of a believing community (Moran, 1979); and human beings do not function as isolated individuals, but it is through interdependent relationships within the faith community that the image of God in each person flourishes (Wedge, 2002). Additionally, catechetical models (1.2) such as Shared Christian Praxis (Groome, 1980) and the 'Four Step' model (Malone and Ryan, 1994) have both emphasised the importance of discerning wisdom through dialogue in community.

Pedagogical inferences for religious education not only point to the importance of creating opportunities for discussion within the classroom, but point to the necessity to sharpen the nature of the interaction in order to ensure focused, sustained dialogue occurs. In this respect, it is not sufficient to organise a group discussion without discerning the style and purpose of the process to be employed and linking the participatory strategy with the relevant data gathering or thinking activity. Similarly, students need to be explicitly and regularly workshopped on a range of collaborative interaction

strategies (e.g. active listening, paraphrasing, rules around group trust and respect ….) if they are to become effective communal learners.

**Proposed criterion:**

*4.1 Values the 'wisdom' of the community*

**(ii) Collaborative learning teams:**

Closely aligned to drawing upon the shared wisdom of the learning community, the notion of participating in the learning process as a member of a small collaborative learning team is a pivotal concept in the cooperative learning literature (Dalton & Watson, 1997; Gibbs, 2001) (4.3.4 & 5.5.4). The rationale for organising learning experiences within the context of small collaborative teams includes their capacity to: address the 'zone of proximal development'[30] and scaffold learning amongst team members (Vygotsky, 1978); foster the cognitive process of conceptual elaboration that requires feedback from a multitude of sources, notably the peer group as well as the teacher (Caine & Caine, 1995; Jensen, 1998b); recognise that dialogue has the capacity to unite critique and inquiry (Peterson, 1992); nurture interdependence (i.e. each individual's actions benefit the group and the group's actions benefit the individual) (Johnson & Johnson, 1989; Kagan, 1994); generate a commitment to other people's successes as well as one's own (O'Brien & White, 2001); and the development of social skills (Gibbs, 2001).

From a pedagogical viewpoint, teachers need to utilise strategies that scaffold learning experiences in religious education (3.4.3). The scaffolding process allows collaborating mentors to initiate and lead less experienced learners into deeper understandings of religious concepts and higher levels of skill development. Each learning team must develop the awareness that the accomplishment of a specific goal is inextricably linked to the whole team working together. Within the religious education classroom there is a need to explicitly develop a range of social skills that positively sustain the learning process and support the process of socialisation into the Catholic tradition (Wedge, 2002). Most cooperative skills are learned through a process of social interaction. Initially, skills need to be explicitly modelled and taught; subsequently skills are continually reinforced through the various activities. Opportunities for giving and receiving feedback on skill attainment are also crucial. Learning experiences in religious education, as with any key learning area, should include strategies to nurture leadership, trust, decision-making and conflict resolution.

**Proposed criterion:**

*4.2 Function within small collaborative learning teams*

30 The difference between what a child can do independently and what a student can accomplish with assistance

**(iii) Modelling, Joint Construction and Independent activities:**

Brain-based learning theory (5.2.5 & 5.2.6) recognises maximising participation in the learning dynamic requires a balanced approach to the instructional process. Whilst appreciating a whole range of skills and concepts are developing concurrently (Scherer, 2001), the brain generally develops many specific skills and conceptual understandings in a sequential fashion (Walsh, 2000). In order to develop the skill levels of the learner, the developmental sequence moves through predictable pathways (e.g. novice; advanced beginner; competent; proficient; and expert (Fogarty, 1998)). Effectual learning sessions incorporate explicit instruction, processing, encoding and neural rest (Jensen, 1998b). In 'brain compatible classrooms' teachers engage the learner's direct attention for twenty to forty percent of the time (Jensen, 1998a). Concepts and skills are deconstructed into small parts, reconstructed through explicit teaching, the joint construction of tasks and by being embedded in 'rich' multidimensional learning experiences (Scherer, 2001; Johnston, 2001).

Map Four highlighted a contemporary Australian pedagogical approach that suggests participation in the teaching and learning cycle is scaffolded through a series of levels, often referred to as the **'To, With, By'** process (Archdiocese of Melbourne, 1999) (4.2.3). New concepts, processing skills or thinking strategies are introduced by the teacher explicitly instructing or modelling the idea **(**'**To** the class'); followed by a process of joint construction were the activity is performed jointly ('**With** the class'); finally students, generally in small learning teams, operate independently ('**By** themselves') to construct meaning and develop their skill base.

In terms of religious education, various writers highlight the need for teachers to move beyond traditional 'transmission models' when sharing 'the Christian Story' (Spurling-Jones, 1995; Ryan et.al., 1996; Mudge, 1999) (1.1.2). Teachers are challenged to embrace a pedagogical practice that combines explicit focused teaching with processes that empower the learners to construct their own insights and meanings from the learning encounter (3.4.1).

**Proposed criterion:**

*4.3 Incorporates Modelling, Joint Construction and Independent activities*

**(iv) Individual and group accountability:**

A further component of the cooperative learning literature (5.5.4) highlights the concept of individual and group accountability. This concept stresses the notion that a learning team is not successful until each separate member has: understood the concept; substantively contributed to the task; satisfied the academic goal; and has enhanced their personal social skill development (Kagan, 1994). Individuals and learning teams need to be able to assess and evaluate their own performance (Gibbs, 2001). The

students require goal clarity and the necessary skills to be able to measure progress towards goal achievement (Kagan, 1994).

Explicitly encouraging students to be accountable for their learning has been a constant theme in most Australian curriculum documents, especially in Tasmania (4.1). Research (4.3) highlighted the passive learning nature of many students, especially with regards to superficial attention, inappropriate application, non-retrieval of existing knowledge and the lack of reflective thinking (Johnston, 2001; Dusting, 2002). Thinking and knowledge bases are consolidated by explicitly sharing information and ideas with another person (Schniedewind & Davidson, 2000) and, whilst there are always several ways to solve a problem, real understanding is reached when the concept can be taught/explained to others (Tickle, 2001).

Pedagogical practices that foster individual and communal accountability include: the promotion of peer tutoring which allows the consolidation of thinking processes; techniques that ensure all participants remain focused on the task at hand by randomly reporting on some aspect of the group's performance at specified times; reflective self assessment strategies; and employing cooperative learning strategies such as roving ambassadors or expert jigsaw discussions (White, O'Brien & Todd, 2003).

**Proposed criterion:**

*4.4 Encourages individual and group accountability*

*In Summary:*

In Stage Two the following four criteria are presented as the basis for critical reflection upon the principle of participation within the overall *DEEP* pedagogical framework.

***Key Principle:*** **Participation:** ***The communal dimension of learning***

**Distinguishing criteria:** The pedagogical strategy:

4.1 Values the 'wisdom' of the community

4.2 Functions within small collaborative learning teams

4.3 Incorporates Modelling, Joint Construction and Independent activities

4.4 Encourages individual and group accountability

## Overlapping Criteria:

As with the overarching principles, it must be highlighted the identified criteria do not exist in isolation. In some cases nuances from one criterion are reflected in descriptors for another item. For example, making provision for open-ended responses (Criterion 2.5) also allows opportunities for problem-solving (3.1) and personal relevance (3.2) to emerge. Generally, it is argued that the congruence between items supports and reinforces the intellectual concepts being portrayed. Stage Two of the action research project critiques the various criteria in terms of language clarity and overlaps in meaning.

## Preliminary Pedagogical Criteria for the *DEEP* Framework:

Flowing out of the concept mapping process, the following preliminary chart (Fig. 10), summarising the distinguishing pedagogical criteria of the *DEEP* Framework, is presented. This chart formed the basis for Stage Two of the action research process (cf. Ch's 8 & 9). The chart also provides a reference point for identifying specific, numerically coded criteria. It must also be noted, as a result of the reflective dialogue with RECs in Stage Two, the following additional criteria were added to the preliminary chart for Phase 3 of the fieldwork research:

1.0 Discernment:
- No additional criteria

2.0 Enrichment:
- 2.6 - Adjust for appropriate developmental levels

3.0 Engagement:
- 3.7 - Learning experiences are co-constructed

4.0 Participation:
- 4.5 - Activities are time efficient and manageable
- 4.6 - Role allocation supports learning

*Figure 10: Preliminary Pedagogical Criteria for the 'DEEP' Framework*

**Discernment:**
**The generation of personal meaning and understanding**

1.1 Generates opportunities for meaning to emerge

1.2 Reconstructs learning through elaboration

1.3 Nurtures 'Connected Knowing'

1.4 Emphasises critical and lateral thinking processes

1.5 Engages the learner in Reflective Practice

**Engagement:**
**Personal choice to be involved in learning**

3.1 Is problem based

3.2 Is personally relevant

3.3 Provides learning connections through regular feedback

3.4 Acknowledges the role of emotion in learning

3.5 Encourages risk taking

3.6 Allows for neural fatigue and recovery

Preliminary Pedagogical Criteria for the '*DEEP*' Framework as revealed by the Concept Mapping Process – Stage One

**Enrichment:**
**Catering for individualised learning**

2.1 Inputs data through a variety of learning styles

2.2 Accommodates cognitive processing styles

2.3 Addresses a range of outcomes in one task

2.4 Caters for mixed ability levels

2.5 Allows for open-ended responses

**Participation:**
**The communal dimension of learning**

4.1 Values the 'wisdom' of the community

4.2 Functions in small collaborative learning teams

4.3 Incorporates Modelling, Joint Construction and Independent activities

4.4 Encourages individual and group accountability

## Conclusion:

Essentially, by virtue of integrating the concept maps across three key fields of enquiry in this chapter, a variety of pedagogical principles and supporting criteria are shown to interact concurrently in the religious education classroom. It is only through such interaction that the individual student is able to encounter their faith tradition and, in the process, construct their individual understandings and relationships with God. No framework can meaningfully exist in isolation; it is the melding of and interaction between the catechetical insights, curriculum directions and pedagogical practices that ensures a balanced approach to religious education.

In the next chapters (cf. Ch's 8 & 9), Stage Two of the action research process examines the manner in which a number of experienced religious educators utilised the *DEEP* framework in practice and assessed its value within the context of primary religious education classrooms. In particular, the action research project evaluates the key principles and supporting criteria of the *DEEP* framework as it was applied to the critique of a number of lesson activities.

# *Chapter Eight*

## Action Research: Stage Two
## Statistical Data

### *'A presentation of the fieldwork statistical data'*

### Introduction:

The purpose of this chapter is to present concisely, the statistical data that emerged from Stage Two of the action research study. As the nature of the research project relied primarily on qualitative data, especially through the focus group dialogue and participant comments on evaluation proformas, it must be appreciated the information recorded in this chapter is limited both in scope and value. The significant qualitative data, especially in the form of direct quotations from participants, is more efficiently integrated into the discussion and analysis of results presented in Chapter 9.

The tables presented in the chapter summarise statistical data drawn from the lesson evaluation sheets completed during the fieldwork activities. Whilst subject to a number of limitations, this data serves to identify a number of key patterns, especially with regard to shifts in emphasis in the utilisation of the *DEEP* principles as an evaluative tool and the relative importance of specific criteria within the overall framework.

### Action Research Stage Two: Fieldwork - Statistical Data

The following statistical data was generated during Stage Two of the action research program, primarily through the analysis of lesson evaluation sheets compiled by the participating Religious Education Coordinators (RECs) after experiencing[31] or teaching nominated learning activities. The presentation of this data is subject to a number of major qualifications:

(i) The focus in Stage Two of the research was on discerning the validity and potential value of the proposed *DEEP* framework. Hence, the emphasis was on obtaining qualitative data

31 In phase 1 of the fieldwork, lesson activities were 'modelled' to RECs.

through the focus group process. Insights and direct references to this data are described in chapter 9.

(ii) The lesson evaluation sheets (cf. Appendices 4 & 6) were primarily designed to stimulate reflective practice with regards to specific lesson activities. Whilst the critique of particular lessons against the *DEEP* criteria generated an array of detailed information, in-depth analysis of the relative merits of particular activities was beyond the scope of this study. As noted earlier, a crucial feature of the research design required RECs to become familiar with the framework and experience its application in 'real life' professional settings in order to facilitate its subsequent critique.

(iii) Whilst an analysis of the data has allowed some nuances regarding specific criterion to be drawn, it must be stressed an over reliance on numerical data is questionable. For example Table 2 summarises the frequency in which criteria were observed to occur within the various activities. On the surface it may appear some criteria are more prominent than others. However, this doesn't necessarily speak to the relative importance or validity of the specific items. Lower rates of 'recognition' may be a function of:

- the actual pedagogical weaknesses of the nominated strategies;
- inexperience in recognising some of the 'newer' pedagogical insights; and
- the highly specific nature of some criteria (e.g. 1.2: reconstructing learning through elaboration) in comparison to more generalised character of other criteria (e.g. 4.1: value the wisdom of the community).

(iv) The composition of the lesson evaluation sheets was altered in Phase 3 (cf. Appendix 6), to facilitate a stronger focus on the actual critique of the proposed framework. The methodology of recording of the frequency of criteria (Table 2) was adjusted slightly, hence the data is not strictly comparable.

**Table 1: Initial Criteria developed by RECs: Matched to the *DEEP* Framework**

This table records the assorted pedagogical criteria articulated by RECs at the commencement of phase one. The comments emanated from eleven workshop groups utilising the techniques of 'Somersault Questions' and 'Talk, Listen & Record' technique (cf. Appendices 1 & 2). After individual RECs were given a period for personal reflection, the structured workshop activities enabled RECs to identify up to five key criteria they believed would be 'crucial' in evaluating an effective lesson in religious education. The comments generated were subsequently matched against the four major dimensions of the *DEEP* framework.

Overall 76% of all criteria identified could be directly matched against the *DEEP* framework. In terms of key principles the theme of engagement dominates the criteria articulated by RECs. Over one third (35%) of all responses reflect the challenge of meaningfully engaging students in religious education; in particular, problem solving (3.1) and personal relevance (3.2) are highlighted. The three other dimensions of the framework are relatively evenly balanced (Discernment: 16%; Enrichment: 12%; Participation: 13%). Specific '*DEEP*' criteria highlighted by RECs include 'connected knowing' (1.3) and working in small group learning teams (4.2). Further, RECs articulated two additional criteria, notably the importance of appropriate resources or teaching aids and the need to monitor the planning and pacing of a lesson.

**Table 1: Initial Criteria developed by RECs – Matched to specific *DEEP* Criteria**

| | No. of Criteria Identified[32] (Max. 5 per group) | Overall Percentage (Rounded) |
|---|---|---|
| Discernment | | |
| 1.1 | 0 | |
| 1.2 | 1 | |
| 1.3 | 4 | |
| 1.4 | 0 | |
| 1.5 | 3 | |
| Total No. of Criteria Noted | 8 | 16% |
| Enrichment | | |
| 2.1 | 3 | |
| 2.2 | 0 | |
| 2.3 | 0 | |
| 2.4 | 1 | |
| 2.5 | 2 | |
| 2.6 | N/A | |
| Total No. of Criteria Noted | 6 | 12% |
| Engagement | | |
| 3.1 | 4 | |
| 3.2 | 6 | |
| 3.3 | 2 | |
| 3.4 | 3 | |
| 3.5 | 3 | |
| 3.6 | 0 | |
| 3.7 | N/A | |
| Total No. of Criteria Noted | 18 | 35% |
| Participation | | |
| 4.1 | 2 | |
| 4.2 | 4 | |
| 4.3 | 1 | |
| 4.4 | 0 | |
| 4.5 | N/A | |
| 4.6 | N/A | |
| Total No. of Criteria Noted | 7 | 13% |
| Other | | |
| Resources/Teaching Aids | 5 | |
| Different approaches to Story | 1 | |
| Planning & Pacing concepts | 4 | |
| Suspend judgment | 1 | |
| Teacher's passion | 1 | |
| Total No. of Criteria Noted | 12 | 24% |
| Overall Total | 51 | 100% |

32 RECs developed criteria in workshop groups. Overall there were a total of 11 groups, four groups identified only 4 key criteria.

**Table 2: Frequency of Criteria Evident in Nominated Teaching Strategies**

Based on the lesson evaluation sheets (cf. Appendices 4 & 6) across the three phases of the fieldwork, this table records the frequency in which specific criteria are identified as being 'evident' within a nominated teaching strategy. Due to small sample sizes within individual categories, only 'overall' percentage figures are calculated so as to reflect meaningful data. Some items were only investigated in Phase 3, resulting in non-applicable (N/A) references being made in earlier phases.

It is notable that, in Phases 1 and 2 of the research cycle, the criteria from dimensions of Participation (82.9% & 78.0%) and, to a lesser extent, Discernment (82.1% & 71.4%) are more frequently identified during the teaching of nominated strategies. However, by Phase 3, teachers are acknowledging the presence of all four *DEEP* constructs to an almost equivalent level (85.1% - 86.7%).

The six most frequently identified individual criteria include:

- 1.1: Generate opportunities for meaning to emerge (87.5%)
- 2.4: Cater for mixed ability levels (88.5%)
- 3.5: Encourage risk taking (88.5%)
- 4.1: Value the 'wisdom' of the community (86.5%)
- 4.2: Function in small collaborative learning teams (90.6%)
- 4.4: Encourage individual and group accountability (87.5%)

**Table 2 Frequency of Criteria – Evident in Nominated Strategies : Phases One - Three**

| | Phase 1 | Total Activities (Max: 19) | Phase 2 | Total Activities (Max: 42) | Phase 3 | Total Activities (Max: 35) | Combined Total Phases 1 - 3 | Total Activities (Max: 96) |
|---|---|---|---|---|---|---|---|---|
| Application of *DEEP* Framework | Frequency | Overall Percentage | Frequency | Overall Percentage | Frequency | Overall Percentage | Frequency | Percentage of Total Activities |
| Discernment | | | | | | | | |
| 1.1 | 17 | | 33 | | 34 | | 84 | 87.5 |
| 1.2 | 16 | | 26 | | 25 | | 67 | 69.8 |
| 1.3 | 17 | | 37 | | 33 | | 77 | 80.2 |
| 1.4 | 16 | | 23 | | 29 | | 68 | 70.8 |
| 1.5 | 12 | | 31 | | 28 | | 71 | 74.0 |
| Total Frequency/ Total Possible Criteria | 78/95 | 82.1% | 150/210 | 71.4% | 149/175 | 85.1% | 367/480 | 76.5% |
| Enrichment | | | | | | | | |
| 2.1 | 7 | | 25 | | 25 | | 57 | 59.4 |
| 2.2 | 15 | | 31 | | 31 | | 77 | 80.2 |
| 2.3 | 12 | | 26 | | 33 | | 71 | 74.0 |
| 2.4 | 18 | | 36 | | 31 | | 85 | 88.5 |
| 2.5 | 17 | | 26 | | 29 | | 72 | 75.0 |
| 2.6 | N/A | | N/A | | 32 | | N/A | N/A |
| Total Frequency/ Total Possible Criteria | 69/95 | 72.6% | 144/210 | 68.6% | 181/210 | 86.2% | 362/480 | 75.4% |
| Engagement | | | | | | | | |
| 3.1 | 19 | | 27 | | 32 | | 78 | 81.3 |
| 3.2 | 16 | | 33 | | 26 | | 75 | 78.1 |
| 3.3 | 10 | | 28 | | 31 | | 69 | 71.9 |
| 3.4 | 15 | | 20 | | 27 | | 62 | 64.6 |
| 3.5 | 18 | | 33 | | 34 | | 85 | 88.5 |
| 3.6 | 10 | | 22 | | 28 | | 60 | 62.5 |
| 3.7 | N/A | | N/A | | 33 | | N/A | N/A |
| Total Frequency/ Total Possible Criteria | 88/114 | 77.2% | 163/252 | 64.7% | 211/245 | 86.1% | 429/576 | 74.5% |
| Participation | | | | | | | | |
| 4.1 | 19 | | 33 | | 31 | | 83 | 86.5 |
| 4.2 | 17 | | 36 | | 34 | | 87 | 90.6 |
| 4.3 | 11 | | 27 | | 31 | | 69 | 71.9 |
| 4.4 | 16 | | 35 | | 33 | | 84 | 87.5 |
| 4.5 | N/A | | N/A | | 31 | | N/A | N/A |
| 4.6 | N/A | | N/A | | 22 | | N/A | N/A |
| Total Frequency/ Total Possible Criteria | 63/76 | 82.9% | 131/168 | 78.0% | 182/210 | 86.7% | 323/384 | 84.1% |

**Table 3: Open-ended Evaluations Coded against *DEEP* Criteria**

In Phases 1 and 2, participants were asked to write open-ended evaluative comments (cf. Appendix 4) on the lesson activities 'keeping the *DEEP* framework in mind'. This table codes the frequency of open-ended responses against the proposed criteria, as well as recording additional 'unprompted' evaluative principles. The participation dimension (28.1%) dominates the open-ended responses, engagement (20.2%) and discernment (19.8%) are equally represented, whilst the enrichment dimension is least represented (17.8%).

In terms of specific criteria, apart from the emphasis on participatory criteria, RECs reveal an evaluative preference for reflective practice (1.5 – 15 responses) and personal relevance (3.2 – 15 responses). When responding in an open-ended manner, it is notable that five criteria are relatively absent from the evaluative process (i.e. less than 5 responses). These criteria include:

- elaboration on learning (1.2);
- learning styles (2.1);
- addressing multiple outcomes (2.3);
- connecting through regular feedback (3.3); and
- allowing for neural fatigue and recovery (3.6).

RECs also refer to an additional 34 evaluative items (14% of total responses) that could not be coded into the *DEEP* framework. These items are grouped into five categories. The two most prominent criteria emphasise the effective use of lesson time (9 responses) and the matching of activities to the developmental levels of the students (11 responses).

**Table 3: Open-ended Evaluation utilising *DEEP* criteria**

| Total Activities | Phase 1 (Max: 19) | Phase 2 (Max: 42) | Combined Total Phases 1 - 2 (Max: 61) | | |
|---|---|---|---|---|---|
| Application of *DEEP* Framework | Frequency | Frequency | Frequency | Frequency related to overall responses | Overall Percentage |
| Discernment | | | | | |
| 1.1 | 2 | 5 | 7 | | |
| 1.2 | 1 | 2 | 3 | | |
| 1.3 | 1 | 11 | 12 | | |
| 1.4 | 7 | 4 | 11 | | |
| 1.5 | 2 | 13 | 15 | | |
| Total Frequency | 13 | 35 | 48 | 48/242 | 19.8% |
| Enrichment | | | | | |
| 2.1 | 1 | 3 | 4 | | |
| 2.2 | 5 | 7 | 12 | | |
| 2.3 | 0 | 2 | 2 | | |
| 2.4 | 3 | 10 | 13 | | |
| 2.5 | 3 | 9 | 12 | | |
| Total Frequency | 12 | 31 | 43 | 43/242 | 17.8% |
| Engagement | | | | | |
| 3.1 | 0 | 10 | 10 | | |
| 3.2 | 3 | 12 | 15 | | |
| 3.3 | 0 | 2 | 2 | | |
| 3.4 | 4 | 4 | 8 | | |
| 3.5 | 4 | 6 | 10 | | |
| 3.6 | 2 | 2 | 4 | | |
| Total Frequency | 13 | 36 | 49 | 49/242 | 20.2% |
| Participation | | | | | |
| 4.1 | 7 | 10 | 16 | | |
| 4.2 | 8 | 15 | 23 | | |
| 4.3 | 1 | 17 | 18 | | |
| 4.4 | 5 | 6 | 11 | | |
| Total Frequency | 21 | 47 | 68 | 68/242 | 28.1% |
| Other | | | | | |
| Time effective | 3 | 6 | 9 | | |
| Explicit teaching | 1 | 3 | 4 | | |
| Role allocation | 0 | 6 | 6 | | |
| Co-construction | 0 | 4 | 4 | | |
| Develop. level | 0 | 11 | 11 | | |
| Total Frequency | 4 | 30 | 34 | 34/242 | 14.0% |
| Overall Responses | 63 | 179 | 242 | 242/242 | 100% |

**Table 4: Rating Lesson Effectiveness: Phase 3**

This table records the ratings RECs allocated to the 'effectiveness' of particular lessons in Phase 3 of the project utilising the preliminary *DEEP* framework as the evaluative criteria (cf. Appendix 6). In essence, much of the data generated is not significant for this study per se, as the emphasis in this research is on developing evaluative criteria in contrast to actually judging the effectiveness of particular lessons[33]. Nonetheless, it is interesting to observe the manner in which perceived lesson effectiveness progressively declined from the participatory dimension (Highly Effective – 125 responses) to the discernment dimension (Highly Effective – 79 responses).

The table also summarises the overall frequency in which a particular criterion was recognised and utilised as an evaluative indicator within the course of a particular lesson. It is noteworthy that the discernment dimension featured most prominently with a recognition level of 89.7%, followed by enrichment with a recognition level of 83.8%. It must be noted that the relative decline in the participation dimension was largely a function of trialling criterion 4.6 (Role Allocation) which was not well recognised.

Of particular note to this study is the identification of the criteria that are deemed non-applicable. In this respect, the three criteria that rate most frequently as 'non-applicable' include:

- 4.6: Role allocation supports learning (18 responses);
- 3.2: Personal relevance (11 responses); and
- 3.4: Role of emotion (10 responses).

Whilst the design of specific strategies would naturally exclude some criteria, it is arguable, if a particular criteria is repeatedly viewed as 'non-applicable' across a number of strategies, then potentially the criteria itself may lack validity. Detailed discussion of these criteria occurs in Chapter 9.

33 The empirical application of the criteria in evaluating lesson effectiveness could be a focus for future research.

**Table 4 Rating Lesson Effectiveness: Phase 3 - Total 35 Strategies**

| Application of *DEEP* Framework | N/A | Not Effective (1) | Low (2) | Medium (3) | Highly Effective (4) | Overall Recognition Level[34] | Overall Recognition Percentage |
|---|---|---|---|---|---|---|---|
| Discernment | | | | | | | |
| 1.1 | 1 | 0 | 2 | 15 | 17 | 34 | |
| 1.2 | 9 | 0 | 5 | 8 | 13 | 26 | |
| 1.3 | 2 | 0 | 4 | 12 | 17 | 33 | |
| 1.4 | 4 | 0 | 6 | 12 | 15 | 31 | |
| 1.5 | 5 | 0 | 6 | 8 | 17 | 30 | |
| Total | 21 | 0 | 23 | 55 | 79 | 157/175 | 89.7% |
| Enrichment | | | | | | | |
| 2.1 | 9 | 0 | 2 | 11 | 13 | 26 | |
| 2.2 | 4 | 0 | 3 | 14 | 14 | 31 | |
| 2.3 | 4 | 0 | 2 | 14 | 15 | 31 | |
| 2.4 | 3 | 1 | 1 | 10 | 20 | 32 | |
| 2.5 | 6 | 0 | 4 | 6 | 19 | 29 | |
| 2.6 | 8 | 0 | 3 | 6 | 18 | 27 | |
| Total | 69 | 1 | 15 | 61 | 99 | 176/210 | 83.8% |
| Engagement | | | | | | | |
| 3.1 | 6 | 0 | 4 | 6 | 19 | 29 | |
| 3.2 | 11 | 0 | 3 | 6 | 15 | 24 | |
| 3.3 | 7 | 0 | 2 | 8 | 18 | 28 | |
| 3.4 | 10 | 1 | 1 | 6 | 17 | 25 | |
| 3.5 | 4 | 0 | 2 | 10 | 19 | 31 | |
| 3.6 | 9 | 2 | 4 | 7 | 13 | 26 | |
| 3.7 | 9 | 0 | 4 | 9 | 13 | 26 | |
| Total | 56 | 3 | 20 | 52 | 114 | 189/245 | 77.1% |
| Participation | | | | | | | |
| 4.1 | 6 | 0 | 0 | 8 | 21 | 29 | |
| 4.2 | 3 | 0 | 0 | 6 | 26 | 32 | |
| 4.3 | 3 | 1 | 4 | 6 | 22 | 32 | |
| 4.4 | 5 | 0 | 0 | 5 | 25 | 30 | |
| 4.5 | 5 | 0 | 1 | 9 | 20 | 30 | |
| 4.6 | 18 | 0 | 0 | 6 | 11 | 17 | |
| Total | 40 | 1 | 5 | 40 | 125 | 170/210 | 81.0% |

34 The overall recognition levels reflects the frequency in which the criteria was identified and used as an evaluative indicator.

## Conclusion:

This chapter provides a useful, albeit limited, statistical database to support a more detailed critique of the *DEEP* framework emanating from focus group discussions with experienced RECs, in the context of the religious education classroom (cf. Ch 9). Whilst the statistical information (Tables 1 – 4) is tentative, due to exploratory nature of action research a number of key themes emerged. In particular, the increased emphasis on the discernment and enrichment dimensions as the research progressed and the endorsement through identification and application of a significant proportion of the specific evaluative criteria. As discussed in subsequent chapters, the data generated by Stage Two of the project contributes significantly both to the refinement of key conceptual ideas and to the validation of the underlying principles of the *DEEP* framework.

# *Chapter Nine*

## The DEEP Framework: A Practical Critique

## *'A reflection upon the application of the DEEP framework in classroom settings'*

### Introduction:

In this chapter the research outlines the findings and insights generated by Stage Two of the action research process conducted with Religious Education Coordinators (RECs) across the Archdiocese of Hobart. The focus of this stage of the research was on the application of the *DEEP* framework in a professional setting. In particular, participants were requested to utilise a range of 'brain-based' teaching strategies within the context of primary school religious education lessons and evaluate the quality of this type of pedagogical approach in light of the criteria articulated in the framework.

This chapter initially presents an overarching critique of the *DEEP* framework as the process moved through the three research phases. It integrates relevant statistical data (cf. Ch 8) with the comments and insights arising from the focus group dialogue. Discussion includes a broad analysis of the four major dimensions of the framework, noting how the response of RECs evolved throughout the project. As well as reflecting upon the actual framework, reference is also made to other research questions, notably the impact of articulating a pedagogical framework on RECs perceptions of the learning process in religious education. A major feature of the chapter is a detailed analysis of each individual criteria leading to validation or refinements of the preliminary framework.

## Broad Critique of the *DEEP* Framework:

### *Insights from the Statistical Analysis of the DEEP Framework:*

Prior to exposure to the *DEEP* framework, Phase 1 of the research process commenced by asking the combined group of RECs to articulate criteria that could facilitate the critique of an effective lesson activity. Utilising structured workshop techniques (cf. Appendices 1 & 2), RECs identified a total of 51 criteria (cf. Table 1) they believed would be useful in discerning effective pedagogical practice. Subsequent cross-referencing to the *DEEP* framework indicated that RECs placed great emphasis on criteria that facilitated engagement on the part of the students. Over 35% of initial responses could be classified under the engagement dimension, with *problem solving* (3.1)[35] and *personal relevance* (3.2) featuring prominently. By comparison, the other three *DEEP* dimensions ranged from 12% to 16% of responses. In terms of specific criteria, only *connected knowing* (1.3) and *collaborative learning* (4.2) were recorded by four or more groups. Specific *DEEP* criteria absent from the REC developed criteria included *meaning making opportunities* (1.1); *emphasising critical and lateral thinking* (1.4); and *accommodating cognitive processing styles* (2.2).

Overall, three quarters (76%) of the criteria highlighted by RECs corresponded to the framework, indicating that the combined professional wisdom of a group of experienced religious educators provided an initial validation of the *DEEP* framework (cf. Table 1). In terms of specific variations, it was notable 10% of comments focused on the suitability of teaching aids and resources, indicating a tendency to evaluate lesson activities in terms of available curriculum resources in combination with pedagogical principles. An additional issue (8% of responses) identified by RECs, that subsequently proved relevant to this study, was the identification of the planning and pacing of lesson concepts and activities as a potential evaluative criteria.

Following exposure to the *DEEP* framework and the modelling of teaching strategies, the RECs evaluated a range of lesson activities employing the *DEEP* criteria. The evaluation sheets (cf. Appendix 4) initially asked participants to identify whether specific criteria were explicitly evident in the lesson activities. Whilst recognising some activities, by their design, may reflect a greater range of criteria overall, RECs could clearly discern evidence of the majority of the *DEEP* criteria. Across a total of ninety-six teaching strategies, participants found evidence of the combined criteria being present in over three-quarters of the lessons taught. The participation dimension featured most strongly, averaging 84% responses per criterion, whilst the other three dimensions were evenly balanced averaging between 74% - 76% responses per criterion (cf. Table 2).

The dominance of the participation dimension was further borne out in the second component of the evaluation sheet for Phases 1 and 2 (cf. Appendix 4). This section required participants to critique

35 For the sake of brevity most specific criteria have been recorded in an abridged form

teaching strategies using open-ended responses whilst keeping the *DEEP* framework 'in mind'. The data obtained was coded against the framework (cf. Table 3). When asked to specifically evaluate each lesson and articulate a rationale for their responses, RECs overwhelmingly referred to participatory criteria at a significantly higher level than for of the other three dimensions (i.e. 28.1% compared to 19.8%, 17.8% and 20.2% respectively). Similarly, in Phase 3 using a four point rating scale, highly effective ratings were given most commonly for participation criteria (cf. Table 4).

Further analysis of Table 2 indicates the greater weighting attached to participation was particularly evident in Phases 1 and 2, whilst by Phase 3, nearly all dimensions were evenly balanced. This suggests, whilst participation was initially more easily observable, as RECs became more familiar with the framework, they began to recognise other dimensions more capably. Equally, the initial modelling of cooperative learning strategies was a relatively new experience for many participants, hence their sensitivity to this dimension may have been accentuated. Interestingly, by Phase 3, the average recognition levels across all criteria had increased to over 85%. However, the inclusion of additional criteria and modifications to the design of the evaluation sheets from earlier phases of the action research model may have partially contributed to this increase.

A feature that emerged throughout the action research process was the greater weighting and importance RECs attached to the discernment dimension of the framework as the project evolved. Initially, discernment was primarily linked to connected knowing and reflection (cf. Table 1). However, in light of the professional workshops, RECs began to attach greater importance to *meaning making opportunities* (1.1) and, to a lesser extent, *critical and lateral thinking* (1.4). Overall discernment was ranked second, on average, to participation on the specific identification of criteria across all three phases. (cf. Table 2). By the completion of Phase 3, the discernment dimension was the most recognised and utilised criteria (89.7%) when evaluating lesson effectiveness (cf. Table 4).

Whilst not of major significance it was noteworthy to observe, after the emphasis RECs placed on engagement in the preliminary workshop discussions, this dimension was ranked fourth (albeit by a small margin) in subsequent iterations of the research.

### *Insights from the Focus Group Analysis of the DEEP Framework[36]:*

Focus group discussions confirmed much of the above analysis. In particular, there was a very strong endorsement as to the value and importance of the four key dimensions of the framework. Typical responses obtained, when noting the value of the framework, included: "effective… elements of *DEEP* easy to identify in conversations with children"; "very good … identified all essential

36 All quotations are cited from the focus group transcripts or coded evaluation sheets and hence are not attributable to individual RECs.

components of a good activity"; "…. evident in work samples"; "useful for younger children, especially participation".

As expected, the nature of individual lesson activities, at times, emphasised some particular dimensions of the framework over others. For example, the strategy 'Scripture Detours' (White, O'Brien & Todd, 2003) placed greater stress on enrichment (opened ended responses) and discernment (especially lateral thinking), whilst participation "was strongest" in the strategy 'Scripture Detective' (White, O'Brien & Todd, 2003). Yet overall, when asked to discern if some dimensions and criteria were more significant than others, RECs commented that all four dimensions were valuable and relevant ("most criteria helped"; "it was difficult to single out specific criteria"; "could apply to all to some degree").

Whilst RECs noted maximising participation and engagement were fundamental starting points for most lessons ("participation is the lynchpin for enrichment and discernment"; "*DEEP* framework highlighted the communal dimension of learning"), as the project developed, a stronger appreciation of the significance of the discernment dimension began to emerge. Commenting on the usefulness of the framework by Phase 3, RECs noted: "discernment really evoked a focus on the religious content of the lesson"; "students made connections"; "discernment was great…. helped tease out religious meanings and connections". The shift to emphasising the discernment dimension was well summarised by one REC who remarked "enrichment, engagement and participation may make a lesson seem effective but it is not really unless it generates opportunities for religious meaning to emerge".

In critiquing the framework it was perceived that applying the discernment criteria is difficult in the short-term context of an individual lesson as "discernment often emerges after the lesson when children have started to think about parallels in their lives". Further, it was suggested observing the discernment dimension was complicated "because many children haven't had a personal religious experience or have no religious background." Such comments highlight the importance of applying the framework over a series of lessons within the context of an entire unit, in contrast to expecting each of the dimensions or criteria to be equally present and relevant in every lesson.

A major critique of the initial framework emerging from Phase 2 discussions was the absence of 'religious language' in association with specific criteria, particularly within the discernment dimension. RECs suggested the criteria could be 'sharpened' by the insertion of the term 'religious' at appropriate points (e.g. 'religious meaning'; 'religious concepts'; 'religious understandings'). Nevertheless, debate surrounding the definitions of 'religious language' was mixed. Some participants argued the terms 'religious' and 'spiritual' could be interchanged synonymously, whilst others

believed such an approach would substantively alter the nature of the discernment criteria. In particular, confusion arose between 'religious education' and 'deepening one's personal spirituality'.

On balance, as was argued in Chapter 4, whilst the religious education classroom embraces the intersection of the Catechetical, Curriculum and Pedagogical perspectives, pedagogical models are primarily focused on the educative process within the classroom. Hence, remaining with the term 'religious' (i.e. implying concepts and understandings are linked to the 'study' of a religious tradition) is more appropriate. Within the context of this discussion, the concept of reflective practice (criterion 1.5) was also revamped to emphasise 'reflections on life'.

These modified descriptors of the criteria utilising 'religious' terminology were 'tested' in Phase 3. Subsequent Focus Group analysis indicated incorporating the term 'religious' within selected criteria had merit. A significant rationale for this position suggested such terminology would emphasise to teachers using the framework "the ultimate goal of a religious education activity" (i.e. to engage students in a thoughtful reflection upon religious concepts that may ultimately enhance their understandings of God and their response to the Christian message (Archdiocese of Hobart, 2004)).

Apart from a broad endorsement of the *DEEP* concept, a number of other insights emerged from the application of the framework, particularly with regards to deepening RECs perceptions of the learning process in religious education (cf. Ch 1). By employing the framework, the capacity of RECs to engage in reflective practice was strengthened ("framework very effective in evaluating lessons"; "gave a focus to how children worked and learnt in groups"). In particular, participants appeared to develop a greater awareness as to why particular lessons were not successful ("exposed the reason why"; " basically students were unable to disclose their understandings if the path of the story altered").

A component of the evaluative process asked participants to comment on the manner in which specific criteria were 'least' helpful. Observations from the least helpful category reveal that RECs did not so much view the nominated criterion as lacking in value, rather it was a reflection on the criterion that demonstrated a weakness in the lesson ("risk taking … doesn't fit emphasis on getting it right"; "neural fatigue occurred …. kids switched off"; "personal relevance not highlighted") and so, as a result, the framework enhanced the reflective process.

The framework also ensured teachers were balanced in applying evaluative criteria across the pedagogical spectrum and simply did not focus on the more easily observable criteria ("…kept me on task to evaluate all areas of the *DEEP* framework"; "gave criteria to evaluate, gave scaffolding to me the teacher"). As the research project progressed RECs came to expect 'more' of the lessons they were teaching. Critiquing lessons against the framework heightened awareness of what a quality lesson

should embrace ("it makes the teacher focus on the main teaching emphasis"; "highlights how a great activity can be planned"). Further, the framework was seen as valuable when "debriefing students and working in conference situations"; "pinpointing levels of understanding"; and "highlighting children who were not engaged".

By reflecting on the framework it was evident RECs became more conscious of the proximal zone of student learning. Comments regarding 'connections to prior learning and understandings' were prominent ("students struggled due to their knowledge (or lack there of) about scripture passages"). Equally, perceived student difficulties in coping with a lesson were no longer simply related to a lack of prior knowledge. Rather, an enhanced appreciation of the need to scaffold cooperative learning strategies and thinking skills, combined with an analysis of the broader learning context became more important ("needed to be broken down … more experience required to see the 'what ifs'…").

The *DEEP* framework not only contributed to lesson evaluation but also was to seen to be useful for the sequencing of lesson strategies in future planning. For example, it was noted the strategy 'Scripture Detective' (White, O'Brien & Todd, 2003) "didn't allow for extending knowledge … hence in future it would be better used as a summarising/concluding activity". Similarly, the framework facilitated "longer term evaluations of earlier lessons" as there was a heightened awareness that "children had to gather threads together from other lessons to complete the task".

Reflecting on the focus group discussions, it was also of interest to observe a shift in the commentary on the enrichment dimension. Initially, comments were broad and generalised ("all abilities catered for…"; "catered for everyone"). Towards the conclusion of the project, greater specificity and emphasis was placed on this dimension ("if you are not catering for all, then before you have even started teaching half of the class has failed"; "…. activity really made children think through the process"). RECs appeared to become more conscious of the value of 'individualising' learning experiences within the religious education classroom.

One of the potential dangers, during a professional development experience, of articulating any conceptual model in a sequential manner is that the participants could come to see each dimension of the framework as a distinct entity, rather than an a dynamic, interactive paradigm. There was recognition noting the value of the 'layers of learning concept' (cf. Ch 7, Fig. 9) ("participation is a fundamental starting point") depicting the four key dimensions sequentially building one from another. It was acknowledged participation and engagement could be essential pre-requisites to enrichment and discernment.

Overall, focus groups indicated an appreciation of the various dimensions overlapping and interacting with each other. It was accepted that no criteria operates in isolation. It was only through the positive

interaction of a number of combined interrelated criteria was it possible to discern an effective teaching strategy. Equally, reflective dialogue highlighted not every criterion needed to be present to affirm the quality of a teaching activity. A combination of strategies with differing strategic intents (e.g. catering for differing learning or cognitive processing styles) may be necessary to achieve the pre-determined learning outcomes. Ultimately, it was the dynamic intersection of all dimensions that contributed to a strong pedagogical analysis.

### *Insights on Specific Criteria - General Observations*

In terms of specific criteria, the most commonly observed items (greater than 85%) included: (cf. Table 2)

- *meaning making opportunities* (1.1);
- *catering for mixed abilities* (2.4);
- *encouraging risk taking* (3.5);
- *valuing the wisdom of the community* (4.1);
- *collaborative learning* (4.2); and
- *individual and group accountability* (4.3).

Similarly, the evaluation conducted with open-ended responses (cf. Table 3) emphasised the importance placed on the criteria within the participatory dimension whilst also placing increased importance on *reflective practice* (1.5) and *personal relevance* (3.2) when evaluating lesson outcomes. Whilst, once again, the data may simply be a function of the character of the teaching strategies, focus groups suggested RECs do place greater emphasis on these criteria when evaluating lesson activities.

By contrast, some criteria were not overly evident across the framework (less than 70%), in particular: (cf. Table 2)

- *reconstructing learning through elaboration* (1.2);
- *the variety of learning styles* (2.1);
- *acknowledging the role of emotion* (3.4); and
- *neural fatigue and recovery* (3.6).

Prominent absences from the open-ended evaluations (cf. Table 3) included the above with the addition of *addressing a range of outcomes* (2.3) and *providing regular feedback* (3.3). This points to either a deficiency in the lesson strategy or, as was highlighted in the focus group discussions, there is a need for greater clarification of the actual criteria (“depends on teachers’ interpretations of specific criteria”; “would help for some clearer description of criteria”).

The open-ended evaluations (cf. Table 3) and subsequent focus group discussions that concluded Phase 2 also pointed to four additional specific criteria that were worthy of exploration in Phase 3 of the project. These suggestions subsequently became items:

2.6: Adjust for appropriate developmental levels;

3.7: Learning experiences are co-constructed;

4.5: Activities are time efficient and manageable; and

4.6: Role allocation supports learning

Further detailed reflection on the original and proposed additional criteria are included in the following section.

### *Insights on Specific Preliminary Criteria*[37]

Subsequent to the broad validation of the key underlying principles of the *DEEP* framework, the action research project proceeded to critique in some detail each of the proposed evaluative criteria. The majority of the criteria were formulated in response to the concept mapping process in Stage One of the project (cf. Ch 7: Fig. 10). Generally, the criteria represented the 'major concepts' contained in Maps 6 – 9 (cf. Ch 6). As noted above, additional criteria emerged from the various iterations of the research cycle and were incorporated as appropriate. In the following discussion, each of the original criteria are analysed and, where appropriate, modifications emanating from the discussion are recorded and highlighted at the conclusion of each section. A revised summary of the pedagogical criteria for the *DEEP* framework is included at the end of the chapter (Fig. 11).

## *1.0 Discernment Criteria*

### 1.1 Original Criterion: Generates opportunities for meaning to emerge

For many RECs the articulation and absolute significance of this criterion was the pivotal insight from the action research process. From not having been named as a criterion at the commencement of Phase 1, *'opportunities for meaning making'* was identified in over 87% of activities and was seen as the highest ranking (34 out of 35 activities) 'recognisable' evaluative criteria when rating lesson effectiveness in Phase 3.

As noted in the general analysis of the discernment dimension, as the project unfolded RECs became increasingly more aware and insistent that the provision of meaning making opportunities was essential to the successful implementation of any pedagogical process. Evaluative comments frequently included specific references to the meaning making process (e.g. "…. led to a re-examination of the actual story path"; "children were able to generate ideas"; "children gained

37 To save repetitive references, the statistical data corresponding to the specific criteria are summarised in Tables 2, 3 & 4 respectively.

meaning from the lesson"). As observed earlier, the insertion of the term 'religious meaning' was seen as important in "sharpening the focus" and "being explicit" about engaging in thought and study surrounding religious concepts.

A qualification to the criterion highlighted that 'meaning making' is an ongoing process that "can't happen in one lesson" and "needs to evolve over several activities".

Informal dialogue from the professional workshop in Phase 1 verified the contention that, whilst many primary religious educators were comfortable employing constructivist learning principles in other key learning areas, almost unconsciously they reverted to teacher centred 'transmission models' when exposing children to religious concepts (Spurling-Janes, 1995) The need to shift to a more child-centred learning environment where students were empowered to explore religious meaning from both a personal and communal perspective was a major revelation. Teachers began to appreciate sound pedagogical practice necessitated a shift in their role from an over reliance on 'direct instruction' to one where they were viewed more holistically as 'facilitators' of the learning experience.

**Modification to the criterion:**

*1.1 Generates opportunities for religious meaning to emerge*

### 1.2 Original Criterion: Reconstructs learning through elaboration

For a number of participants the notion of extending learning through the process of reconstruction was relatively new as an explicit concept. Whilst often 'employed' incidentally, RECs needed to observe some 'modelled' examples[38] before the idea assumed real meaning. Being more specific in nature, it was noted this criterion would not be as evident (or appropriate) in all strategies (especially the organising and summarising activities associated with 'Quadrant B' thinking processes[39]), a feature borne out in the statistical analysis (69.8%). Nevertheless, as the notion became familiar, it was universally endorsed as a valid and significant criterion ("extending learning through elaboration really allowed children to question and pull apart scripture in a way not seen before").

In light of its more precise nature it was perceived the order of discernment strategies could be revamped to place and connect the more generalised criteria together. Hence, this criterion was renumbered from 1.2 to 1.5 to reflect its more specific nature.

38 See *'Into the Deep'* Strategies: Triple Play - 5.2 & Scripture Detours - 6.2: (White, O'Brien & Todd, 2003)

39 See *'Into the Deep'*: Chapter 4 for quadrant 'B' organising and summarising strategies (White, O'Brien & Todd, 2003)

**Modification to the criterion: (renumbered)**

*1.5 Extends learning through elaboration upon religious concepts*

### 1.3 Original Criterion: Nurtures 'connected knowing'

Focus groups indicated that teachers were acutely aware that prior learning and experiences influenced the capacity of students to meaningfully engage in an activity ("children had little prior knowledge"; "lack of 'churching' forces the teacher to make connections"…). Note was also made of the importance of intertwining secular and religious understandings ("…. culture, faith and life")

However equally it was apparent that the concept of 'connected knowing' was not fully appreciated. Dialogue with RECs did not reveal a conscious awareness of the need to utilise explicit strategies to enable the articulation of prior insights and knowledge, which subsequently allows students to connect their thinking to the current area of investigation. No reference, for example, was made to the 'Life Experience' component of the catechetical 'Four Point Plan'[40] model that underpins the current Tasmanian Religious Education syllabus, nor did teachers highlight the role that cooperative learning strategies could play in this regard.

In part, this limitation may be due to a combination of:

- each strategy being evaluated in isolation;
- the overlap between explicit strategies that nurture 'connected knowing' and 'reflective practice'; and
- the acknowledgement that teachers naturally facilitate 'connections' informally and incidentally through the course of a lesson.

Hence, whilst RECs endorsed the inclusion of this criterion into the framework, further work needs to be done to ensure all nuances of meaning are fully appreciated. Including the term 'facilitate', in contrast to the less explicit notion of 'nurture', may help accentuate the importance of incorporating 'connecting' processes overtly in pedagogical design.

**Modification to the criterion:**

*1.3 Facilitates 'connected knowing' to prior secular and religious understandings*

40 The diocese is still currently using the 'Melbourne Guidelines' featuring the 'Four Point plan' (Archdiocese of Melbourne, 1995) as its core religious education resource.

### 1.4 Original Criterion: Emphasises critical and lateral thinking processes

Response to this criterion was strong across all participants and was seen as an essential criterion. Striking a balance between strategies emphasising either critical or lateral thinking processes was especially acknowledged ("…. activity enabled creative thought which in turn stimulated deeper thinking"). Equally, it was felt that the criterion was emphasised when "critical thinking was absent" and "reminded" teachers that lateral thinking and the synthesis of ideas was just as important as "recording information". The importance of the 'thinking' dimension, especially as it is viewed as a core component of the Tasmanian 'Essential Learnings' Framework[41], prompted comments that it should be repositioned in the sequence of discernment criteria.

**Validation of the criterion – retained original terminology & changed order to highlight the importance of the concept:**

*1.2 Emphasises critical and lateral thinking processes*

### 1.5 Original Criterion: Engages the learner in reflective practice

As noted earlier, this criterion was modified for Phase 3 to read 'engage the learner in Reflections on Life'. The rationale for this change was two-fold. Firstly 'reflections on life' picked up on a key component of Groome's (1980) Shared Christian Praxis model. For some RECs, the highlighting of the catechetical intent was important ("what is the impact on spirituality … call and response") whilst others emphasised the reflective interaction of "faith and life" ("so what does it mean in my life?"; "children are good at externalising meaning but not internalising it in their own lives").

Secondly, confusion surrounded what was meant by 'reflective practice'. Some RECs perceived it in a pedagogical context (i.e. students critically reflecting upon the actual learning process). Other participants suggested alternative criteria in the discernment dimension, notably generating meaning making opportunities (1.1) and nurturing connected knowing (1.3), overlapped confusingly with the notion of reflective practice.

Phase 3 deliberations brought little by way of clarification on the part of RECs. For those operating with a 'Shared Praxis' orientation the inclusion of the term 'values' (i.e. 'reflections on life and values') was seen to have merit, though for most, clarity of definition was crucial. From a pedagogical perspective, what is vital is that the students are provided with structured and semi-structured opportunities to actually undertake a reflective process beyond the direct generative flow of a lesson. The term 'Reflective Moments' (O'Brien & White, 2001, p 35) appears to capture the nuance of meaning more effectively. Essentially, 'reflective moments' are opportunities, formally built into the lesson design, that empower students to: 'think for themselves and not just let their ideas be tied to the

41 See a detailed reference to the 'Essential Learnings Framework' in Chapter 3

teacher's opinion'; 'analyse the achievement of learning goals'; and 'verbalise insights to ascertain where else in their environment knowledge, skills and understandings can be applied'.

**Modification to the criterion & changed order:**

*1.4 Structures 'reflective moments' into the learning experience*

## *2.0 Enrichment Criteria*

### 2.1 Original Criterion: Inputs data through a variety of learning styles

An analysis of the statistical data would suggest that this criterion was one of the least recognised and valued (e.g. recognised in only 59.4% of activities; mentioned on only four occasions in open-ended evaluations and considered as 'not applicable' for nine out of thirty-five activities in Phase 3 evaluations). During Phase 2 the question was raised as to whether the criterion should be merged with 'cognitive processing styles' (2.2) ("is the distinction worthwhile or just academic?").

However, subsequent focus groups clearly asserted its importance in the framework ("highlights how children grasp data differently"; "catered for all learning styles") and affirmed the difference between how students input data and the manner in which they cognitively process learning (2.2) was worth maintaining ("the distinction is worth making"; "one focuses on classroom set up, the other on the child"). As participants observed, "specific activities tend to only focus on one style of learning". What is important is that various learning preferences should be catered for across a range of lesson activities. Hence, this criterion is more relevant when critiquing the pedagogical integrity of a unit of work in comparison to a specific lesson.

Further reflection suggests inserting the term 'access' (in preference to input) would emphasise a key distinction between learning styles and cognitive processing. Learning styles emphasise the preferred manner in which the brain initially 'accesses' incoming sensory information, whilst cognitive styles focus on the process the brain utilises to manipulate, comprehend and extend the data received.

By way of critique, the major feedback from RECs revolved around terminology. The term 'data' was seen as constricting and simply focusing on content. It was proposed the terminology 'concepts and understandings' was more appropriate as it highlighted the broader notion of 'connecting' knowledge into meaningful patterns.

**Modification to the criterion:**

*2.1 Accesses concepts through a variety of learning styles*

### 2.2 Original Criterion: Accommodates cognitive processing styles

Individual differences in cognitive processing styles have been a major insight offered by the brain-based learning research. For most participants in the study, an understanding of cognitive processing theory was limited. Some RECs had been exposed to Gardner's (1991) Multiple Intelligence paradigm, conversely no one had encountered Herrmann's (1996) 'Whole Brain' model in an educative setting and no references were made to 'thinking styles' when RECs formulated their initial pedagogical criteria. During Phase 1, professional development workshops outlined the essential premises of the interactive four-quadrant 'Whole Brain' model. This was particularly necessary as the teaching strategies utilised in the study were explicitly arranged to reflect the four thinking quadrants[42].

As a consequence, it was not surprising to note RECs placed great store on this evaluative criteria (e.g. recognised in over 80% of activities; mentioned on twelve occasions in open-ended evaluations). Further, as the project evolved, participants became more skilled in identifying the primary cognitive focus of an activity, whilst appreciating that an effective strategy would also provide some scope for at least one of the other thinking styles to be catered for.

Value was seen in maintaining the more generic terminology (i.e. cognitive processing styles) in preference to limiting the criterion to one particular theory or model, but to include the term 'varied' to highlight the unique distinctiveness of thinking preferences across a cohort. This especially recognises how brain-based learning models will continue to evolve in the professional literature and enables the *DEEP* framework to adapt to emergent thinking.

**Modification to the criterion:**

*2.2 Accommodates varied cognitive processing styles*

### 2.3 Original Criterion: Addresses a range of outcomes in one task

The inclusion of the term 'outcomes' suggested an evident merging of curriculum and pedagogical principles within this criterion. On one hand some RECs were concerned about the notion of endeavouring to blend "too many" academically oriented outcomes into one task. However, others recognised that the outcomes for a 'rich' task extended beyond content and embraced skills and attitudes, many of which integrated with and reinforced learning processes relevant to other key learning areas. Whilst endorsed as a useful element of the framework ("it is possible to accept different outcomes when children explain their answers"), the criterion did not feature strongly in the thinking of RECs when asked to evaluate using open-ended responses (only two references).

42 Teaching strategies in *'Into the Deep'* were classified and arranged to reflect the four thinking quadrant of Herrmann's (1996) Whole Brain model.

Further reflection notes the link between this criterion and a fundamental premise of the 'Essential Learnings' framework (i.e. 'setting tasks based on real world contexts and embedded in recurrent learning' (Department of Education, Tasmania, 2002, p 47)). It was also suggested that a rewording of the criterion to emphasise the multiple dimensions of a 'rich' strategy would be beneficial.

**Modification to the criterion:**

*2.3 Addresses multiple outcomes within a 'rich' task*

### 2.4 Original Criterion: Caters for mixed ability levels

Reflections from Phase 2 clearly indicated catering for diverse ability levels within the context of a single activity was a crucial pedagogical principle. (e.g. recognised in over 88% of activities; prominently mentioned in thirteen open-ended evaluations and considered as a valid criterion on thirty-two out of thirty-five activities in Phase 3 evaluations). However, discussions revealed focusing solely on 'ability' did not adequately describe the diversity of the learning cohort. RECs noted different developmental levels in terms of "Fowler's stages of faith development"; "Kolberg's levels of moral development"; "emotional and social maturity"; "age/grade level of the students"; and "the extent of immersion within the faith tradition".

Emanating from this reflection, it was decided to trial an additional criterion (2.6 - Adjust for appropriate developmental levels) in Phase 3 of the research. Subsequent reflective dialogue reaffirmed the importance of catering for the diversity within a cohort ("allows gifted children to work at higher levels"), but suggested the notions of 'mixed ability' and 'developmental stages' could be merged into the one criterion. It was noted, that at any one time, variations in the knowledge and skill base of students would be influenced by the interaction of their intellectual capacity and their exposure to developmental influences.

**Modification to the criterion:**

*2.4 Caters for mixed ability and developmental levels*

### 2.5 Original Criterion: Allows for open-ended responses

As with the notion of 'elaborating on learning' (1.2), this criterion is also more specific in nature and, to some extent, could arguably be seen as a significant component of the discernment criteria ("encouragement of students to disclose their own understandings") and 'catering for mixed abilities' (2.4). As with any of the more specific criteria, it was not applicable to all strategies and, hence, was located in the mid-range of the statistical analysis. Further critique questioned the degree to which a teacher should guide and set expectations around open-ended tasks without negating the criterion's

overall importance. Nevertheless, reflective discussions often highlighted this element when discriminating between the relative effectiveness of various strategies ("…. highlighted the value of open-ended questions"; "….responses were not open-ended").

Whilst recognising that not every activity should demand an open-ended response, on balance, RECs found this criterion a valuable pedagogical indicator due to it's clarity and ease of observation and hence worth distinguishing from other, broader enrichment criteria.

**Validation of the criterion – retained original terminology:**

*2.5 Allows for open-ended responses*

## *3.0 Engagement Criteria*

### 3.1 Original Criterion: Is problem based

This significant insight from brain-based learning theory (Wolfe & Brandt, 1998: Walsh, 2000), whilst being conceptually fairly simple and straightforward, had a profound impact on the group of experienced religious educators ("problem based activities seem crucial for engagement primarily because it lessens teacher delivery and promotes student learning"). In combination with 'generating meaning making opportunities' (1.1), the articulation of this criterion was pivotal in the paradigm shift from transmission modes of teaching to constructivist learning. Although fairly specific in nature the criterion featured strongly across the statistical analysis (e.g. recognised in over 81% of activities; mentioned in 10 open-ended evaluations).

In terms of evaluating the criterion, it was recommended the notion of problem solving could be extended to include the terms "enquiry" or "investigation". It was suggested this modification would serve to clarify that 'problem solving' is more than solving moral difficulties or ethical dilemmas but includes the exploration of a broader field of knowledge. Whilst acknowledging the nuances, the explicit 'sharpness' of the term 'problem solving', especially as it represented a major pedagogical shift for many participants, suggests the criterion would have more impact on the consciousness of teachers without further embellishment

**Modification to the criterion:**

*3.1 Generates problem solving opportunities*

### 3.2 Original Criterion: Is personally relevant

From the outset this criterion was emphasised by RECs as being a critical element of a pedagogical framework. When compiling their initial criteria in Phase 1 over half the workshop groups specified relevance as a key component. Equally, it featured prominently in open-ended evaluative responses, being mentioned on fifteen occasions. Reflective comments included: "relevance is crucial, especially in religious education"; "the activity was definitely meaningful to the students"; "brought home to me the topic (Mass attendance) is not personally meaningful to the majority of students".

A concern expressed by participants is that it is unrealistic to expect the conceptual content of each individual lesson to be 'personally' relevant on all occasions. It was noted, for example, that personal relevance was 'not applicable' in almost one third of the strategies trialled in Phase 3. RECs suggested the "interest level" of the content was significant even if it wasn't personally relevant. This view was shared by Dalton and Watson (1997) who noted relevance was drawn from three major sources: personal connections; potential application to learning; and links to the underlying values of the community.

Further reflection by this researcher questioned whether the term 'personal' was the complicating factor. By its nature it implies a focus solely on the individual in contrast to relevance within a broader societal context. Additionally, substantive conceptual development of a purely intellectual nature often needs to be undertaken in order to lay the groundwork for later 'connections' to personal or societal relevance. Further, the intrinsic 'inner relevance' of learning experiences may satisfy the personal 'needs' of the learner even when relevance in a personal or social context is not as explicit or overt. Hence, the removal of the term 'personal' and an acknowledgement of the nuances implied in the concept 'relevance' would prove beneficial when enunciating this criterion.

**Modification to the criterion:**

*3.2 Fosters relevant learning experiences*

### 3.3 Original Criterion: Provides learning connections through regular feedback

This criterion rarely received any form of specific comment or emphasis during the research phases. When challenged as to its importance, all RECs believed it warranted inclusion in the final list of criteria, with participants asserting it was "crucially important" as the link to the next phase of learning ("became important in providing learning connections through regular feedback").

It was revealed, there was a lack of comprehension around the term 'feedback' ("clarify the term feedback … how and by whom?") What was not evident to participants was the distinction between 'formative' (i.e. immediate, ongoing feedback that 'shapes' concept development) and 'summative'

(i.e. more formal assessment of conceptual and skill outcomes) modes of feedback. The term 'feedback' tended to suggest a degree of informality, lacking in structure and rigour. Additional critique asked, "do we include children and teachers in the feedback process?" The lack of clarity surrounding this criterion was further complicated by a research methodology that focused on analysing individual lesson activities thereby negating the impact of feedback and assessment on connecting religious learning across a series of teaching experiences.

Upon reflection, it is felt the criterion could be broadened to emphasise the formal role of assessment in the pedagogical process. This is particularly the case when it is remembered that generally, formal assessment had not figured prominently in the thinking of primary religious educators (White & Borg, 2002). Additionally a specific reference to assessment would help further differentiate the criterion from item 1.3: Facilitates 'connected knowing'.

**Modification to the criterion:**

*3.3 Facilitates learning connections through regular assessment and feedback*

### 3.4 Original Criterion: Acknowledges the role of emotion in learning

In spite of being recognised as one of the more significant insights from the brain-based research literature (Goleman, 1996; Wolfe, 2001; King-Friedrichs, 2001), this criterion proved to be one of the most problematic for RECs. Central to the disquiet was the multiple interpretations conjured by the term 'emotion'. For some participants the 'security' of the learning environment was paramount. Others placed emphasis on whether the strategy evoked 'emotive' responses from the affective domain through, for example, art, drama and music. A third group noted the emotive responses generated by activities that were either too complex or too easy.

An analysis of the focus group dialogue indicated that there was a strong overlap with 'encouraging risk taking' (3.5). It was evident that the 'emotional' security of the learning environment (i.e. trust; personal confidence; mutual respect; honouring diverse viewpoints ….) was crucial in generating a 'risk taking culture'. Further reflection by this researcher suggests the emotional responses that could be generated by 'boredom' or 'fear of failure' would be primarily addressed through the application of the range of enrichment criteria.

When favourably critiquing a number of strategies, participants noted the motivational value of strategies that enabled students to express and extend intellectual insights through the affective domain ("interest in problem solving enhanced by the motivation of the drama activity"). A need was seen to balance strategies that had a strong content focus with activities that linked into the affective domain.

An insight confirmed by de Sousa's (2000) research with secondary religious education students in Victoria.

Hence, it is contended the focus of this criterion should be narrowed to reflect more specifically the emotive response students can have to learning experiences associated with the affective domain in contrast to the emotional responses associated with 'risk taking' and 'choice' which will be specified in criteria 3.5 and 3.7.

**Modification to the criterion:**

*3.4 Stimulates positive emotive responses within the affective domain*

### 3.5 Original Criterion: Encourages risk taking

Flowing from the above discussion, it is apparent that emphasising the notion of a 'secure learning environment' is significant within this criterion. Within this context, focus groups clearly indicated 'encouraging risk taking' was fundamentally crucial for effective pedagogy. In particular, comments expressed concern about the tendency for religious education in the past to focus on seeking "the right answers" in contrast to allowing students the freedom to explore their own thought process and seek 'approximations to the truth'. Notions of choice were also highlighted, but as noted below the reflective dialogue discerned it was worthy to name this feature as a distinct, albeit, interrelated criterion.

In association with the broader notion of risk taking, issues surrounding the promotion of "self esteem" and "the need to cater for mixed confidence levels" were also highlighted. Consequently amalgamating the concept of providing a secure learning context for students with the facilitation of 'risk taking' in learning has merit.

**Modification to the criterion:**

*3.5 Provides a secure learning context that nurtures risk taking*

### 3.6 Original Criterion: Allows for neural fatigue and recovery

This specific insight from brain-based learning theory was acknowledged as having value ("especially for little children") but did not feature prominently in any of the focus group discussions. Essentially it was seen as a useful design and lesson management feature without having major implications for the framework. In fact one participant cautioned that by "over allowing" for neural fatigue "some children lose momentum". Participants also noted that the particular strategies under investigation had, by design, allowances for neural fatigue built into the lesson structure, hence the full impact of this

criteria could not be fully assessed. In effect, by being predominantly engaged in collaborative learning activities, students progressed through varied, distinct levels of activity and, hence, were not subjected to extended periods of explicit teaching.

On reflection, providing for neural fatigue and recovery is possibly more an element that is significant to the ongoing, incidental repertoire of teaching skills (e.g. questioning techniques) without being a distinct criterion in its own right. Potentially the notion could be incorporated into the additional participation criterion (4.5 – 'time efficient and manageable') that will be discussed in the next section.

**Modification to the criterion:**
*Delete criterion 3.6 (Allows for neural fatigue and recovery) and incorporate components into criterion 4.5 (Ensures efficient time management, pacing and neural recovery processes)*

### 3.7 Proposed additional Criterion: Learning experiences are co-constructed

Flowing from Phase 2 reflections, RECs suggested trialling a criterion that recognised engagement was enhanced when students took some direct responsibility for their own learning. In particular, the notion of providing learning teams "with freedom to move" and "allowing choice" either with regards to content or methodology was highlighted frequently. Equally, on a broader scale, the potential for students to be involved in "co-constructing" and "adapting" their learning context in some manner was also highlighted.

Subsequent feedback from Phase 3 indicated a high degree of recognition (e.g. observed in thirty-three of thirty-five strategies) and a general acceptance of this criterion ("children were given some choice in what they were asked to do"). However some RECs were uncertain of its meaning, confusing 'negotiating lesson content and processes between the teacher and the learning cohort' with 'jointly constructing responses to the issue or problem under consideration'. The latter being more indicative of the participatory criteria, especially 'valuing the wisdom of the community' (4.1) and 'joint construction' in criterion 4.3.

Further reflection by the researcher also questions whether the component of 'choice' was already embedded in the nature of 'risk taking' (3.5) and allowing for a 'variety learning styles' (2.1). Whilst acknowledging a potential overlap, the powerful impact of empowering student learning through the provision of choice in selecting alternative learning pathways seems worthy of naming as a separate criterion ("ultimately what can be achieved is decided to a large degree by the children").

**Modification to the criterion: (Include and renumber criterion)**

*3.6 Provides choices by co-constructing the learning context*

## *4.0 Participation Criteria*

### 4.1 Original Criterion: Values the 'wisdom' of the community

Observing students sharing ideas, stimulating the thought processes of their peers and critiquing new concepts were all positively endorsed by RECs as vital pedagogical outcomes. Prominent comments included: "constructed understandings together"; "shared information between team members"; "sequences of events co-constructed"; and "feed off other's ideas … 'what if's' …. built upon by the group". Statistical data indicated the criterion was recognised in over 86% of activities and mentioned in sixteen open-ended evaluations. It was noted the utilisation of cooperative strategies "freed the teacher to contribute to the 'wisdom' of the group" more in the role of a "co-learner" than as a dominant expert.

By way of a minor critique it was considered the inclusion of the term 'shared wisdom' would further emphasise the dynamic interaction of the discussion process. Further, it highlights that 'wisdom' does not just rest in the 'community' but it also comes from within.

**Modification to the criterion:**

*4.1 Values the 'shared wisdom' of the community*

### 4.2 Original Criterion: Function within small collaborative learning teams

Of all the individual criteria, this criterion proved dominant. The importance of "learning collaboratively" and "working cooperatively" were continually highlighted by RECs. After being initially named by four groups as a significant criterion in Phase 1, the emphasis continued to grow throughout the project. Collaborative learning teams was the most recognisable criterion noted in over 86% of activities; it was cited most frequently (23) in open-ended evaluations and was considered to be a 'non-applicable' criterion in only three out of thirty-five activities in Phase 3 evaluations.

Flowing from the intrinsic nature of collaborative learning teams, Phase 2 reflections probed the issue as to whether the specific allocation of roles within cooperative group contexts should be a distinct criterion in its own right. Consequently, item 4.6 *'Role allocation supports learning'* was trialled in Phase 3. Generally the data did not support this criterion. It was the least recognised of all criteria in Phase 3 and was deemed to be 'non-applicable' on over half the lesson evaluations. The terminology itself was also not fully understood as portrayed by remarks such as "is it formal role allocations

(leader, time-keeper…) as in co-operative groups?" or the "sharing of responsibility for different facets of learning?". Further reflection suggests that if it were the former (i.e. formal allocation of roles) then the notion would be covered by modifying the terminology from "small to structured". If the latter dimension needs emphasising (i.e. shared responsibility for learning) it would be addressed in criterion 4.4 'individual and group accountability'.

**Modification to the criterion:**
*4.2 Functions within structured collaborative learning teams;*
*and delete exploratory criterion 4.6 (i.e. Role allocation supports learning)*

### 4.3 Original Criterion: Incorporates Modelling, Joint Construction and Independent activities

Being more specific in nature, this criterion did not feature as prominently (only 72%) across the range of strategies examined. Yet, interestingly, it was the most often cited criterion (17) in Phase 2 open-ended evaluations when RECs were first introducing the various pedagogical strategies to their classes ("solid modelling process led to success"; "modelling crucial across the board"). Although initially unfamiliar with this three step instructional process, participants came to appreciate its value in scaffolding cooperative learning and thinking skill development as the project developed. Clarification was sought in Phase 2 as to whether 'independent' meant working "solo" or the group working "independently of the teacher". Essentially, it was noted both nuances are appropriate depending upon the strategy. The key element is 'independence' from the teacher.

Later deliberations by the researcher explored the role of 'explicit' teaching within the learning process of the religious education classroom. In particular, it would be of concern if there were an over reliance on processing strategies leading to students sharing 'pooled ignorance' in the absence of substantive content being taught. It was contended, the term 'modelling' needed "to be split", to reflect the dual elements of demonstration and explicit teaching.

In response to this issue, the substituting of the formal language of 'modelling, joint construction and independent activities' with the alternate descriptor the 'To, With & By' model (Archdiocese of Melbourne, 1999) has merit. The 'to' component of the process broadens the notion of modelling (i.e. demonstrating a learning process) to include an emphasis on specific, direct focused instruction (i.e. explicit teaching). What is crucial of course, is that conceptual development is processed and consolidated by activities involving joint construction ('with the cohort') and independent activity ('by individual or small groups of learners')

**Modification to the criterion:**

*4.3 Incorporates the 'To, With and By' instructional processes*

### 4.4 Original Criterion: Encourages individual and group accountability

In line with other participatory criteria, encouraging individual and group accountability was strongly endorsed as an essential element of the framework ("accountability reinforces learning"). Participants observed "strong displays of children owning their work" and evidence of "accountability to the group". Statistically, the criterion was evident in over 87% of strategies and was noted in eleven open-ended evaluations.

One observation suggested a refinement to the criterion to include evaluating how " a student could function individually on an individual task". Consensus indicated this would be embraced within the definition of 'individual accountability'. Other participants questioned the manner in which group accountability works in 'practice' ("how does a teacher assesses the quality of contributions in group process?"; "the dilemma of evaluating the finished product in terms of quality of ideas versus presentation"). Once again, it was discerned this was more a function of professional training and judgment rather than a limitation of the criterion and ultimately "involvement in the work is more important then the finished product".

Fundamentally, taking responsibility for one's own learning is a critical counter balance to the criteria that articulated 'risk taking', 'freedom of choice' and 'open-ended responses'. The criterion was validated in its original form.

**Validation of the criterion – retained original terminology:**

*4.4 Encourages individual and group accountability*

### 4.5 Proposed additional Criterion: Activities are time efficient and manageable

As noted earlier, the action research process suggested, whilst some pedagogical practices may satisfy the majority of proposed criteria, if the lesson is impractical in terms of time allocation or management issues, then, in effect, it may become counter productive within the broader learning context. This issue was raised by four groups during Phase 1 and was an 'unprompted' open-ended response on nine occasions. When explored as a criterion in Phase 3, it received a high level of recognition (31 out of 35 activities) and was seen as a relevant evaluative criterion in all but five activities.

It was noteworthy the notion of management issues extended beyond simplistically accommodating allowable lesson schedules to include nuances around the pacing ("tasks need to be broken into

smaller manageable sections"), the intensity of the lesson context and the potential for groups to finish concurrently ("it was good to see children finished at about the same time"). Furthermore, the discussion surrounding 'neural fatigue and recovery' (3.6) tended to suggest that this insight from brain-based theory could be accommodated within this broader criterion.

**Modification to the criterion:**

*4.5 Ensures efficient time management, pacing and neural recovery*

## Conclusion:

This chapter has presented a detailed synopsis of the findings from the 'fieldwork' component of the action research project. Overall, the data has provided a strong endorsement of the *DEEP* framework as a viable model to inform the critique of pedagogical practice at a classroom level. As RECs became more familiar with the model, they came to appreciate the significance of all five major pedagogical principles. In particular, the interactive nature of the model and its orientation towards wholeness was highlighted, especially the manner in which participation and engagement were crucial in supporting the enrichment and discernment processes.

The critique of the individual criteria validated the majority of items derived from the concept mapping process, whilst addressing significant nuances of language and confusing overlaps between criteria. The process of critical reflection over a series of iterations led to the formulation and validation of a slightly revised series of criteria as summarised in Figure 11. An analysis of the focus group dialogue also highlighted the beneficial impact of the criteria in enhancing the capacity of RECs to engage in reflective practice in the religious education classroom and more fully appreciate the nature of the learning process, especially as informed by insights from brain-based learning theory.

*Figure 11: Revised Pedagogical Criteria for the 'DEEP' Framework*

## Discernment:

### *The generation of personal meaning and understanding*

1.1 Generates opportunities for religious meaning to emerge
1.2 Emphasises critical and lateral thinking processes
1.3 Facilitates 'connected knowing' to prior religious and secular understandings
1.4 Structures 'reflective moments' into the learning experience
1.5 Extends learning through elaboration upon religious concepts

## Engagement:

### *Personal choice to be involved in learning*

3.1 Generates problem-solving opportunities
3.2 Fosters relevant learning experiences
3.3 Facilitates learning connections through regular assessment and feedback
3.4 Stimulates positive emotive responses within the affective domain
3.5 Provides a secure learning context that nurtures risk taking
3.6 Provides choices by co-constructing the learning context

Revised Pedagogical Criteria for the *'DEEP'* Framework
– Completion of Stage Two

## Enrichment:

### *Catering for individualised learning*

2.1 Accesses concepts through a variety of learning styles
2.2 Accommodates varied cognitive processing styles
2.3 Addresses multiple outcomes within a 'rich' task
2.4 Caters for mixed ability and developmental levels
2.5 Allows for open-ended responses

## Participation:

### *The communal dimension of learning*

4.1 Values the 'shared wisdom' of the community
4.2 Functions within structured collaborative learning teams
4.3 Incorporates the 'To, With, By' instructional process
4.4 Encourages individual and group accountability
4.5 Ensures efficient time management, pacing and neural recovery

# *Chapter Ten*

## The DEEP Framework: A Small Step on the Journey

## *'Potential implications for pedagogy in primary religious education arising from an articulation of the DEEP framework'*

### Introduction:

Through the generation and refinement of the *DEEP* framework, this study provides educators with a coherent pedagogical model to assist in the development and evaluation of primary religious education programs. The purpose of this chapter is threefold. First it synthesises the key findings that have emerged from the research program by revisiting the investigative questions posed at the commencement of the project (cf. Ch 1). Second there is an exploration of the potential application of the *DEEP* framework across a range of professional contexts both within the Archdiocese of Hobart and the wider Australian religious education scene. Finally, acknowledging the exploratory nature of the research, consideration is given to future directions for research in pedagogical practice within the religious education classroom.

### Synthesis of Key Findings:

The underlying motivation for this study was to explore the potential contribution to religious education of a pedagogical model derived from brain-based learning theory. In particular, the prospect of such a model to inform the development and evaluation of teaching strategies in the religious education classroom was especially considered. This led to the formulation of the primary research question:

***What contribution can the articulation of a pedagogical framework derived from brain-based learning theory make to the evaluation of teaching strategies in primary (Yrs 2 – 6) religious education classrooms in the Archdiocese of Hobart?*** (cf. Ch 1)

In response to the challenge of answering this question, four sub-themes are identified (cf. Sub-questions Ch 1):

### *1. Enhancing an understanding of the learning process in religious education.*

The major finding of the research project is the identification, articulation and subsequent validation of the *DEEP* pedagogical framework for religious education. The concept mapping process, in Stage One of the project, demonstrates that the synthesis of three fields of enquiry, namely religious education, brain-based learning and broad pedagogical notions, is capable of producing a pedagogical model that could inform and enhance the instructional process in religious education. Subsequent analysis of the framework by experienced educators in the context of the religious education classroom serves to strongly validate and refine the preliminary model.

Clearly the internal validation of the framework by experienced religious educators is substantial (cf. Ch's 8 & 9). From the outset, over 75% of the 'best practice' indicators identified by RECs paralleled insights generated by the concept mapping process (Table 1). As the project developed, open-ended evaluative criteria utilised by RECs reflected *DEEP* criteria on over 85% of occasions (Table 3). By the end of the research period, the early emphasis RECs had placed on the engagement and participation dimensions of the framework had shifted to show a profound appreciation for the importance of discernment and enrichment and, most significantly, a recognition level that was balanced evenly (85 – 86%) across all four dimensions (Table 2).

The use of triangulated data and multiple iterations serves to generate a high degree of face validity (Connole et al., 1993). Through a literature analysis, shared discussion with RECs and repeated application in a classroom setting, a strong conceptual consensus did emerge. Whilst the degree of external validity and, hence, the capacity to generalise to other contexts is limited by an action research methodology (Kock et al., 2000), the purpose of this research was to pursue local relevance and develop a form of internal validity.

The project is also able to demonstrate a high degree of 'catalytic validity' (Connole et al., 1993). Stimulated by a high level of acceptance of the underlying theoretical model, the research methodology had a profound effect upon the professional development of diocesan RECs ("this project has completely changed the manner in which I teach RE"; "RE has come alive in my classroom"). Further, whilst not a focus for this study, the perceived impact on student attitudes and learning outcomes ("For the first time my students can't wait for the

next RE lesson"; "I never thought my children were capable of thinking in this way in religious education") was also significant.

Emanating from this study a number of significant findings are identified:

(i) Through exposure to the *DEEP* framework, RECs progressively came to value and accentuate more prominently the pedagogical dimensions of discernment and enrichment. Initially criteria centring on capturing the attention of students (engagement) and maximising their involvement in religious education lessons (participation) dominated the evaluative thinking of RECs. Through the provision of an appropriate reflective tool, there evolved a much stronger appreciation of the importance of individualising the learning (enrichment) and generating significant, challenging, meaning-laden learning experiences (discernment). Essentially as the project progressed REC's came to expect 'much more' of every lesson both in terms of conceptual outcomes and empowering the students as active 'searchers' within their religious tradition.

(ii) The adoption of a constructivistly oriented pedagogical framework addresses many of the potential limitations apparent in the catechetical and curriculum paradigms. From a catechetical perspective (Maps 1.2.5 & 2.1.1) [43], the discernment dimension tackles the importance of critical dialogue when reflecting on faith related issues (Raduntz, 1995) and challenges teachers to extend their teaching beyond simple 'transmission' models aimed at maintaining 'institutional integrity' (Rossiter, 1999) in order to embrace strategies that encourage a 'transformation' in thinking and attitudes. Similarly, the principle of enrichment attends to concerns around the presumption of faith (Malone & Ryan, 1996), the diversity of students (Dwyer, 2000) and the tendency for some critical reconstruction models to follow 'lock step' pedagogical approaches (Ryan, 1999). By appreciating a variety of development levels, allowing for open-ended responses and by catering for individualised learning and thinking styles, the enrichment dimension encourages teachers to adapt learning experiences to the unique needs of a cohort of learners.

In a similar manner, weaknesses within the curriculum framework (Maps 2.2.1 & 3.5), especially with regards to relevancy (de Sousa, 1999), rigour (Elliott, 1998) and repetition (Rossiter, 1995) are directly confronted by the *DEEP* framework. In

43 To avoid confusion between the coding system for the concept maps (cf. Ch 6) and the numbering of the specific criteria in the revised *DEEP* framework (cf. Ch 9), any reference to the concept maps will be prefaced by the 'Map' notation.

particular, the engagement dimension focuses attention on relevancy by highlighting the value of problem solving and risk taking, the importance of co-constructing learning experiences and acknowledging the role of emotion on the learning process. The importance of connecting to prior understandings (1.3) [44], elaborating on religious concepts (1.5) and providing regular feedback to guide the next stage of learning (3.3) addresses the potential repetitious nature of a religious eduction program. Furthermore, a focus on academic rigour is strengthened by an emphasis on critical and lateral thinking (1.2) and by accentuating most components of the enrichment dimension.

(iii) Key insights from brain-based learning theory emphasise or rearticulate, in a new manner, a number of pedagogical principles that are 'known' but not being consciously applied within the context of the religious education classrooms. Prominent among these concepts are the notions of:

- Elaboration (1.5) - especially with regards to building upon and extending concepts (i.e. rehearsals of knowledge) in contrast to continual repetition.
- Critical and Lateral Thinking (1.2) – there was a general acknowledgement from RECs that prior to exposure to the framework there was little emphasis on challenging students with an array of high order thinking tasks in religious education classrooms.
- Cognitive Styles (2.2) – closely aligned to the above, it is strongly recognised that thinking tasks needed to be balanced across the 'Whole Brain' spectrum.
- Problem-solving (3.1) – RECs came to fully appreciate the constructivist learning principles embedded in pedagogical practice in other Key Learning Areas are equally valid in religious education. The notion of commencing a unit with a problem to be solved in contrast to a topic to be studied is pivotal in shifting from transmissional to transformative modes of instruction.
- Role of Emotion (3.4) – An awareness of the 'gating' function. The Limbic system heightened the sensitivity of RECs to the emotional climate of the classroom. The research highlighted different nuances in the emotional domain especially with regards to risk taking (3.5); choice (3.6) and the impact of strategies operating in the affective domain (3.4).

44 The criteria referred to in this chapter, reflect the revised pedagogical criteria as summarised in Figure 11, Chapter 9.

(iv) The issue of personal relevancy (3.2) was prominently named as crucial evaluative criteria from the outset of the study. As the project progressed a more sophisticated appreciation of the concept emerged. The 'ego-centric' emphasis on the personal dimension broadened to acknowledge that relevancy can arise from the values and needs of the faith community and society at large as well as emerging from the intrinsic value and importance of the field of knowledge (Dalton & Watson, 1997).

(v) Focus group dialogue stimulated a simple, yet profound, insight regarding the importance of religious language. The preliminary criteria were formulated utilising generic educational language. The reflective process highlighted the need to be explicit in naming the learning process in religious education classrooms as primarily focusing upon integrating 'faith and life'. Hence, overt references to religious concepts and understandings are seen as fundamental, especially within the discernment dimension.

(vi) Whilst the collaborative dimension of learning was valued and recognised as highly significant by participants, the research project highlights the need for extensive pedagogical skill development in this area. In particular, the crucial importance of the 'To, With, By' (4.3) instructional process, strategies to promote individual and group accountability (4.4) and reflective practice (1.4) and the value of neural recovery (4.5) are all identified as areas for development.

(vii) In a similar vein, whilst not a major focus of the study, the fieldwork component revealed the role of assessment (3.3) in religious education was poorly understood and rarely implemented. In particular, it was recognised that assessment strategies which focus primarily on 'replicating' knowledge in contrast to stimulating analysis, application and synthesis are no longer valid indications of the extent or depth of outcome achievement. Providing structured feedback against measurable outcomes utilising appropriate assessment rubrics is identified as an area requiring further professional development.

(viii) The RECs in the study identified two additional criteria that did not emerge from the concept mapping analysis. The first, co-constructing the learning context (3.6), reflected a growing, broader awareness of constructivist learning principles, especially with regards to the 'Essential Learnings' project. The second, 'efficient time management' (4.5) was indicative of the practical, pragmatic orientation of practicing teachers. The need for pedagogical strategies to be time efficient,

manageable and balanced in terms of instructional intensity is a valuable addition to the preliminary framework.

In essence, the framework provides primary religious education teachers with a planning 'filter' that, in combination with other catechetical and curriculum 'filters', provides the basis for a sound, well-rounded religious education program.

### *2. The evaluation of teaching strategies in the religious education classroom.*

As demonstrated by the action research project, the capacity of the *DEEP* framework to inform and support ongoing processes of reflective practice is of significant practical value to classroom practitioners. The simplicity of the acronym '*DEEP*' allows teachers to easily recall the four key pedagogical dimensions that underpin the reflective process. In a structured manner these dimensions can be easily translated into reflective questions. For example:

- **D**iscernment: Did the lesson generate opportunities for the students to discern meaning for themselves?
- **E**nrichment: Were the individual learning needs of students catered for within the lesson/s?
- **E**ngagement: How did the lesson positively 'engage' each student in the learning process?
- **P**articipation: Did the learning experience foster collaborative interaction and the sharing of ideas?

Equally, at an informal level, teachers are able to quietly reflect on a lesson experience and make judgments as to the effectiveness of a particular activity simply by mentally 'testing' observed outcomes against all four key dimensions of the framework.

An appreciation of the 'layers of learning' concept (cf. Fig 9, Ch. 7) suggests, whilst participation and engagement are 'fundamental starting points', effective lesson activities need to recognise individualised learning needs and, most importantly, move students to a point where the potential exists for religious meaning to emerge. The interactive, dynamic nature of the various learning layers is also crucial. The reflective process is enhanced by teachers recognising the importance of an 'orientation towards wholeness'. Specific criteria do not function in isolation. The complementary balance of all elements of the framework

operating as a cohesive whole is a vital factor in the evaluative process. This is especially the case when the framework is utilised as a reflective tool across a series of lesson activities.

In terms of formal processes for curriculum evaluation, the explicit criteria articulated in the framework are fundamentally crucial to the evaluative process. In another context, the researcher (White, 2002), highlights a vital weakness of many reflective practice processes is that teachers tend to rapidly 'jump' from making an evaluative judgment (i.e. the success or failure of a lesson or unit of work) to suggested improvements and solutions without really analysing the complexity of the learning context. In particular, a clear, in-depth rationale as to why a lesson activity may or may not have been successful is often lacking. The more detailed criteria contained in the framework presents teachers with explicit benchmarks to justify and articulate their evaluative insights and, furthermore, provides useful 'pointers' for the future augmentation of learning experiences.

Additionally, as was apparent from the professional growth of RECs throughout the project, the inclusion of specific criteria shifts the evaluative focus from the 'simple' more 'easily observable' criteria (e.g. 4.2: functioning in collaborative learning teams; 3.1: generates problem-solving opportunities) to the more 'subtle' or 'complex' notions of meaning making (1.1) and cognitive style (2.2). Instead of critiquing lesson effectiveness primarily in terms of participation and engagement, the *DEEP* criteria accentuates the importance of the less explicit, yet potentially more crucial, dimensions of enrichment and discernment.

### *3. The impact of brain-based learning theory on pedagogical development.*

As demonstrated by the concept mapping process and subsequently validated by the fieldwork analysis, brain-based learning theory provided a rich array of conceptual insights that proved to be fundamental to the development of the *DEEP* framework at a variety of levels.

(i) Research into brain-based learning lead directly to the development and articulation of the 'enrichment' dimension of the *DEEP* framework. One of the major outcomes of this study has been an enhanced appreciation of the diversity and individuality that exists within each cohort of learners in the religious education classroom. Brain-based learning theory, particularly through the identification of learning styles and thinking preferences (Map 5.5.2 & 5.5.3), has provided educators with a means with which to both recognise and meaningfully cater for diversity within the classroom. This led directly to the formulation of the following criteria: accessing concepts through a variety of learning styles (2.1); accommodating varied cognitive processing styles (2.2); and catering for mixed ability and developmental levels (2.4).

(ii) Brain-based learning theory complemented and accentuated fundamental issues arising from the field of religious education research that led, in particular, to the formulation of the 'discernment' dimension of the framework (Map 6.0). Both fields of enquiry stressed the pivotal role of generating meaning making experiences (1.1) for the learning process and connecting new knowledge to prior understandings (1.3). Furthermore, an underlying orientation towards wholeness (Maps 3.3; 5.2.5; 5.3.2 & 5.5.3), whereby notions of meta-cognition, authentic knowing, whole brain thinking and ways of knowing were woven together, was another major link between the two fields of research.

(iii) Brain-based learning principles underpin many of the conceptual notions surrounding constructivist learning that is a central philosophical premise of the *DEEP* framework (Maps: 3.2; 4.1; & 5.5). In particular, pedagogical criteria flowing out of the participation dimension drew heavily on insights derived from co-operative learning, which, in turn, was reliant on brain-based theory for its conceptual base (Johnson & Johnson, 1989; Kagan, 1994; Caine & Caine, 1994). Equally, the importance of critical and lateral thinking (1.2) and reflection (1.4) in the discernment dimension were also highlighted.

(iv) Brain-based notions similarly validated a number of generic learning principles emanating from other fields (cf. Ch 2 & 3) thus leading to the formulation of specific criteria across the framework. Notable criteria in this regard were especially associated with the engagement dimension and included: problem-solving (3.1); relevancy (3.2): feedback (3.3); and risk taking (3.5).

(v) Brain-based theory also specifically contributed to the derivation of three other criteria across the *DEEP* framework that were not previously evident in other fields of research. Notably: extending learning through elaboration (1.5); acknowledging the role of emotion (3.4); and ensuring neural recovery (4.5).

Overall, whilst brain-based learning is subject to its own inherent limitations (Map 5.6), its capacity to reinforce established pedagogical principles and to articulate fresh pedagogical insights enabled this field of knowledge to make a substantive contribution to the development of a pedagogical framework for primary religious education.

## *4. Implications for religious education in the Archdiocese of Hobart.*

The Archdiocese of Hobart is currently embarking on a major strategic initiative in the area of religious education. The adaptation of the *DEEP* framework is pivotal to a number of interrelated developments. In itself, the development of a pedagogical framework in religious education will not generate a major paradigm shift in classroom practice. However, in combination with an integrated program of professional development (especially focused on the modelling of teaching strategies premised on *DEEP* principles) and a curriculum renewal project, the existence of a coherent, philosophical basis for pedagogical practice will enhance the quality of teaching and learning in religious education across the Archdiocese.

### (i) Curriculum Development:

In terms of curriculum development, the Archdiocese is presently finalising the core syllabus document for the emerging religious education program, due to be launched at the commencement of 2005. The core document seeks to blend and integrate the three major frameworks that underpin religious education (cf. Ch 2). Each component is premised upon clear, coherent philosophical principles. The *DEEP* framework, following the critique of RECs and senior Catholic Education Office personnel, has been endorsed from a pedagogical perspective. The curriculum framework has been informed by the Tasmanian 'Essential Learnings' approach, whilst the catechetical framework will reflect Groome's (1980) 'Shared Christian Praxis' model. Of note, is the fundamental intent to integrate all three perspectives into a holistic approach to religious education. It is recognised each dimension of the syllabus will serve as a filter when planning and critiquing an overall unit of work. No one dimension will be featured in isolation and the choice of teaching and learning activities will reflect elements of all three perspectives.

### (ii) Enhancement of teacher quality

Reflecting upon the major insights generated by the research project a number of nuances were developed or affirmed that could, if acted upon, enhance the level of teaching quality and performance across the diocese. In summary, the *DEEP* framework emphasises the necessity for primary religious educators to:

a) Generate 'higher expectations' with regards to the anticipated outcomes of selected activities. Strategies that maximise participation and engagement are ineffective if they do not meet individualised learning needs and ultimately do not generate opportunities for religious meaning to emerge.

b) Connect and sequence religious learning experiences into meaningful interrelated patterns of activity. Whilst recognising not every strategy will reflect a full range of *DEEP* principles, over time a combined series of lessons should reflect a balance across the *DEEP* criteria.

c) Recognise the proximal zone of learning and set challenging and stimulating learning tasks that are 'just beyond' the capacity of individual students, yet 'within reach' of a collaborative cohort.

d) Utilise a range of strategies that promote and facilitate high-order thinking processes, balanced across the critical and lateral spectrums.

e) Cater for the individualised learning needs of students in terms of learning styles, cognitive processing preferences and developmental levels.

f) Appreciate the role emotional responses play in the learning context, especially with regards to risk taking, relevance, choice and catering for the affective domain.

g) Acknowledge the significance of the communal dimension of learning and move from teacher centred, transmission oriented classrooms to establishing authentic, collaborative learning communities whereby primacy is placed upon enquiry, transformation and the co-construction of learning experiences.

h) Utilise pedagogical practices that specifically reflect particular criteria within the framework. Notably: the 'To, With, By' instructional model (4.3); the concept of 'wait time' in association with reflective moments (1.4) and neural recovery (4.5); and a range of cooperative learning strategies (4.2).

i) Design 'rich' curriculum units in religious education that commence with a problem to be solved (3.1); incorporate multiple outcomes (2.3); identify and build upon prior learning (3.3); and utilise a cognitive or learning style model (such as Whole Brain Learning or Multiple Intelligences) to cater for individualised learning.

j) Develop assessment activities that discern conceptual development and allow for personal, reasoned expressions of religious meaning in contrast to simply recalling specific content or reiterating someone else's understandings.

k) Critique 'suggested' lesson sequences contained in published religious education units to discern if they genuinely meet the needs of a particular cohort of students.

l) Reflect on pedagogical strategies they have found beneficial within other Key Learning Areas (KLA's) and apply them to religious education. This would be particularly the case with regards to higher order thinking, cooperative learning and activities associated with the affective domain.

**(iii) Professional Development:**

Currently, the pedagogical principles articulated in the *DEEP* model form the basis of a major program of professional development being undertaken in all schools across the Archdiocese. As noted earlier, in 2003, all diocesan RECs attended a conference based on the *DEEP* framework. From a pedagogical perspective, the action research process with RECs identified a number of fundamental 'gaps' in terms of professional development. Key areas of development include:

- establishing co-operative learning processes within the classroom;
- the development of 'rich' learning tasks;
- catering for differing cognitive styles;
- generating high order thinking activities; and
- redefining the role of assessment as a mechanism to drive learning within the religious education classroom.

It is envisaged by the conclusion of 2004, over 80% of all religious education teachers (approximately 400 teachers) will have undertaken an eight-hour Pastoral Institute module focusing on pedagogy in religious education. The assessment task for the module requests teachers to develop and critique a unit of work in religious education utilising the *DEEP* framework.

Complementing the introductory in-service program, an integrated professional development plan is being devised to facilitate the introduction of the emerging Archdiocesan religious education curriculum. Progressively the plan will address and integrate the three major religious education frameworks. As teaching and learning experiences within each perspective are explored, *DEEP* learning principles will continue to be highlighted. For example, 'life experience' teaching strategies associated with the Praxis model in the catechetical framework would be extended and critiqued by applying the *DEEP* pedagogical filter. Similarly, outcomes based assessment tasks from the curriculum perspective, could also reflect *DEEP*

principles if they were developed to cater for differing learning styles and place greater emphasis on conceptual (as distinct from content) intent.

Informed by the research program, the following refinements have been incorporated into the Archdiocesan professional development plan:

- The introduction of a unit focusing on pedagogy in the post-graduate Certificate of Religious Education;
- Extending the 'Good Beginnings' program for beginning teachers in Religious Education to include practical workshops from the '*Into the Deep*' resource book; and
- A revamping of the Archdiocesan 'Pastoral Institute' program, so as to shift the focus from totally 'academic, content-based' modules of study, to professional inputs that blend theory and practice. In essence, to ensure *DEEP* principles are modelled during the delivery of any professional learning experience.

**(iv) Broader implications for the Archdiocesan system:**

In a broader professional context, from an Archdiocesan system perspective, the introduction of the *DEEP* framework will contribute significantly towards four other interrelated projects that will enhance religious education:

(i) A reflective model of Whole School Review and Improvement: As part of school registration requirements and Archdiocesan expectations, the system is currently formulating a comprehensive model for school review. A key component of the model is the establishment of 'benchmark' evaluative criteria across a range of areas. The *DEEP* framework will not only provide a significant starting point for religious education, but with minor adaptations, its holistic, generic nature may contribute to the development of pedagogical criteria in other key learning areas.

(ii) An Archdiocesan 'Teaching and Learning Platform': Closely related to the above, the diocese is finalising a seminal document articulating a coherent philosophical platform for teaching and learning. Its purpose is to align curriculum development, pedagogical practice and professional development across the system and link it closely to the 'Essential Learnings' framework developed by the Tasmanian State Education system. In this context the *DEEP* framework is both a stimulus document and a source of critique for the emerging statement.

(iii) Professional Standards: At the initiative of the Australian Government, Tasmanian schooling systems are engaged in a process of developing a range of professional standards as part of a 'Quality Teaching' project. Each standard is designed to articulate the 'indicators' of quality classroom practice in a variety of professional settings. In this respect it is believed the *DEEP* framework will provide some starting points for developing indicators that would describe 'quality practice' in the field of religious education.

(iv) Undergraduate Teacher Training: In association with the Australian Catholic University, the Archdiocese is about to introduce a four-unit course in religious education for pre-service trainee teachers. Due to its small size and geographic isolation, the vast majority of teachers in Tasmania have had little or no formation in religious education. It is believed the *DEEP* framework will not only inform elements of course content and delivery but will also provide criteria to help guide reflective practice and performance evaluations during practicum experiences.

Overall, whilst acknowledging the Religious Education initiative in the Archdiocese of Hobart is still in the early developmental phases, it is apparent the *DEEP* framework is making a substantial contribution to the Archdiocesan learning community. Not only has it influenced the design of the emerging syllabus, its potential to act as 'planning filter' will strengthen the capacity of educators to write and implement meaningful, engaging teaching units in the years to come.

## Generalisation of Research Findings:

Flowing from the Tasmanian experience, it is believed the *DEEP* framework has, subject to further research, the potential to influence pedagogical development in religious education in the broader national context. With appropriate contextual variations, the perceived beneficiary outcomes of the model for the Archdiocese of Hobart, especially with regards to reflective practice, professional development, curriculum development and the training of under-graduate teachers, could be extrapolated to the wider Australian diocesan context. This could be especially the case within the eleven dioceses that, like the Archdiocese of Hobart, have linked their curriculum development to the foundational 'Sharing Our Story' syllabus from the Diocese of Parramatta. These dioceses would find the *DEEP* framework a useful extrapolation of the 'Whole Brain' thinking pedagogy contained in the seminal syllabus document.

The *DEEP* framework is in close alignment with the broader constructivist models of learning emerging in other key learning areas across Australia (Map 4) and, as such, the majority of Australian primary teachers would empathise with its underlying principles. Further it is arguable, especially in a primary school environment, the nature and diversity of the Tasmanian student cohort has many parallels across Australia. With slight variations, primary classes are co-educational, of mixed ability, are similar in size and generally organised relative to the age of the students. National curriculum expectations, benchmark testing for literacy and numeracy, the impact of technology and similarities in teacher training methodologies are combining to produce an increasingly homogeneous educational environment. Whilst noting the similarities, it must be acknowledged that, in comparison, Tasmanian Catholic schools would have lower percentages of multi-cultural students and a relatively higher level (over 35%) of non-catholic students within any one cohort. Nevertheless, overall, it is arguable a pedagogical model premised on brain-based learning theory would have generic applications across the nation.

As noted previously, the majority of other Australian religious education syllabus documents have been developed without reference to a coherent pedagogical philosophy, hence the adaptation of *DEEP* principles would enrich and complement existing programs, without 'clashing' with entrenched paradigms. This is evidenced by anecdotal evidence gathered by the researcher when conducting professional development workshops across Sydney and Melbourne. Whilst a 'textbook' orientation now underlies the curriculum framework in these dioceses, there was a high degree of acceptance of the *DEEP* principles as a mechanism to assist with the 'unpacking' of a decidedly structured conceptual framework.

Whilst arguing the *DEEP* framework potentially has wider applications, the limits of an action research methodology (cf. Ch 5) must be acknowledged. The nature of action research combined with a small sample size (12 participants) and inherent design limitations (e.g. the position of power held by the researcher, the objectivity of a participant researcher, the researcher being responsible for the professional development of participants: cf. Ch 5) all suggest caution should be expressed when seeking to generalise the findings of the research project both within and beyond the Tasmanian context.

## Future Research Directions:

From the outset it was recognised this study, by its nature and design, was exploratory and, as such, was laying the groundwork for future research in the area of religious education that, to

date, had not been comprehensively addressed. Whilst the articulation of the *DEEP* framework and its subsequent validation by a small cohort of experienced religious educators is significant in its own right, this study has the potential to be a catalyst for a number of pedagogically oriented research projects.

Given the immense scope of any educational system, this study originally decided to limit its focus to the primary (Yrs 2 – 6) religious education classroom. As is evidenced by the lack of reference to specifically primary age children in the main body of the text, as the study developed the pedagogical principles that emerged did not generally appear to have, by definition or design, any specific age/grade level implications or limitations. The possible exception to this premise, revealed through focus group dialogue, was the difficulty a number of younger (Year 2 & 3) students experienced when endeavouring to undertake some higher order critical and lateral thinking tasks (1.2). Even then it was the complexity of the task that was seen to be problematic in contrast to the *DEEP* criteria that it represented. Hence, whilst only 'tested' within the context of primary (Years 2 – 6) age students, it is felt the *DEEP* principles that evolved could be equally applied to a broader cohort of learners. In this respect, a further critique and validation of the framework in a secondary school context would be valuable.

Having established a range of specific pedagogical criteria, the possibility is now created for research to be conducted into the pedagogical methods that are actually employed by teachers in a classroom setting. As noted earlier (cf. Ch 2), a number of generalised anecdotal comments (Spurling-Janes, 1995; Malone & Ryan, 1996) have been made regarding pedagogical practice in religious education, however little systematic research has been conducted to verify these insights. The potential now exists to study, in a variety of ways (e.g. direct classroom observation; examination of lesson registers; an analysis of student work samples), the pedagogical methodology of teachers and code specific practices against the identified *DEEP* benchmarks. Furthermore, flowing from the establishment of baseline data, the prospect is generated to evaluate the influence of interventionary strategies on subsequent classroom practice. In particular, the efficacy of contrasting modes of professional development delivery (e.g. whole staff school-based modules, locally facilitated over a period of time in contrast to individually oriented, externally delivered system-based courses …) could be assessed using pre and post course observational data based on the *DEEP* framework.

A third field of enquiry that could be initiated is an exploration into the impact of pedagogical methods on student learning outcomes. As noted in the methodology for this project (cf. Ch

5), an assortment of student work samples were collected so as to stimulate the reflective process, however no specific judgments were made as to the nature and quality of learning achievements. Traditionally, the quality and extent of student learning has been assessed by examining finished, 'polished' samples of work. With the advent of the *DEEP* criteria, it is feasible to generate evaluative rubrics that not only reflect content (or ideally conceptual) outcomes, but also include reference to the learning process itself as described by the foundational *DEEP* principles.

Hence, when evaluating the impact of a particular teaching strategy (or range of strategies) on student learning, researchers would not be simply reliant on 'finished, content oriented products' (e.g. examination results, essays, projects) but rather could also evaluate process-oriented strategies that may profitably reflect meaning laden, open-ended responses depicted through a variety of expressive modes. With the development of appropriate evaluative rubrics potentially it may be possible to compare learning outcomes from experimental and control groups to discern the impact of contrasting pedagogical styles. Ultimately religious educators shouldn't simply live in the 'hope' that a particular strategy may result in enhanced student outcomes, rather they should be reassured that particular methodologies are truly effective in the classroom.

A final line of enquiry that may be stimulated by this research project is the manner in which a pedagogical approach complements or inhibits the strategic intent of educational paradigms emanating from the catechetical or curriculum frameworks. It has been argued in this dissertation that a pedagogical approach needs to operate in combination with the other two frameworks of religious education. Potentially there is value in exploring more explicitly, in a classroom setting, the manner in which pedagogical principles may address a variety of assorted issues and challenges associated with the catechetical or curriculum approaches (cf. Ch 2). For example, does the inclusion of enrichment strategies that cater for the differentiated learning needs of students, help ameliorate an inherent weakness of the Shared Christian Praxis model, which assumes a commonality of faith experiences? Alternatively, from a curriculum perspective, does an open-ended, risk-taking pedagogical approach contribute to academically rigorous, conceptually clear outcome achievement? Ultimately the educational imperatives suggested by the interaction between the three major frameworks will have significant implications for future syllabus design and professional development delivery throughout the Australian context.

## Conclusion:

Overall, the development and articulation of the *DEEP* framework provides, for the first time in Australia, religious educators with a coherent rationale to inform their teaching practice. In essence, it is believed that the articulation of the *DEEP* framework has the potential to furnish the 'missing link' in the pedagogical practice of religious education in the classroom and bridge many of the conceptual limitations that exist in contemporary Australian religious education paradigms. Applied in conjunction with syllabus developments that recognise the importance of balancing the catechetical, curriculum and pedagogical frameworks and supported by an integrated program of professional development, the framework has the capability to significantly alter pedagogical activity in Australian classrooms.

Exposure to the *DEEP* framework enhances the capacity of educators to be more discerning in the nature and extent of the learning experiences they plan for their students. It also provides them with the basis for critique and reflection upon the effectiveness of their pedagogical practice. In essence, the *DEEP* framework encourages teachers to move beyond their 'comfort zone' and take a 'risk' with their teaching of religious education. It may be, for many, simply a rearticulation of what 'good teachers' already know. However, applied in a sustained and focused manner it has the capacity to convert the religious education classroom into a dynamic learning community that is collaborative, enriching and transformational.

An integral feature of the *DEEP* framework is that, at its heart, lays the spiritual needs, aspirations and potential of both the students and the teachers. The model places primacy on empowerment and connecting human beings with their God. The conceptual framework recognises it is the dynamic interaction between pupil and teacher, acting as co-learners and fellow 'searchers', that will lead to an authentic process of transformation and an encounter with the 'Divine'.

Ultimately the framework affirms that religious education within the classroom is much more than an academic pursuit or a series of interesting, enjoyable lesson activities. Religious education lessons are part of a much deeper religious experience, embedded within the fabric and culture of the faith community. The pedagogical process is not just merely about choosing strategies that connect students with the conceptual content of religious education, it also embraces an awareness that every word and action of the religious education teacher either, implicitly or explicitly, affirms or contradicts the underlying Christian message.

Pedagogy in religious education is much more than simply 'teaching', it is a process that grapples with mystery, faith and love. As Palmer (1998, p 10) reminds us 'good teaching cannot be reduced to technique; good teaching comes from the identity and integrity of the

teacher'. Hence, pedagogical practice in the religious education classroom is not only about the 'art and science' of teaching, it is also a journey of discovery where all participants are challenged to venture into the '*deep*' waters, to participate with their faith community, actively engage themselves in the learning process and, in doing so, discern religious meaning in their own unique and powerful way.

# Bibliography:


Adams, D. & Hamm, M. (1994). *New designs for teaching and learning: Promoting active learning in tomorrow's schools.* San Francisco, California: Jossey-Bass Inc.

Albright, C.R. (2001). Body and Soul: Neuroscience. *Bulletin*, Issue19, retrieved June 25, 2001, from: http://www.parkridgecenter.org/cgi-bin/ShowPage.dll?MODE=2&ID=510

Alper, M. (1998). *The 'God' part of the brain*, Rogue Press, New York, retrieved May 5, 2001, from: http://www.godpart.com.form.htm

Amalorpavadass, D.S. (1973). *Theology of catechesis*, Bangalore: National Biblical Catechetical and Liturgical Centre.

Archdiocese of Hobart. (2003). *Learning and teaching platform*: Draft Statement, Hobart: Catholic Education Office.

Archdiocese of Hobart. (2004). Definitions of religious education: *Draft religious education syllabus document*, Hobart: Catholic Education Office

Archdiocese of Melbourne (1984). *Guidelines for religious education for primary students in the Archdiocese of Melbourne.* Melbourne: Catholic Education Office.

Archdiocese of Melbourne (1995). *Guidelines for religious education for primary students in the Archdiocese of Melbourne.* Melbourne: Catholic Education Office.

Archdiocese of Melbourne (1999). CLaSS: Children's literacy success strategy, Melbourne: Catholic Education Office.

Archdiocese of Melbourne (2001). *To Know, worship and love* series, Melbourne: James Goold House Publications.

Archdiocese of Sydney (1991). *Celebrating our journey*, Sydney: Catholic Education Office.

Armstrong, T. (1998). Neurological underpinnings of teaching and learning. *Brain topics: A handbook for teachers and parents*, Ch 3, retrieved May 5, 2001, from: Idaho Virtual Campus, http://ivccourses.ed.uidaho.edu/

Ashbrook, J.B. (1989). The whole brain as the basis for the analogical expression of God. *Zygon: Journal of Religion and Science*, 24 (1), 65 – 80.

Ashbrook, J.B. (1996). Making sense of God: How I got to the brain. *Zygon: Journal of Religion and Science*, 31 (3), 401 – 420.

Atkin, J.A. (2000). *Developing a framework for understanding how we learn*, Paper presented to Diocesan Religious Education Workshop, Catholic Education Office, Parramatta

Barrett, C. (2001). Education: Queensland Style! Rich Learning Tasks, *Bits 'n Bytes*, 4 (5), 3 – 6.

Barry, G. (1998). Assessment and reporting in religious education. *Word in Life, journal of religious education,* 46 (3), 43 – 45.

Barry, G., Elliott, M. & Rush, K. (2003). Religious literacy: Redesigning the religion classroom, Paper presented at: *Third national symposium religious education and ministry*, Melbourne: Australian Catholic University

Begley, S. (2001). Religion and the brain, *Newsweek,* retrieved June 25, 2001, from: http://afyuksel.com/arastirma/religion.html

Bellanca, J. (1998). Teaching for intelligence, in search of best practice. *Kappan,* 79 (9), 658 – 660.

Bellanca, J. & Fogarty, R. (1994). *Blueprints for thinking in the co-operative classroom.* Melbourne, Vic: Hawker Brownlow Education.

Ben-Hur, M. (1998). Mediation of cognitive competencies for students in need. *Kappan*, 79 (9), 661 – 666.

Bezzina, M. (1997). Does Groome's shared christian praxis provide a sound basis for religious education? *Word in Life,* 45 (3), 16 – 24.

Bloom, B. S. (1964). *Taxonomy of educational objectives: A classification of educational goals.* Chicago: Longmans, Green.

Bounds, C. (1997). Learning in religious education. *Word in life*, 45 (1), 5 – 11.

Boys, M. (1989). *Educating in faith: Maps and visions*. San Francisco: Harper Row.

Brandt, R. (2000). On teaching brains to think: A conversation with Robert Sylwester, *Educational Leadership*, 57 (7), 72 – 75.

Brennan, D. & Ryan, M. (1996). Five insights for religion teaching: An overview of teacher's responses. *Catholic School Studies*, 69 (1), 10 – 12.

Brooks, J. G. & Brooks, M. G. (1993) *In search of understanding: The case for constructivist classrooms.* Alexandria, Virginia; Association for Supervision and Curriculum Development.

Bruer, J.T. (1998). Brain science, brain fiction. *Educational leadership*, 56 (3), 14 – 18.

Bruer, J.T. (1999). In search of…. brain based education. *Kappan*, 80 (9), 648 – 657.

Bull, G. (1989). Reflective teaching: Using process and thinking as content. Carlton South, Vic: Australian Reading Association.

Burford, C. (2002). Pedagogy, frameworks & learning: Can we make the link?, *Learning Matters*, 7 (3), 3 – 7

Caine, R. (1992). *Making connections: Teaching and the human brain*. Retrieved June 25, 2001, from: http://www.smcoe.k12.ca.us/pdc/PDS/restruct4.html

Caine, R. & Caine, G. (1994). *Making connections: Teaching and the human brain.* Menlo Park, California: Innovative learning publications.

Caine, R. & Caine, G. (1995). Reinventing schools through brain-based learning. *Educational Leadership*, 52 (7), 43 – 47.

Chismar, J. (2001). Your brain on God: Neurotheology fuses spirituality and science. *Religion today*, retrieved June 25, 2001, from: http://news.crosswalk.com/religion/item/0,1875,347184.00.htm

Chugani, H.T., Phelps, M.E. & Mazziota, J.C. (1987). Positron emission tomography study of human brain formation.

In Bruer, J.T. (1999) In search of…. brain based education, *Kappan*, 80 (9), 648 – 657.

Clarke, D. (2001). Assessment: Why? *Learning matters*, Vol 5 (3), 2 – 5.

Cole, P. (2001). *An overview of interstate and international approaches to curriculum provision.* Discussion paper prepared for Victorian Department of Education, Employment and Training, Melbourne: PTR Consulting.

Congregation for Catholic Education (1988). *The religious dimension of education in a Catholic school.* (Australian Edition), Homebush, NSW: St Paul Publications.

Congregation for the Clergy (1997.) *General directory for catechesis.* (Australian Edition), Homebush, NSW: St Paul Publications.

Connole, H., Smith, B. & Wiseman, R. (1993). *Issues and methods in research,* Study Guide, Master of Education, Adelaide: University of South Australia.

Cooper, C. & Boyd, J. (1998). *Schools as collaborative learning communities*, retrieved May 5, 2001 From: http://www.vision.net.au/~globallearning/services/CLC.html

Crawford, M. & Rossiter, G. (1985). *Teaching religion in the secondary school: Theory and practice,* Strathfield, NSW: Christian Brothers Resource Group.

Crawford, M. & Rossiter, G. (1987). What is the place for 'academically' challenging RE in Catholic schools? *Catholic School Studies,* 60 (1), 20 – 24.

Crotty, L. & O'Grady, S. (1999). Can outcomes transform the religious education curriculum? *Journal of Religious Education*. 47 (2), 3 – 10.

Curriculum Council, Western Australia (1998). *Curriculum framework for kindergarten to year 12 education in Western Australia*, Osborne Park, WA: Curriculum Council.

Curry, L. (1990). A critique of the research on learning styles, *Educational Leadership*, Vol 48, (2), 50 – 55.

Dalton, J & Watson, M. (1997). *Among friends: Classrooms where caring and learning prevail.* Armadale, Vic: Eleanor Curtain Publishing.

D'Arcangelo, M (1998). The brains behind the brain. *Educational Leadership*, 56 (3), 20 – 25.

d'Aquili, E. & Newberg, A. (2001). *Why God won't go away: Brain science and the biology of belief*, New York: Ballantine Books.

De Bono, E. (1992). *Six thinking hats for schools*, Cheltenham: Hawker Brownlow Publications.

Department of Education, Training and Employment S.A. (1999). *South Australian curriculum standards and accountability framework.* Retrieved Nov 15, 2000, from: http://www.nexus.edu.au/ems/sacsa/downloads/new_framework/gen_intro…contents.htm

Department of Education, Tasmania (2002). *Essential learnings framework 1,* Hobart: Department of Education.

de Souza, M. (1999). *Students' and teachers' perceptions of year 12 religious education programs in catholic schools in Victoria: Implications for curriculum,* Unpublished PhD Thesis, Ascot Vale, Victoria: Australian Catholic University.

de Souza, M. (2000). A comparison of teachers' and students' perceptions of learning experiences in senior secondary RE: Implications for teaching & learning in Religious Education, *Journal of Religious Education,* 48 (4), 35 – 45.

de Souza, M. (2001). Addressing the spiritual dimension in education: Teaching affectively to promote cognition, *Journal of Religious Education*, 49 (3), 31 – 41.

Diamond, M. (1988) *Enriching heredity: The impact of the environment on the anatomy of the brain.* New York: Free Press

Diamond, M. (1998). The brains behind the brain. *Educational Leadership*, 56 (3), 20 – 25.

Dick, B. (1993). You want to do an action research thesis? *Action Research Theses,* Retrieved Jan 7, 2002, from: http://www.scu.edu.au/schools/gcm/ar/art/arthesis.html

Dick, B. & Swepson, P. (1997). *Action Research FAQ: (Frequently Asked Questions File),* Retrieved Jan 7, 2002, from: http://www.scu.edu.au/schools/gcm/ar/arp/arfaq.html

Diocese of Ballarat, (2004). Enrichment programs, enrichment page for gifted and talented, retrieved Jun 1, 2004, from: http://www.ceo.balrt.catholic.edu.au/gt_site/enrichment.htm

Diocese of Bathurst, (1995). *The Christ we proclaim.* Bathurst: Catholic Education Office.

Diocese of Parramatta, (1988). *Sharing our story.* Parramatta: Catholic Education Office.

Diocese of Parramatta, (2000). *Sharing our story, Religious Education Curriculum K – 12,* Parramatta: Catholic Education Office.

Dusting, R. (2002). *Teaching and learning using PEEL*, Unpublished Professional Development Package, CEO Parramatta.

Dwyer, B. (2000). *The context of R.E. curriculum development in Australia*. Publication pending, Canberra: National R.E. Curriculum Project, 2000.

Education Queensland. (2000a). *New basics project technical paper*, Queensland Department of Education, Retrieved Nov 16, 2000 from: http://www.education.qld.gov.au/corporate/newbasics/html/about.html

Education Queensland. (2000b). *The rich tasks – introduction*, Queensland Department of Education, Retrieved April 15, 2000 from: http://www.education.qld.gov.au/corporate/newbasics/html/richtasks/richtasks.html

Education Queensland. (2000c). *Productive pedagogies,* Queensland Department of Education, Retrieved April 15, 2000 from: http://education.qld.gov.au/corporate/newbasics/html/pedagogies/intellect/int6a.html

Eisner, E. (1995). Standards for American schools: Help or hindrance? *Kappan*, 76 (10), 758 – 764.

Ellingsen, R. (1989). *The classroom of the 21st century: The integrated thematic instruction approach to brain-compatible learning.* Kent, WA: Susan Kovalik & Associates

Elliott, M. (1998). Multiple intelligence & other delusions: Gifted learners in the Catholic religious education classroom. *Word in Life: Journal of Religious Education,* 46 (3), 22 – 28.

Elliott, M. (1999). The eight great gripes of gifted kids: Issues for religious educators. *Journal of Religious Education*, 47 (3), 42 – 48.

Elliott, P. J. (2000). *To know, worship and love.* (Primary Student Text and Teaching Companion). Melbourne: James Goold House.

Eltis, K. (1995). *Focus on learning: report of the review of outcomes and profiles in New South Wales schools.* Sydney: N.S.W. Dept. of Training and Education Co-ordination.

Flannery, A. (1996). Declaration of religious freedom, *Vatican Council II – Constitutions, degrees, declarations,* Dublin: Dominican Publications.

Flynn, M. (1985). *The effectiveness of catholic schools*. Sydney: St. Paul Publications.

Fogarty, R. (1998). The intelligence friendly classroom – it just makes sense. *Kappan*, 79 (9), 655 – 657.

Francis, L.J. & Fearn, M. (2001). Assessing and interpreting learning preferences among A-level religious studies students: the revised index of learning styles. *British Journal of Religious Education,* 24 (1), 41 – 51.

Freire, P. (1972). Cultural action for freedom. Harmondsworth, England: Penguin.

Gardner, H. (1991). *The unschooled mind: how children think and how schools should teach.* New York: Basic Books.

Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. New York, Basic Books.

Gardner, J & Williamson, J. (1994). Teacher professional development: An evaluation of the Atkin model of teaching & learning and its effects on students. Retrieved Oct. 11, 2001, from: http://www.aare.edu.au/94pap/gardj94.092

Gareth Jones, D. (1981). *Our fragile brains: A christian perspective on brain research.* Illinois: Inter-varsity Press.

Gibbs, J. (2001). Tribes: A new way of learning and being together. Windsor, California: Center Source Systems.

Given, B.K. (2000). Theatres of the mind. *Educational Leadership*, 58 (3), 72 – 75.

Glass, J. & Muthu, G. (1999). Learning and individual differences: A systems approach, HERDSA, Annual International Conference, Melbourne, 12 – 15 July, 1999, 1 – 9. Retrieved Oct 27, 2001 from: http://www.herdsa.org.au/vic/cornerstones/pdf/Glass.PDF

Goleman, D. (1996). *Emotional intelligence*. New York: Bantam Books.

Groome, T.H. (1980). *Christian religious education: Sharing our story and vision*. San Francisco: Harper & Row.

Groome, T.H. (1991). *Sharing faith: A comprehensive approach to religious education and pastoral ministry.* San Francisco: Harper and Row.

Groome, T.H. (1992). Catechesis and religious education: 'Let's stay together'. *Living Light*, 29 (3), 40 - 46

Groome, T.H. (1998). *Educating for life, a spiritual vision for every teacher and parent.* Allen, Texas: Thomas More.

Grimmitt, M. (1987). *Religious education and human development*, Great Wakering: McCrimmon

Grimmitt, M. (2000). Constructivist pedagogies of religious education project: Re-thinking knowledge, teaching and learning in religious education, *Pedagogies of Religious Education,* Ch 11, 207 – 227. Essex: McGrimmon.

Hackett, C. (1995). 'Religious education moves on' – Review of Australian Research in Religious Education in Catholic Secondary Schools 1984 – 1994. *Word in Life*, 43 (4), 13 – 19.

Hardiman, M.M. (2001). Connecting brain research with dimensions of learning, *Educational Leadership,* Vol 59 (3), 52 – 55.

Healy, H. & Kidd, S. (2002). Learning and teaching in the RE classroom, *Learning Matters*, Vol 7 (3), 18 - 22

Healy, J. (1992). New brains, new schools? Retrieved May 5, 2001, from: http://www.smcoe.k12.ca.us/pdc/PDS/restruct4.html

Heinemann Australian Dictionary, (1987). *Heinemann Australian Dictionary*. Port Melbourne: Heinemann Educational Australia

Herrmann, N. (1988). *The creative brain*, New York: Brain Books.

Herrmann, N. (1996). *The whole brain business book*. New York: McGraw-Hill.

Holian, R. (1999). Doing action research in my own organisation: ethical dilemmas, hopes and triumphs. *Action Research International,* Paper 3. Retrieved Jan 7, 2002, from: http://www.scu.edu.au/schools/gcm/ar/ari/p-rholian99.html

Holohan, G.J. (1999). *Australian religious education: Facing the challenges*. Canberra: National Catholic Education Commission.

Hughes, I. (2001). Action Research. *Action research electronic reader*, Retrieved Jan 7, 2002, from: http://www.cchs.usyd.edu.au/arow/reader/hughes5.htm

Hunter, J. & Jimenez, S. (1998). Civics and citizenship education: What pedagogy? What possibilities? *1998 Abstracts*, Retrieved Oct 21, 2001, from: http://www.aare.edu.au/98pap/jim98335.htm

Hyerle, D. (1996). *Visual tools for constructing knowledge.* Alexandria, Virginia: Association for Supervision and Curriculum Development.

Jensen, E (1998a). How Julie's brain learns. *Educational Leadership*, 56 (3), 41 – 45.

Jensen, E (1998b). *Teaching with the brain in mind.* Alexandria, Virginia: Association for Supervision and Curriculum Development.

Jensen, E. (2000a). Brain-based learning: A reality check. *Educational Leadership*, 57 (7), 76 – 80.

Jensen, E. (2000b). Moving with the brain in mind. *Educational Leadership*, 58 (3), 34 – 38.

Jones, S.C. (1996). Review of cognitive research, 1996 Presidential Award Elementary Mathematics. Retrieved May 5, 2001, from: http://www.memory aids.com/research..html

Johnson, D. & Johnson, R. (1989). *Cooperation and competition: Theory and research.* Edina, MN: Interaction Book Company.

Johnson, R., Johnson, D. & Holubec, E. (1987). *Structuring cooperative learning: Lesson plans for teachers.* Edina, MN: Interaction Book Company.

Johnson, R., Johnson, D. & Smith, K. (1991). *Active learning: Cooperation in the college classroom.* Edina, MN: Interaction Book Company.

Johnston, C. (2001). Fostering deeper learning, resources for secondary teachers of economics, University of Melbourne. Retrieved July 1, 2001, from: http://www.econ.unimelb.edu.au/ecowww/fost.html

Joseph, R. (2000). The transmitter to God: The limbic system, the soul and spirituality. Retrieved Jun 26, 2001, from: http://www.brain-mind.com/chapter.html

Kagan, S (1994). *Cooperative learning*, San Juan Capistrano: Kagan Cooperative Learning.

Kearney, P. (1993). *Cooperative learning techniques.* Hobart, Tas: Artemis Publishing Consultants.

Keating, R. (2000). Towards a holistic approach to spirituality. *Journal of Religious Education*, 48 (4), 16 – 21.

Kemmis, S & McTaggart, R. (1988). *The action research planner.*3rd ed. Victoria: Deakin University Press.

Khoo, V. (2002). Productive pedagogy, *Inform*, Vol 5 (2), 9 – 12.

King-Friedrichs, J. (2001). Brain-friendly techniques for improving memory, *Educational Leadership*, Vol 59 (3), 76 – 79.

Kock, N.F., McQueen, R.J. & Scott, J.L. (2000). Can action research be made more rigorous in a positivist sense? The contribution of an iterative approach. *Action Research E – Reports, 9.* Retrieved Jan 7, 2001, from: http://www.cchs.usyd.edu.au/arow/arer/009.htm

Kolb, D. A. (1984). *Experiential learning*, Englewood Cliffs, NJ.: Prentice Hall.

Lanzing, J. (1997). What is concept mapping? Retrieved Jan 9, 2004, from: http://users.edte.utwente.nl/lanzing/cm_home.htm

Larsen, J. (2000). *Religious education and the brain,* N.Y: Paulist Press.

Leamnson, R. (2000). Learning as biological brain change. Retrieved May 5, 2001, from: http://www.findarticles.com/cf_0/m 1254/6_32/67884315/p9/article.jhtml

Lewis, M. (1995). Focus group interviews in qualitative research: A review of the literature, *Action Research Electronic Reader.* Retrieved Jan 7, 2001, from: http://www.cchs.usyd.edu.au/arow/reader/rlewis.htm

Lovat, T.J. (1989). *What is thing called religious education*. Wentworth Falls, NSW: Social Science Press.

Lowery, L (1998). New science curriculum reflect brain research. *Educational Leadership*, 56 (3), 26 – 30.

Luke, A. & Freebody, P. (1999). Further notes on the four resources model. Retrieved January, 2004, http://www.readingonline.org/research/lukefreebody.html

MacLean, P.D. (1978). A mind of three minds: Educating the triune brain. *The 77th Yearbook of the National Society for the Study of Education*, Chicago: University of Chicago Press,

MacLean, P. (1996). Women: A more balanced brain? *Zygon: Journal of Religion and Science*, 31 (3), 421 – 439.

McCarthy, B. (1990). Using the 4MAT System to bring learning styles to schools, *Educational Leadership*, Vol 48 (2), 31 – 37.

McLoughlin, C. (1999). The implications of the research literature on learning styles for the design of instructional material, *Australian Journal of Educational Technology*, Vol 15 (3), 222 – 241, Retrieved Oct 29, 2001 from: http://cleo.murdoch.edu.au/ajet15/mcloughlin.html

McNiff, J. (1988). *Action research: Principles and practice.* London: Macmillan Education.

Mageean, B. (1995). Cognitive science & religious education. Retrieved Oct 11, 2001, from: http://www.aare.edu.au/95pap/mageb95.178

Maina, F. (1999). Participatory action research for curriculum change: Can full participation be achieved? Retrieved Jan 10, 2002, from: http://www.csci.educ.ubc.ca/publication/insignts/online/v05n01/maina.html

Malone, P. (1990). *Teacher approaches to the planning of religious education: A study of a sample of teachers in Catholic secondary schools in Sydney.* Unpublished Ph.D. Thesis: Macquarie University.

Malone, P. (1997). Classroom use of curriculum resources. *Word in Life*, 45 (4), 14 – 19.

Malone, P. (2002). Classroom use of curriculum resources in religious education. Retrieved Feb 1, 2002, from: http://www.acu.au/ren/malrew11.htm

Malone, P. & Ryan, M. (1994). *Sound the trumpet: Planning & teaching religion in the catholic primary school*. Wentworth Falls, NSW: Social Science Press.

Malone, P. & Ryan, M. (1996). *Review of sharing our story*. Parramatta: Parramatta Diocesan Catholic Education Office.

Margulies, N. (1992). *Mapping inner space.* Melbourne, Aust: Hawker Brownlow Education.

Marzano, R.J. (1992). *A different kind of classroom: Teaching with dimensions of learning.* Alexandria, Virginia: Association for Supervision and Curriculum Development.

Masters, J. (2000). The history of action research. *Action Research E – Reports, 3*. Retrieved Jan 7, 2002, from: http://www.cchs.usyd.edu.au/arow/arer/003.htm

Marton, F. & Ramsden, P. (1988). What does it take to improve learning? In P. Ramsden (Ed), *Improving Learning: New Perspectives*, London: Keegan Paul.

Meyer, J. (1998). Variation in student learning: A basis for improving teaching & learning, *Teaching & Learning Forum 98*, Retrieved Oct 29, 2001, from: http://cleo.murdoch.edu.au/asu/pubs/tlf/tlf98/meyer.html

Miller, R. (Ed.) (2000). *Creating learning communities: Models, resources, and new ways of thinking about teaching and learning.* Brandon, VT: The Foundation for Educational Renewal, Inc.

Mitchell, N. (1995). Teaching theology as religion education in a secondary school: Some findings. In Raduntz, H. (Ed) *Potential and opportunity: Critical issues for Australian catholic education into the 21st century*, (pp. 85 – 95), Blackwood, S.A: Auslib Press.

Moore, B. (1991). *Religious education: Issues and methods in curriculum design.* Adelaide: University of S.A., Texts in Humanities.

Moore, B. & Habel, N. (1982). *When religion goes to school*. Adelaide: Texts in Humanities.

Moran, G. (1979). *Theology of revelation*, N.Y: Seabury.

Moran, G. (1991). Understanding religion and being religious. *Professional approaches for Christian educators,* 21, 249 – 252.

Mudge, P. (1999). Religious education and lateral thinking – A symbiotic relationship. *Journal of Religious Education*, 47 (3), 33 – 41.

Mudge, P. (2000). *Sacred space constituted by connected knowing: Perspectives from scripture, cosmology and epistemology,* Unpublished Doctor of Theology Thesis, Melbourne College of Divinity.

Mudge, P. (2002). The cultivation of connected knowing – some practical applications for the religious education classroom. *Journal of Religious Education*, 50 (1), 2 – 8.

Murray, E. (1993). 'A critique of Graham Rossiter's approach to RE', *Word in Life*, 41 (1), 19 - 22

Murphy, J. (2001). If one is a Christian, then one ought to know something about one's Christian beliefs and understand them. *Journal of Religious Education*, 49 (2), 31 – 36.

Nava, R. (2001). Integration in holistic education, retrieved Oct 12, 2001 from: http://www.neat.tas.edu.au/HENT/world/rgn/levels.htm

Nelson, J.S. (1999). The human meaning of the brain, *Zygon: Journal of Religion and Science: Journal of Religion and Science,* Vol 34, (1), 45 – 50.

Newman, J. (1999) Validity and action research: An online conversation. In Hughes, I. (ed) *Action Research Electronic Reader*, Retrieved Jan 7, 2002, from: http://www.behs.cchs.usyd.edu.au/arow/arer/reader/htm

Novak, J.D. (1991). Clarify with concept maps. *The Science Teacher*, 58 (7), 45 - 49

Novak, J.D. (2004). The theory underlying concept maps and how to construct them. Retrieved Jan 9, 2004, from: http://cmap.coginst.uwf.edu/info/

O'Brien, K. & White, D. (2001). *The thinking platform*. Marayong, N.S.W.: K.D. Publications,

O'Neil, J (1990). Making sense of style, *Educational Leadership*, Vol 48 (2), 4 – 9

Palmer, P. (1998). *The courage to teach*, San Francisco: Jossey-Bass Inc.

Perry, B. (2000). How the brain learns best, retrieved May 5, 2001, from: http://www.findarticles.com/cf_0/m OSTR/4_110/66933213/pl/article.jhtml

Persinger, M.A. (1996). Feelings of past lives as expected perturbations within neurocognitive processes that generate the sense of self. *Perceptual and Motor Skills*, 83 (3), 1107 – 1121.

Peterson, G. (1999). God on the brain: The neurobiology of faith. *The Christian Century,* 116, 84 – 88.

Peterson, R. (1992). *Life in a crowded place: Making a learning community.* Portsmouth, NH: Heinemann Educational Books, Inc.

Peterson, S. (2000). How does the brain develop? – A conversation with Steven Patterson. *Educational Leadership*, 58 (3), 68 –71.

Plotnick, E. (1997). Concept mapping: A graphical system for understanding relationships between concepts. *ERIC Digest*. Retrieved Jan 9, 2004, from: http://ericfacility.net/ericdigests/ed407938.html

Pribram, K. H. (1998). Brain & values: Is a biological science of values possible? *Proceedings of the Fifth Appalachian Conference on Behavioural Neurodynamics*, Mahwah, New Jersey: Lawrence Erlbaum Associates.

Price, P.S. (1997). Learning as a sense-making activity. Paper presented at the Annual Conference of the Australian Association for Research in Education. Retrieved Oct 21, 2001, from: http://www.aare.edu.au/97pap/pricp376.thm

Price, G., Dunn, R., & Dunn, K. (1991). *Productivity environmental preference survey*, PEPS Manual, Lawrence, LS: Price Systems, Inc.

Raduntz, H. (1995). Shared praxis approach to Christian religious education: Why it is not critical? In Raduntz, H. (Ed) *Potential and Opportunity: Critical issues for Australian Catholic Education into the 21st Century*, (pp. 191 – 203). Blackwood, S.A.: Auslib Press,

Ramachandran, V.S. & Blakeslee, S. (1998). *Phantoms in the brain*. New York: Morrow.

Rossiter, G. (1987). Knowledge and faith in religious education since the second Vatican Council. *Word in Life*, 35 (1). 13 – 19.

Rossiter, G. (1988). A cognitive basis for affective learning in classroom religious education. *British Journal of Religious Education*, 11 (1), 5 – 9.

Rossiter, G. (1995). Some reflections on a critical, evaluative study of religion in Catholic schools. In Raduntz, H. (Ed) *Potential and Opportunity: Critical issues for Australian Catholic Education into the 21st Century*, (pp. xxiii – xxix). Blackwood, S.A.: Auslib Press.

Rossiter, G. (1998). The centrality of the concept – 'Faith development' in Catholic school religious education. *Word in Life: Journal of Religious Education,* 46 (1), 20 – 27.

Rossiter, G. (1999). Historical perspective on the development of Catholic religious education in Australia: Some Implications for the Future. *Journal of Religious Education*, 47 (3), 5 – 18.

Rossiter, G. (2001). Young people's search for meaning: A focus for research and development in school religious education. *Religious Education Journal of Australia,* 17 (2), 23 – 34.

Rowe, H.A.H. (1999). Cognition & instruction. In Keeves, J.P. & Margonibanks, K. (Ed.) *Australian Education: Review of Research, 1965 – 1998*, Melbourne: ACER.

Rummery, G. (1977). The development of the concept of religious education in Catholic schools 1872 – 1972. *South Pacific Journal of Teacher Education*, 5 (4), 268 – 279.

Ryan, M. (1998). An evaluation of outcomes-based approaches in religious education curriculum guidelines. *Word in Life: Journal of Religious Education,* 46 (1), 14 – 19.

Ryan, M. (1999). The classroom religion program in Catholic schools: Three Rival Conceptions of Curriculum. *Journal of Religious Education*, 47 (3), 19 – 26.

Ryan, M., Brennan, D. & Willmett, T. (1996). *Catholic schools Australian landscapes*, Wentworth Falls, NSW: Social Science Press.

Scherer, M. (2001). Perspectives: The brain & learning, *Educational Leadership*, Vol 59 (3), 5.

Schniedewind, N & Davidson, E. (2000). Differentiating cooperative learning, *Educational Leadership*, Vol 58 (1), 24 – 27.

Seymour-Rolls, K. & Hughes, I. (2001). Participatory action research: Getting the job done, *Action Research Electronic Reader.* Retrieved Jan 7, 2002, from: http://www.cchs.usyd.edu.au/arow/reader/rseymour.htm

Smart, N. (1989). *The world's religions.* Cambridge: Cambridge University Press.

Smith, F. (1990). *To think.* New York: Teachers College Press.

Sperry, R. (1968). Hemisphere disconnection and unity in conscious awareness, *American Psychologist*, Vol 23: 413 –422.

Spurling-Janes, M. (1995). Melbourne guidelines for junior primary education: A critical evaluation of its implementation. In Raduntz, H. (Ed) *Potential and Opportunity: Critical issues for Australian Catholic Education into the 21st Centu*ry, (pp. 69 – 83), Blackwood, S.A: Auslib Press.

Sousa, D. (1995). *How the brain learns: A classroom teacher's guide*. Va: Reston.

Stringer, E.T. (1996). *Action research: A handbook for practitioners*. California: SAGE Publications.

Swerdlow, J.L. (1995). Quiet miracles of the brain. *National Geographic Magazine*, 187 (6), 2 – 41.

Sylwester, R (1995). *A celebration of neurons: An educator's guide to the human brain.* Alexandria, Virginia: Association for Supervision and Curriculum Development.

Sylwester, R (1998). Art for the brain's sake. *Educational Leadership*, 56 (3), 31 – 35.

Teske, J. (1996). The spiritual limits of neuropsychological life. *Zygon: Journal of Religion and Science,* 31 (2), 209 – 234.

Tickle, B. (2001). Talking about thinking, *APMC*, Vol 6 (4), 10 – 14

Tomlinson, C.A. & Kalbfleisch, M.L. (1998). Teach me, teach my brain – a call for differential classrooms. *Educational Leadership*, 56 (3), 52 – 55.

Trochim, W. (2000). Research methods knowledge base. Retrieved Jan 9, 2004, from: http://trochim.human.cornell.edu./kb/conmap.htm

Trull, D. (2001). The God spot. Retrieved Oct 11, 2001, from: http://parascope.com/articles/slips/fs22_3.htm

Varengo, P. (1993). The 'knowing' of religious education. *Word in Life*, 41 (2), 5 – 7.

Vygotsky, L. (1978). *Mind in society.* Cambridge: Harvard University Press.

Walsh, P. (2000). A hands on approach to understanding the brain. *Educational Leadership*, 58 (3), 76 – 78.

Ward, C. & Daley, J. (1993). *Learning to learn: Strategies for accelerating learning and boosting performance.* Rochedale South, Qld: Switched-On-Publications.

Webb, G. (1996). Becoming critical of action research for development. In Zuber-Skerritt, O. (Ed.) *New Directions in Action Research*, Ch 9, London: Falmer Press.

Wedge, E. (2002). Learning moments: Co-operative learning in the RE classroom, *Catholic Schools Studies,* Vol 2, 31 - 33

Welch, M. (1998). Action research assignment. Retrieved Jan 12, 2002, from: http://educ.queensu.ca/~ar/

White, D. (1997). *Breathing life into the RE classroom*. Bathurst: Catholic Education Office.

White, D. (2002). *Reflective practice: Wishful thinking or a practical leadership tool?* Paper presented at the International Conference to study the Issues and Challenges facing Catholic Educational Leadership, Australian Catholic University, Sydney, N.S.W.

White, D. & Borg, G. (2002) Assessment in primary religious education: Somewhere over the horizon?, *Journal of Religious Education.*50 (4), 17 - 22

White, D., O'Brien, K. & Todd, S. (2003). *Into the deep*. Marayong, NSW: K.D. Publications.

Whitefield, D. (2001). Learning styles – great minds don't think alike. Retrieved July 1, 2002, from: http://cleo.murdoch.edu.au/asu/pubs/tlf/tlf95/whit271.html

Wilson, J. & Wing Jan, L. (1993) *Thinking for themselves: Developing strategies for reflective learning.* Armadale, Aust: Eleanor Curtain Publishing.

Winter, R. (1996). Some principles and procedures for the conduct of action research, In Zuber-Skerritt, O. (Ed.) *New Directions in Action Research*, (pp. 13 –27) London: Falmer Press.

Wolfe, P. (1998). The brains behind the brain. *Educational Leadership*, 56 (3), 20 – 25

Wolfe, P. (2001). *Brain matters: Translating research into classroom practice.* Alexandria, VA: Association for Supervision and Curriculum Development.

Wolfe, P. & Brandt, R. (1998). What do we know from brain research. *Educational Leadership*, 56 (3), 8 – 13.

Wortley, S. (2000). Business as usual or action research in practice? *Action Research E – Reports, 6.* Retrieved Jan 7, 2002, from: http://www.cchs.usyd.edu.au/arow/arer/006.htm

Wright, A. (1994). Language and experience in the hermeneutics of religious understanding. *British Journal of Religious Education*, 18 (3), 167 – 174.

Wurst, S. & Crotty, R. (2001). Establishing the foundations of RE in contemporary Australian society, *Journal of Religious Education*, Vol 49 (2), 26 – 30.

Zohar, D. & Marshall, I. (2000). *Spiritual intelligence: The ultimate intelligence.* London: Bloomsbury.

# Appendices

## Appendix 1 – Somersault Questions

(Adapted from 'The Thinking Platform' (O'Brien & White, 2001)

Introduction:

The 'Somersault' strategy is designed to stimulate lateral thinking around a critical issue by posing a question that is the opposite of the real issue to be addressed by the learning community. By brainstorming the 'negative' perspective of a question it is often easier to **'somersault'** the question and discern the more 'positive' points of view. Students often enjoy the opportunity to light heartedly explore a question they would not normally seriously address. The freedom of brainstorming 'negative' responses helps unlock the thinking process when students are called upon to formulate 'positive' responses to the real question.

Process:

Clearly define the topic for investigation/discussion. Initially do not disclose the real purpose of the discussion. (eg. How to enhance the school environment.)

Divide a sheet of paper in half and devise a discussion question which is the opposite of the real issue for investigation (eg. How can we ensure our school environment is an absolute disgrace?). Record the question in the left hand column of the page.

Using the 'DOVE'[45] brainstorming technique, learning teams record possible responses on the left hand side of the page. (eg. Ensure no garbage bins are provided….) Appropriate subheadings may be used to direct discussion (eg. In the playground; in classrooms; in garden areas….)

After a few minutes, discussion is ceased. The 'somersault question' is posed highlighting the true focus for the discussion (eg. How can we enhance our school environment in order to make it the most attractive school in the district?).

Initially, responses are recorded in the second column by writing ideas that are opposite the originally recorded for the 'negative' question (eg. Provide a large number of garbage bins).

After responding to the initial thoughts that were stimulated by the 'somersault' process, students should formulate additional constructive ideas (eg. Introduce environmental awards, initiate a gardening club….. ).

Utilise the 'Blackboard Share'[46] technique to allow each team the opportunity to present their three 'best answers'.

A plenary session is conducted to review the ideas generated. Older students could be asked to write a one or two paragraph response, incorporating ideas generated by the 'somersault' process.

45 See Chapter 2.3 – Activity # 21

46 See Chapter 2.3 – Activity # 16

# Somersault Questions – REC Conference

| **Question One:**<br><br>**What are the characteristics of the WORST teaching strategies you have used in the RE Classroom?** | **Question Two:**<br><br>**What are the characteristics of the BEST teaching strategies you have used in the RE Classroom?** |
|---|---|
| | |

Fold Sheet Here 

# Appendix 2 – Talk, Listen & Record

(Adapted from 'The Thinking Platform' (O'Brien & White, 2001)

Introduction:

The 'Talk, Listen and Record' technique is a quick, efficient means of gathering a range of ideas. The process initially involves students formulating ideas in response to a focus question. Working in teams of three, each student has an opportunity to 'talk' to their ideas, 'listen' to a second person's ideas and 'record' the third person's ideas.

A particular strength of the 'Talk, Listen and Record' activity is that it not only helps discern areas of common agreement, but also ensures that individual ideas are recognised and can be used as a stimulus for further exploration.

Process:

1. Outline the process to the class and provide a context for the focus question.

2. Pose the focus question and provide a period for personal reflection. (eg. Energy: What are the benefits of solar power?) Invite pupils to list four ideas in direct response to the question.

3. Form learning teams of four. Distribute worksheets, marker pens and scissors.

4. The first member of the team outlines their four ideas (**'talks'**) whilst other team members **'listen'**. The process continues with each team member taking turns to rotate through the roles of 'talking' and 'listening'. After listening to each set of ideas, team members should check they understand the thoughts presented prior to moving to the next step.

5. The team reviews the opinions that have been generated and **'record'** ideas similar to each other. As the ideas are presented, the recorder allocates 'points' based on the number of participants who had a similar thought:

    a. Allocate '3' points for an idea that is supported by at least three of the four team members.
    b. Allocate '2' points for an idea that was suggested by two group members.
    c. Allocate '1' point for all remaining individual ideas. (Spread over two columns to allow for the greater range and diversity of individual ideas.)

6. Place four large sheets of chart paper around the room. Label two sheets with the number ‘1’ and the other sheets ‘2’ and ‘3’.

7. Teams cut worksheet into four sections. Each member takes a different section, using a glue stick pastes their team’s ideas on the chart paper corresponding to the point values.

8. Once tabulated, the teacher invites the class to compare priorities. Through discussion, major themes may be identified whilst individual ideas are acknowledged.

## Talk, Listen & Record: Team Summary

| **3** points | **2** points | **1** point | **1** point |
|---|---|---|---|
| | | | |

*Cut Here* *Cut Here* *Cut Here*

# Appendix 3 – Teaching Strategies Employed During the Research Project

All activities drawn from 'Into the Deep' (White, O'Brien & Todd, 2003)

| Research Phase | Thinking Quadrant | Combined RECs | |
|---|---|---|---|
| One | B<br>D | 4.6 - Life's Choices & 4.5 - Scriptural Think Pad<br>6.2 - Scripture Detours | |
| | | **Southern RECs** | **Northern RECs** |
| Two | A<br>B<br>C<br>D | 3.6 - Scripture Detective<br>4.6 - Life's Choices<br>5.2 - Triple Play<br>6.2 - Scripture Detours | 3.4 - FIND Chart<br>4.5 - Scriptural Think Pad<br>5.1 - Biblical Chatterbox<br>6.3 - Scripture Graffiti |
| Three | A<br>B<br>C<br>D | 3.2 - Character Analysis<br>4.1 - Scripture Snaps<br>5.5 - Build the Barrier<br>6.3 - Scripture Graffiti | 3.6 - Scripture Detective<br>4.3 - Jig-saw Summary<br>5.6 - Wearing the Badge<br>6.2 - Scripture Detours |

# Appendix 4 – Lesson Evaluation Sheet – Phases 1 & 2

***Reflection Sheet***

| Strategy: |
|---|

Date: _____ School Code: _____

The following characteristics of the *'DEEP'* Framework were clearly evident in this lesson: *(please number)*

| | |
|---|---|
| 1.0<br>Discernment | 3.0<br>Engagement |
| 2.0<br>Enrichment | 4.0<br>Participation |

Keeping in mind the *'DEEP'* Framework, critique the lesson

| Evaluation (what did/did not work well?) | Analysis (why?) |
|---|---|
| * → | * |
| * → | * |
| * → | * |
| * → | * |
| * → | * |

Where to next? Suggest

(a) Modifications to the lesson:

(b) Modifications to the *'DEEP'* Framework:

## Appendix 5 – Doctoral Focus Group Stimulus Questions – Phase Two

### Stimulus Questions – Phase Two

Nominated group: _____

Nominated strategies:

- Quad A: _____
- Quad B: _____
- Quad C: _____
- Quad D: _____

### Part One: Critique of nominated strategies

(i) How did it reflect the DEEP framework?
(ii) Evaluation and analysis
(iii) Insights from student work samples

**Quad A:**

**Quad B:**

**Quad C:**

**Quad D:**

### Part Two: How did the DEEP criteria assist with the evaluative process?

If so – how and why; If not – why not?

(a) Broadly (DEEP framework)

(b) Narrowly (Specific criteria)

Collection of reflection sheets for later analysis – notable similarities/differences between evaluations

### Part Three: Discussion of DEEP Framework itself

(a) Clarity of descriptors/criteria

(b) Were the criteria easily identifiable in the lesson outlines/lesson process?

(c) Are there criteria that could be better expressed? Combined together?

(d) Reflecting on the lesson evaluations are there other criteria that could be:

(i) Added:

(ii) Omitted:

## Part Four: Modifications to initial framework:

(i) Insights from above discussion:

(ii) Insights from REC conference:

(Eg. Engagement – insert time efficient and manageable)

(iii) Final reflection: What have we heard in common? What is missing?

***Next phase of research project:***

- ***Selection of strategies:***
- ***Use of redesigned reflection sheet – emphasis on critiquing the DEEP framework***
- ***Timing of next focus groups:***

***Southern: Monday 17th Nov: 3.30 – 5.00pm CEO Hobart***

***North/North – Western: Wednesday 19th Nov: 3.30 – 5.00pm OLMC Deloraine***

# Appendix 6 – Lesson Evaluation Sheets – Phase 3

***Lesson:*** _____

1. Overall, how did you rate the effectiveness of the lesson?

| Not Effective<br>1 | Low<br>2 | Medium<br>3 | Highly Effective<br>4 |
|---|---|---|---|
| | | | |

2. On what basis did you reach this conclusion?

3. How useful was the DEEP framework to the evaluative process? Why/why not?

4. What criteria were:

   (a) Most helpful: Why?

   (b) Least helpful: Why?

5. Are there other evaluative criteria that could be added to the framework? Why?

6. Are there some criteria that are more important than others in judging the effectiveness of a lesson? (Why?)

# Reflection Sheet

**Strategy:** **Date:** **School Code:**

| Criteria | Evidence of the following criteria? | | Rate effectiveness of the lesson based on the criteria | | | | | Comment (if applicable) |
|---|---|---|---|---|---|---|---|---|
| | Not evident | Evident | N/A | Not Effective | Low | Med | Highly Effective | |
| | 1 | 2 | | 1 | 2 | 3 | 4 | |
| **1.0 Discernment** Generation of personal religious meaning and understanding | | | | | | | | |
| 1.1 Generate opportunities for religious meaning to emerge | | | | | | | | |
| 1.2 Extend learning through elaboration upon religious concepts | | | | | | | | |
| 1.3 Nurture 'Connected Knowing' to prior religious understanding | | | | | | | | |
| 1.4 Emphasise critical and lateral thinking processes | | | | | | | | |
| 1.5 Engage the learner in Reflections on Life | | | | | | | | |
| **2.0 Enrichment** Catering for individualised learning | | | | | | | | |
| 2.1 Input data through a variety of learning styles | | | | | | | | |
| 2.2 Accommodate cognitive processing styles | | | | | | | | |
| 2.3 Address a range of outcomes in one task | | | | | | | | |
| 2.4 Cater for mixed ability levels | | | | | | | | |
| 2.5 Allow for open-ended responses | | | | | | | | |
| 2.6 Adjust for appropriate developmental levels | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **3.0 Engagement** Personal choice to be involved in learning | | | | | | | | |
| 3.1 Be problem based | | | | | | | | |
| 3.2 Be personally relevant | | | | | | | | |
| 3.3 Provide learning connections through regular feedback | | | | | | | | |
| 3.4 Acknowledge the role of emotion in learning | | | | | | | | |
| 3.5 Encourage risk taking | | | | | | | | |
| 3.6 Allow for neural fatigue and recovery | | | | | | | | |
| 3.7 Learning experiences are co-constructed | | | | | | | | |
| **4.0 Participation** The communal dimension of learning | | | | | | | | |
| 4.1 Value the 'wisdom' of the community | | | | | | | | |
| 4.2 Function in small collaborative learning teams | | | | | | | | |
| 4.3 Incorporate Modelling, Joint Construction and Independent activities | | | | | | | | |
| 4.4 Encourage individual and group accountability | | | | | | | | |
| 4.5 Activities are time efficient and manageable | | | | | | | | |
| 4.6 Role allocation supports learning | | | | | | | | |

# Appendix 7 – Doctoral Focus Group – Stimulus Questions Phase 3

***Lesson:*** _____

1. Overall, how did you rate the effectiveness of the lesson?

| Not Effective<br>1 | Low<br>2 | Medium<br>3 | Highly Effective<br>4 |
|---|---|---|---|
| | | | |

2. On what basis did you reach this conclusion?

3. How useful was the DEEP framework to the evaluative process? Why/why not?

4. What criteria were:

   (a) Most helpful: Why?

   (b) Least helpful: Why?

5. Are there other evaluative criteria that could be added to the framework? Why?

6. Are there some criteria that are more important than others in judging the effectiveness of a lesson? (Why?)

# Doctoral Focus Group: Stimulus Questions Phase 3

**Date:** **Sub-group:**

| Criteria | Value of criteria? | | Comment (if applicable) – especially suggested modifications |
|---|---|---|---|
| | Omit | Include | |
| | 1 | 2 | |
| **1.0 Discernment** Generation of personal religious meaning and understanding | | | |
| 1.1 Generate opportunities for religious meaning to emerge | | | |
| 1.2 Extend learning through elaboration upon religious concepts | | | |
| 1.3 Nurture 'Connected Knowing' to prior religious understanding | | | |
| 1.4 Emphasise critical and lateral thinking processes | | | |
| 1.5 Engage the learner in Reflections on Life | | | |
| **2.0 Enrichment** Catering for individualised learning | | | |
| 2.1 Input data through a variety of learning styles | | | |
| 2.2 Accommodate cognitive processing styles | | | |
| 2.3 Address a range of outcomes in one task | | | |
| 2.4 Cater for mixed ability levels | | | |
| 2.5 Allow for open-ended responses | | | |
| 2.6 Adjust for appropriate developmental levels | | | |

| | | | |
|---|---|---|---|
| **3.0 Engagement**<br>Personal choice to be involved in learning | | | |
| 3.1 Be problem based | | | |
| 3.2 Be personally relevant | | | |
| 3.3 Provide learning connections through regular feedback | | | |
| 3.4 Acknowledge the role of emotion in learning | | | |
| 3.5 Encourage risk taking | | | |
| 3.6 Allow for neural fatigue and recovery | | | |
| 3.7 Learning experiences are co-constructed | | | |
| **4.0 Participation**<br>The communal dimension of learning | | | |
| 4.1 Value the 'wisdom' of the community | | | |
| 4.2 Function in small collaborative learning teams | | | |
| 4.3 Incorporate Modelling, Joint Construction and Independent activities | | | |
| 4.4 Encourage individual and group accountability | | | |
| 4.5 Activities are time efficient and manageable | | | |
| 4.6 Role allocation supports learning | | | |

**General Comments:**

**(i) Insights from the above discussion**

**(ii) What criteria should be omitted**

**(iii) Suggestions for any additional criteria**

**Thanks and conclusion:**

# Appendix 8 – Information and Consent Letter: Principals

# Appendix 9 – Information and Consent Letter: REC's

# Appendix 10 – Information and Consent Letter:  Parents

## Appendix 11 – Human Resources Ethics Committee: Approval Form