



# THE UNIVERSITY OF WESTERN AUSTRALIA

*Graduate School of Education*

**Doctor of Education (Ed.D.) Research Proposal**

## **THINKING PATTERNS, PUPIL ENGAGEMENT, AND UNDERSTANDING IN EARLY CHILDHOOD**

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## **ABSTRACT**

Mismatches between pupils' sensory modality preferences and the dominant methods used in their learning contexts have been suggested to contribute to low levels of engagement and understanding. The goals of this study will be to (i) determine whether teacher and parent ratings can be used as a rough index of pupils' modality preference patterns in early childhood settings; (ii) examine the relationships between children's modality preferences and kindergarten readiness; and finally (iii) through intervention, to evaluate the impact of multisensory education strategies on pupil engagement and understanding levels in formal learning. A multiple baseline design across participants will be used to evaluate the efficacy of this multisensory educational approach. Results will be analysed using a variety of correlational and multivariate analysis of variance methods. The study outcomes are anticipated to make a significant contribution to the context field of education by providing a rigorous evaluation of the impact of multisensory strategies on key learning outcomes in early childhood education settings.

# INTRODUCTION

Reports on school effectiveness abound with concerns over the apparent disengagement of pupils at all levels of formal schooling. In the USA, for example, results of a 1994 national survey (Hootstein, 1994, p. 32) indicated that many young people “felt bored at least half of the time” they spent in school. Numerous other USA studies have highlighted significant relationships between low engagement levels and failures to develop basic academic skills (e.g., Mathewson, 1994). Based on outcomes such as these, Watson (1996) asserted that high levels of disengagement were “... [the most] potentially damaging problem in American Education” (p. 43). Although definitions of pupil engagement vary considerably within the literature, Skinner and Belmont (1993) offered a particularly comprehensive depiction:

Engagement versus disaffection in school refers to the intensity and emotional quality of children’s involvement in initiating and carrying out learning activities...Children who are engaged show sustained behavioural involvement in learning activities accompanied by a positive emotional tone. They select tasks at the border of their competencies, initiate action when given the opportunity, and exert intense effort and concentration in the implementation of learning tasks; they show generally positive emotions during ongoing action, including enthusiasm, optimism, curiosity, and interest. The opposite of engagement is disaffection. Disaffected children are passive, do not try hard, and give up easily in the face of challenges... [they can] be bored, depressed, anxious, or even angry about their presence in the classroom; they can be withdrawn from learning opportunities or even rebellious towards teachers and classmates (p. 572).

In Australia, a major research projects has been established to explore problems associated with school disengagement. Melbourne University established the *Middle Years Research and Development* (MYRAD) project in 1999 to explore patterns of underachievement and disengagement for pupils in the middle years. Preliminary conclusions from this project suggest that many schools in Australia fail to provide contexts that encourage pupils “to connect with school, to engage with learning, and to become independent and thoughtful learners” (MYRAD, 2002, p. 14). These reports also emphasized the need to integrate thinking and learning skills across core areas in efforts to increase pupils’ learning engagement.

In Western Australia, many educators have sought to identify ways in which pupil engagement and learning can be enhanced. Programs developed to address this goal have included *Emotional Literacy* (McLean, 2001), *Cooperative Learning* (Bennett, 1999; Bennett, Rolheisser, & Stevahn, 1991), and *Brain Friendly Learning* (Plumb, 2002). Indeed, one of the explicit goals of implementing the *First Steps* programs developed in Western Australia was to increase

learning engagement levels in the primary grades. All of these programs represent efforts to support and enhance children's engagement with their learning. None, however, have been reported to increase engagement levels across all subject areas.

## **Links Between Pupil Disengagement and Sensory Modality Preferences**

Low levels of learning engagement are likely to reflect a complex interplay of learning, environment, personal, and circumstantial factors. Markova (1992) has suggested that increasing levels of school disengagement seen in recent years may reflect the inability of traditional classroom practice to accommodate diverse thinking patterns, or sensory modality preferences. The Special Education division of the Virginia State Department of Education (1981) defined a 'modality' as "a sensory channel through which individuals receive and retain information" (p. 56). Markova defines the sensory channel on which an individual relies most heavily as his/her 'preferred modality', and refers to the overall profile of modalities employed by an individual as his/her 'thinking pattern'.

Markova (1992) suggests that there are six primary thinking patterns exhibited by pupils, reflecting the relative reliance on, and priority given to, the auditory, visual, and kinaesthetic channels. The importance of these modalities was originally highlighted by Bruner, Olver, and Greenfield (1966), when they discussed the 'primitive properties' of the haptic space (kinaesthetic), auditory, and visual senses to represent knowledge as imagery of experience and action. These, they asserted, must correspond with what we do (kinaesthetic), what we see (visual), and what we say (auditory). Bruner et al. (1966) further stated that:

School forces [the child] to rely on linguistic encoding as a way of communicating because by its remoteness from direct action, it robs him of contextual and ostensive reference as a mode of carrying meaning (p. 323).

Stated alternatively, children typically cannot resort to pointing or doing to convey meaning in formal schooling contexts, and thus must learn to use language as an implement of thought and learning. Markova (1996) has suggested that *if* a child's thinking pattern *does not* correlate with modalities deployed in the learning context, the child will experience difficulties in engaging with learning activities. Disaffected behaviour such as frustration, embarrassment, avoidance,

lowered self-concept and apparent disengagement from the learning process can result. Hunt (1992) described this state as a manifestation of a *loss of ganus*. This behaviour is characterised by low levels of intrinsic motivation, self-esteem, dignity, curiosity to learn, and joy in learning:

Ganus, a word that comes from a Latin root...covers a myriad of emotions from willingness to fervour, from enthusiasm to zeal. To have the ganus is to have the spirit, the desire, the will, the fire, the craving, the hunger, the yearning, and the aspiration all rolled up in one. *Ganus is the fuel for learning*. Ganus propels the child forward in his/her discovery process for it ignites and sustains the interest in his/her world (pp. 55-56).

## **Previous Research on Sensory Modality Preferences**

Research findings on the relationship between sensory modality preferences and school learning experiences are scarce. Of the studies that have been conducted to date, many have focused on examining differences in modality preferences across pupils from diverse cultural backgrounds. Schaper and Flores (1985), for example, studied the modality preferences of ten high school and seven University level Mexican American pupils. Study participants were tested for their preferences among seven possible modalities (print, aural, interactive, visual, haptic, kinaesthetic, and olfactory). It was found that the 'interactive' modality was dominant within this culture, followed by the visual modality.

Some studies have also aimed to examine modality preferences amongst very young children. In one early example, Derevensky and Petrushka (1979) examined trends in the development of pupils' preferences for using the visual and tactile modes from kindergarten to the second grade. They found rapid development of preferences in the kindergarten year, which slowed dramatically by the first grade. By the second grade, the children's modality preferences had more or less stabilized. This supports the notion that any attempts to affect modality preferences must be done very early in the child's development. Results of this study also suggested a link between a pupils' achievement and modality preferences, indicating higher levels of pupil engagement are associated with use of the kinaesthetic mode.

Other studies with young children have focused on the relationship between pupils' modality preferences and characteristics of their learning environments. A study by Donovan and Austin (1978) compared pupils' modality preferences with the 'primary instructional focus' in their

classrooms. The study involved 107 first grade pupils from the multi-ethnic, multilingual, multicultural, and economically disadvantaged Hawaiian community. Results indicated that pupils whose modality preferences were congruent with the instructional focus of their classrooms achieved significantly higher scores on all of the outcome measures. It should be noted, however, that the Donovan and Austin study focused only on the 'auditory' and 'visual' preferences, comparing these to a 'no modality' preference. As a result, this study neglected to address the kinaesthetic mode so frequently reported to be dominant or preferred by young children.

A restricted focus on particular sensory modes was apparent in many of the studies conducted during the same time period. For example, of the numerous studies that were undertaken to examine the relationship between modality preferences and reading skill development during the late 1960s to early 1970s, almost all focused exclusively on the 'visual' and 'auditory' modes. These trends are evident in the empirical work of Abrams (1976), D'Annunzio (1975), Jones (1972), Mann (1975), Piercy (1971), Schevill (1973) and Simmons (1969). Thus, a failure to examine the kinaesthetic mode was a common limitation of early research within this field.

Further, very few interventions that draw on modality preferences have appeared to date. As early as 1986, Tansley published a *Perceptual Training Booklet* that encouraged teachers to acknowledge the benefits of using approaches based on multisensory stimulation. Although this booklet emphasized the potential benefits of integrating the tactile/kinaesthetic and cross-modality functions with the visual and auditory modes for improving pupil engagement and understanding levels, the effects of the program were not tested empirically.

In their *Project Spectrum*, Gardner, Feldman, and Krechvsky (1998) used a number of activities designed to enhance the integration of children's areas of strength (preferred modalities). Used throughout US eastern city schools in the 1990s, *Project Spectrum* identified the children's individual attributes as early as kindergarten and pre-school. Teachers then tailored learning experiences to complement the child's areas of strength while supporting the development of weaker areas. These techniques used the child's identified abilities and interests as pathways to engaging with the academic curriculum. Again, however, the methods used in this program have not been subjected to a rigorous empirical evaluation.

More recently, McGovern (2000) researched the effects of music on pupil engagement in an integrated, multi-sensory approach to classroom instruction. The project involved pupils enrolled in the K-6 grades of a suburban elementary school. The ethnic composition of the sample was diverse, comprising 91.4% Black, 6.9% White, and 1.7% Hispanic children. The majority of the pupils were considered to be academically 'at risk'. Results indicated that the use of rhythm and body percussion as a strategy to support vocal practice of spelling enhanced levels of pupil engagement and learning performance. Although this study did provide empirical evidence of the relationship between modality preferences and pupil outcomes, the study did not use a design that provided control for threats to internal validity. As such, the results of the study cannot be viewed as conclusive support for this programme's efficacy.

Kinaesthetic experience is identified as a strong primary source of sensory input for the very young infant (Ayres, 1994). This modality is then supported by auditory and eventually by visual as the infant matures. However, if a kinaesthetically orientated pupil has kinaesthetic experiences omitted altogether at a young age, they will experience greater difficulty engaging with the learning situation. Sanders (1996) identifies strong correlation between tonal and rhythm scores with auditory and kinaesthetic aptitudes. This supports the premises that *auditory and kinaesthetic ability* contribute to musical aptitude. Consequently, Sanders suggests that kinaesthetic reinforcement of tonal experiences, including playing instruments or Curwen hand-signs and gestures, helps reinforce pitch and enhances pupils' overall learning engagement.

## **SUMMARY AND INTEGRATION**

Previous research on the forms and implications of children's sensory modality preferences in formal schooling contexts has been limited. Three major themes have emerged in this review:

- 1) While several researchers have suggested that children who rely more on the kinaesthetic, rather than the visual or auditory modes, are likely to be disadvantaged in formal schooling contexts, no studies have been done to examine relationships between modality preference patterns and performance in key learning areas. At the early childhood level, measures of disadvantage are typically derived from some kind of 'kindergarten readiness' scale (KRT

Larson, 1998). These instruments generally attempt to assess children's readiness to enter formal schooling on the basis of their current cognitive, affective, social, and behavioural levels.

2) Little research has been done to evaluate the efficacy of multisensory strategies on key learning outcomes in early childhood settings. Thus, while many researchers have posed potential benefits of using such strategies in areas such as pupil engagement and understanding levels, these effects have not been evaluated empirically.

3) Of the studies that have been conducted, the programs used have been limited in the range of modalities explored. In particular, although some studies have indicated that the kinaesthetic modality is particularly important at the early age level, this has typically been neglected in the empirical research. Few programs that have been developed to date have incorporated a significant kinaesthetic component. Unfortunately, fewer still have been evaluated rigorously for their effects in key outcome areas, such as children's engagement and understanding levels.

Researchers such as Markova (1992) have also noted that instructional strategies based on modality preference profiles are typically seen as 'specialized' activities, rather than approaches that can be incorporated into daily classroom routines. This may, in turn, stem from the fact that most formal modality preference protocols require specialized training to administer and interpret. There are, however, several informal rating scales which are designed to provide broad assessments of modality strengths in adults (e.g. Perceptual Modality Preference Survey (2001)). The availability of such an instrument for children could make the use of such strategies more accessible to teachers who do not have specialized training in the area.

## **OVERVIEW AND AIMS**

The major goals of the current study will be to (i) determine whether teacher and parent ratings can be used as an approximate index of pupils' modality preference patterns at the early childhood level, (ii) examine the relationships between children's modality references and kindergarten readiness, and (iii) evaluate the efficacy of an intervention designed to integrate children's use of all sensory modalities in terms of its impact on pupil engagement and understanding levels in formal learning activities.

To address the first goal, the study will obtain teacher and parent ratings of pupils' modality preferences and correlate these with scores from more formal, one-to-one assessments of modality preferences. To address the second, pupils will also be assessed using formal and informal measures of readiness for formal schooling. These scores will then be correlated with those from the modality preference assessments. Finally, the study will incorporate the use of a multiple baseline design across three early childhood classes to evaluate the effects of multi-sensory intervention strategies on pupils' engagement and understanding levels.

The study will address three major research questions:

- 1) To what extent can informal teacher and parent ratings be used to estimate pupils' modality preferences?
- 2) What are the relationships between modality preference profiles and scores on kindergarten readiness tests?
- 3) Can learning activities that are designed to integrate the visual, auditory, and kinaesthetic modalities have a positive effect on pupils' engagement and understanding levels?

## **METHOD**

### **Participants**

Three classes (n=60) of pre-school children, aged four to five and a half, will participate in the study (n = 20 per class). A metropolitan government pre-school centre will be chosen for the research as this will potentially increase cultural, ethnic and socioeconomic background sample diversity. One such school has already expressed informal interest in participating in this research.

### **Intervention Program**

As indicated, many researchers in the field of pupil engagement have identified that minimal kinaesthetic modality sensory input is deployed in our current education system, if any at all. It is therefore questioned whether this minimal kinaesthetic stimulus leaves the kinaesthetically

dominant pupil marginalized. Woljck (1990) acknowledges that time does not permit a teacher to solely teach auditorally to the auditory learner, visually to the visual learner or kinaesthetically to the kinaesthetic learner. Therefore, Woljck recommends that teachers use all three styles concurrently within each lesson to best engage *all pupils' learning styles*. This recommendation is also made by Markova (1992).

It is the intention of this intervention study to use learning experiences that present pupils with strong *kinaesthetic and interactive foci* as well as the usual auditory and visual modalities. This broader use of perceptual modalities aims to ensure each child can access their strongest receptive modality. The procedures used in the intervention program will be drawn from various previous programs, which honour pupil's unique and diverse abilities (McGovern, 2000; Gardner, 1999; Foss, 2001; Markova, 1992) as well as the researcher's own professional experience. During the intervention sessions, the class as a whole will engage in structured group movement and music activities involving aural and oral skills, social interaction, rhythm and pitch skills, fine and gross motor skills, body percussion, as well as hand-eye coordination (e.g., Step in Time; see p. 13). These activities have been designed to build confidence and freedom of expression by each pupil individually and in unison. Target behaviours include accuracy with pitch and memory of content, movement coordinated with the group, interpersonal skills, hand-eye coordination, rhythm and timing.

## **Research Design**

The major aim of the study will be to compare the intervention described above to one in which only the auditory and visual modalities are used, as is more typical in formal schooling contexts. To address this aim, a multiple baseline across participants design (Howard and Sharp, 1983) will be used. In the study, the multiple baseline structure will be established by observing engagement levels in the three pre-primary classes over a 16-week period. First, a four-week baseline will be established across all three classes in the study. During this period, none of the classes will participate in a specialized intervention program. Individual testing will be undertaken. Videos of normal class activities twice per week will be evaluated to determine pupil's engagement in physical, cognitive, social and task ratings.

Intervention: One of the three classes (Class A) will commence and continue with the intervention for a period of four weeks. During this time, the intervention class will participate in the full intervention procedure as outlined (i.e. drawing on all three of the primary modalities – auditory, visual and kinaesthetic, concurrently). In the other two classes, the same content will be covered, but using methods that include only the visual and auditory modes (i.e., excluding the kinaesthetic component – see below). The latter condition is designed to represent the methods that are used in more typical early childhood settings.

Following this four-week period, Class A will continue with the intervention strategies, and Class B will begin and commence the intervention activities for a period of four weeks. During this time, Class C will continue with the auditory and visual comparison activities. After four weeks, Classes A and B will continue with the intervention activities, and Class C will commence and continue these activities for four weeks.

To provide a pictorial representation of the experimental design, a diagram with hypothetical data for the four engagement measures is shown in Figure 1.

All intervention activities will involve pupils sharing in kinaesthetic singing and performing games consisting of integrated movements that emphasise rhythm and timing of songs. The pupils will interact with individuals as well as with the group, taking turns and following each other's lead.

The comparison activities will cover the same learning content as is used in the intervention conditions, but using only the auditory and visual modalities. These would be strategies consistent with the majority of lessons seen in all classes of early childhood education.

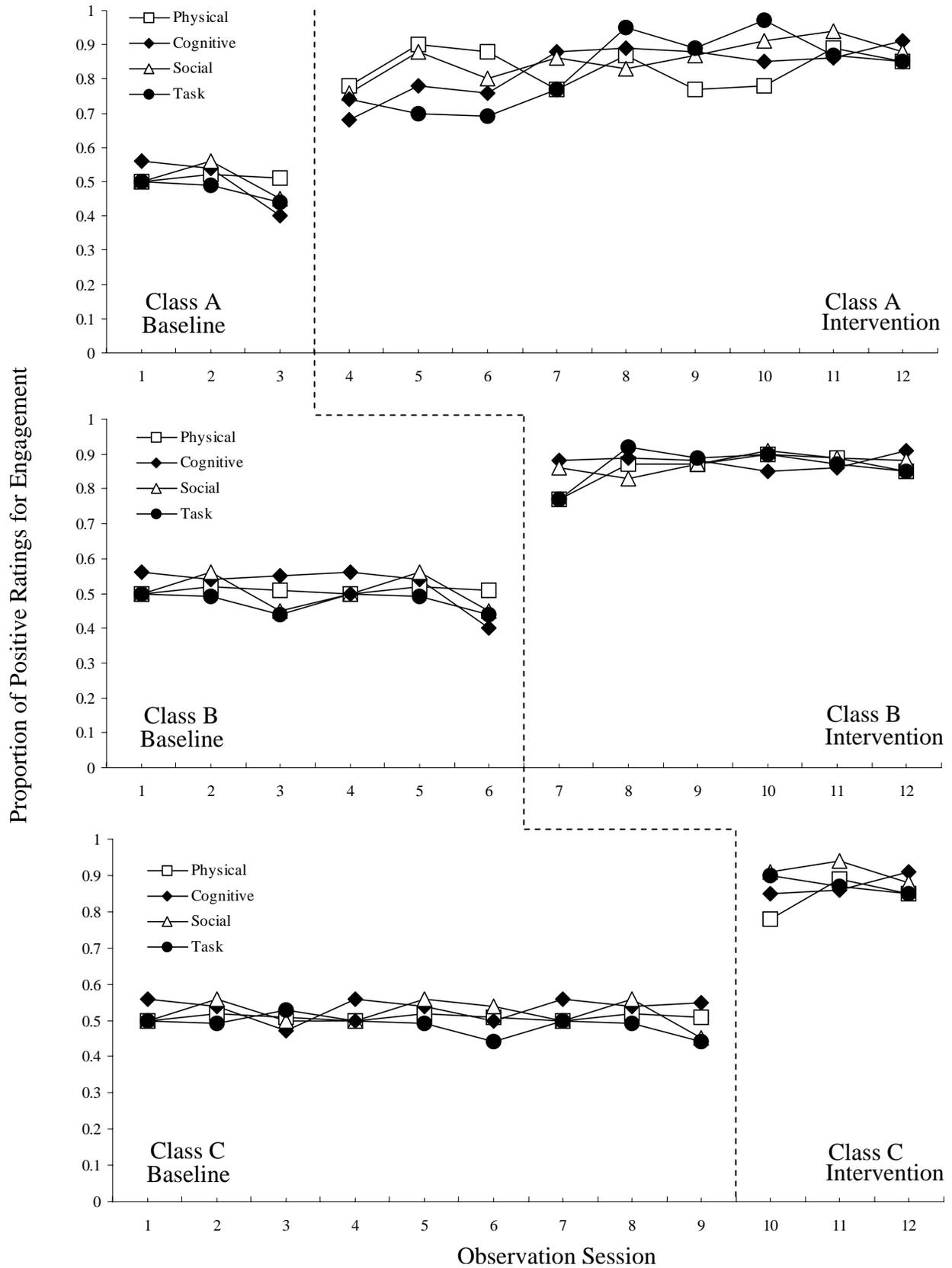


Figure 1. Hypothetical Multiple Baseline Data

### Activity Example: Step in Time

The purpose of this task will be to have pupils identify that a clock measures and displays the passage of time affecting our lives. The function and direction of movement of the two hands of the clock will be presented.

#### Intervention class presentation:

Pupils will be spaced standing on the spot marching, to represent the beat of time, while swinging their arms to the tapping of rhythm sticks. The clock face will be held up and the hands slowly moved around the face in time with their movement. In unison, pupils will chant the passing of ‘**O**’clock’ and ‘**half** past’, as the clock hands advance (ex. One o’clock... half past one... two o’clock... half past two).

As the pupils grasp the process, individual pupils will take a turn in 1) tapping the rhythm, 2) moving the clock hands while assisted by the researcher and teacher. After some practice, the pupils will sing Hickery Dickery Dock several times together while the rhythm tapping is continued by different pupils. This utilizes repetition in learning embedding the concepts through kinaesthetic, visual and auditory experiences.

#### Comparison class presentation:

The teacher will initiate discussion by holding up a clock face and moving the hands herself as she explains its function. Pupils will be encouraged to share their experiences of clocks in their homes et cetera. Then, all will sing Hickery, Dickery, Dock several times.

In each session, these activities will be used to achieve a given target outcome (e.g. learning other pupils’ names). Sessions will last approximately 15-20 minutes, and will be conducted three times per week in each study phase following the baseline period. Over the entire study period, therefore, a total of 12 sessions of activities for each intervention phase.

## **Instrumentation**

### *Pre-Intervention Measures*

Prior to the collection of any baseline data, all children will be assessed using four basic measures.

- I) **Swassing-Barbe Modality Index** (1979). This is the primary instrument that will be used to assess pupil's modality preferences. The Swassing-Barbe Modality Index instrument has been extensively used to assess an individual's modality strengths (George & Schaer, 1987; Janowitz, 1992; Sanders, 1996; Wojcik, 1990). With the Swassing-Barbe Modality Index, each pupil is assessed individually by the instructor. The pupil is presented with a sequence of geometric shapes (hearts, circles, triangles and squares) in three visual, auditory and kinaesthetic sessions. The subject is then asked to recreate the same sequence from memory. The sequences are presented first visually, then auditorally, and finally kinaesthetically according to the manual prepared by the SBMI developer. The Swassing-Barbe Modality Index (SBMI) (1979) instrument has been extensively used to assess an individual's modality strengths by George & Schaer, (1987), Janowitz, (1992), Sanders, (1996), Wojcik, (1990). Each subject's strongest (primary) and second strongest (secondary) modality are then labelled visual, auditory, or kinaesthetic, or mixed. A mixed or balanced modality occurs when all three modalities are within five percentage points of each other. The Perceptual Modality Preference Survey (PMPS) is a more recent instrument than the SBMI used as a validation tool against the SBMI.
  
- II) **Parent and Teacher Modality Preference Checklist** (Appendix A): This checklist will be used to determine whether a combination of teacher and parent ratings can be used to identify modality strengths. To achieve this goal, results from the Swassing-Barbe test will be correlated with those of a checklist constructed by the researcher. Items within this checklist will be modified from various sources (e.g. The Perceptual Modality Preference Survey, Cherry, 2001) to be suitable for use with kindergarten-aged children. Items in this checklist ask parents and teachers to identify the child's preferences

between learning by listening, talking with others, looking at objects, and handling objects. If the outcomes of this checklist correlate highly with scores from the Swassing-Barbe, this will increase the transferability of the instrument in both typical classroom situations and in the home.

- III) **Kindergarten Readiness Test** (Larson & Vitali, 1998). This instrument will be used to provide a measure of general kindergarten readiness for all pupils across the three classes. This test is relatively recent, but has been reported to have acceptable reliability and validity for assessing children's cognitive, physical, social, and emotional readiness for engaging with formal kindergarten environments. The test will be administered by the researcher on a one-to-one basis with each pupil.
- IV) **Class Teacher Rating Scale** (Appendix B): All participating teachers will complete a checklist on all children within their classes. Scores on this rating scale will be used as a supplement to the Kindergarten Readiness Test conducted on a one-to-one basis by the researcher. As the research will commence in Term II, it is anticipated that the teachers involved will have a sound understanding of children's orientation to the classroom context by that time. While this scale has been constructed by the researcher, the items within the scale represent modifications of items drawn from a wide variety of kindergarten readiness and 'at risk' rating scales (e.g., the Saginaw PK-Sort). The full checklist to be used is included in Appendix B. As indicated, the primary function of these ratings will be to corroborate the scores obtained on the Kindergarten Readiness Test.

#### *Ongoing Monitoring of Pupil Engagement Levels*

Throughout both the baseline period and the period of the intervention, videos will be taken of all three classes in every intervention and comparison session. From these tapes, a random sample of three sessions per child per study phase will be chosen for observation to evaluate their engagement levels. Key dimensions used to develop the final behaviour rating scale will include:

- I) **Physical engagement:** This will be assessed in various ways, including how quickly and easily the target pupil (TP) responds to calls or directives, acknowledges an attention device, and comes to assemble and settle with other class members. Specific foci here will include: Does the (TP) become alerted to changes in class practice? Does he/she fail to detect and follow the clues that guide the other class members?
  
- II) **Cognitive engagement:** This will also be assessed in various ways, with specific attention paid to whether the child gives eye-contact to the teacher, is listening, exhibits body language suggesting he/she is attending to and understanding the content of the interaction, responds to the reactions of others in the group, and where appropriate, responds to the teacher's directive comments.
  
- III) **Social engagement:** The extent to which a pupil feels a sense of belonging with their peers is cited as a criterion affecting pupil engagement in learning (Hutchinson, 1999). In this study it will be observed in terms of how well the (TP) responds to directions about 'finding a partner', 'making a circle', or 'sitting in groups of four'. Does the (TP) assume inclusion and step forward? Does he/she 'hang back' as if he/she is not part of the group? Does he/she rebut approaches from others?
  
- IV) **Task engagement:** This will be examined by observing how quickly and how well the (TP) follows the task actions performed by other children or as directed by the teacher. Does the (TP) help initiate the action physically or vocally? Does the (TP) quickly grasp what the rest of the class are doing and join in or copy? Does the (TP) require specific directives or peer guidance to join the task?

Inter-observer agreement will be estimated to ensure observers agree on their interpretation of task engagement. Learning style preferences of the observers will be discussed and identified to raise awareness and seek to prevent distortion of readings. To calculate these estimates, it will be necessary for two observers to observe the same segments of video and then directly compare their ratings in each time interval. A percentage agreement score will then be calculated from the number of intervals in which the ratings agreed are divided by the total number of intervals observed. A criterion level of 80-100% agreement will be required before the data are considered to be reliable.

### *Ongoing Monitoring of Pupil Understanding*

To assess whether the intervention results in deeper levels of pupil understanding, all pupils will undertake short assessment tasks once per week. These assessments will correspond with the different content of the task for that week. For example, to assess pupils' understanding of the function and purpose of a clock, each individual will be given a diagram of a clock face. They will be asked to draw an arrow (demonstrated on the board during instruction) to show the direction of the hand's progress around the clock face. In the course of the clock lessons, different times of the school day will have been demonstrated on a clock face and on the board. In the assessment they will be asked to draw the position of the hands to show the time when the school day finishes.

The data will be collected and assessed to determine how well the pupils of the intervention and the comparison classes performed with the two different presentation styles. Attention will be directed to identify whether or not the pupils with the broader modality experience (kinaesthetic modality) achieved greater accuracy and understanding in the assessment. This would indicate whether kinaesthetic experience enhances the pupil's understanding.

## **DATA ANALYSIS PROCEDURES**

Research Question One will be addressed by averaging the ratings of modality preferences given by parents and teachers and correlating these with scores from the Swassing-Barbe (1979) formal assessment. Research Question Two will be addressed by correlating scores from the Swassing-Barbe with those from the Kindergarten Readiness Test. A particular emphasis in the latter analyses will be placed on scores for the kinaesthetic component of the modality preference test and scores in all of the readiness domains.

A combination of graphical display and statistical analysis methods will be used to address Research Question Three. To determine whether the multi-sensory intervention produces a significant effect on pupil engagement and understanding levels, two mixed design Multiple Analysis of Variances (MANOVA) will be performed. These will be used to assess (i) whether pupil engagement and understanding differ significantly over the four research phases (the

baseline phase and following three intervention phases), and (ii) whether the engagement and understanding levels of the three groups differ significantly within each of the three intervention phases. If the baseline levels of engagement differ significantly across the three classes, it may be necessary to use a post-hoc matching procedure, or to use an Analysis of Covariance (ANCOVA) approach to adjust subsequent scores in the analysis. Post-hoc tests will then be performed to examine specific differences between phases and across groups.

## **ETHICAL CONSIDERATIONS**

Prior to commencing any data collection, informed consent will be obtained from all participating teachers and pupils' parents. Any children for whom informed consent to be videoed is not obtained will enter another classroom for any sessions in which videos are taken. No reference to individuals will be made within the final report. All data will be stored and secured according to University guidelines and requirements. No perceived harm, risk, or possible hurt is anticipated from this proposed intervention program.

The participating school will benefit from having the professional development input of the researcher for three pre-primary teachers as reciprocity. The researcher is an experienced Primary School Music Specialist who has worked in developing multisensory programs throughout the past 10 years. This is anticipated to enrich the Performing Arts Curriculum in the participating school. In addition, they will learn to use specific Music/Activity Resources designed to provide a diverse music program with activities that assist all pupils' participation and performance skills.

## **MAJOR SCHOLARS IN THE FIELD**

**Walter Barbe, Ph.D.**

Adjunct Professor

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**PROPOSED TIMELINE**

<b>Component</b>	<b>Specific Tasks</b>	<b>Time Period</b>
I.	Pre-Intervention Measures	Term II, 2005: Weeks 1-4
II.	Collection of Baseline Data	Term II, 2005: Weeks 1-4
III.	First Intervention Phase	Term II, 2005: Weeks 5-9
IV.	Second Intervention Phase	Term III, 2005: Weeks 1-4
V.	Third Intervention Phase	Term III, 2005: Weeks 5-9
VI.	Analysis and Write up	Completed by January 2006

**ESTIMATED COSTS**

The budget for the project will be minimal. The researcher currently has access to both the Swassing-Barbe Modality Index (SBMI 1979) and the Hawthorne Kindergarten Readiness Test. Other costs associated with the project will include photocopying and incidentals (e.g., materials to make clock tasks), and are estimated to be less than \$300 per year. The video equipment required will be borrowed either from the GSE or from the participating centre.

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# APPENDIX A

## Teacher and Parent Ratings of Modality Preferences

Again, items are listed in conceptual categories for the purposes of the proposal; items will be interspersed across categories in the final rating scale. A dichotomous response format will be used for all questions. On completion, scores will be summed to provide indices of preferences for the visual, auditory, and kinaesthetic modalities.

1. Learns better by listening quietly than by talking actively with others.
2. Learns better by talking actively with others and then by looking at things.
3. Learns better by looking at things than by touching objects.
4. Learns better by talking actively with others than by touching objects.
5. Learns better by listening quietly than by looking at things.
6. Learns better by listening quietly than by touching objects.
7. Learns better by touching and holding objects than by looking at things.
8. Learns better by looking at things than by talking actively with others.
9. Learns better by talking actively with others than by listening quietly.
10. Learns better by looking at things than by listening quietly.
11. Learns better by touching objects than by talking actively with others.
12. Learns better by touching objects than by listening quietly.

## **APPENDIX B**

### **Class Teacher Rating Scale**

Note: Items listed in conceptual groups for the purposes of the proposal; items will be interspersed across groups in final rating scale. A dichotomous response format will be used for all questions. On completion, scores will be summed to provide indices of children's levels in each of the category areas.

#### **Cognitive Engagement**

1. Has at least one area of intense curiosity
2. Exhibits active engagement in cognitive activities (e.g., asks questions, contributes ideas)
3. Exhibits confidence in at least one area of cognitive interaction
4. Initiates learning activities with teachers and/or peers
5. Appears keen to explore his/her environment
6. Attempts new activities

#### **Psychomotor**

7. Exhibits motor coordination
8. Exhibits motor confidence
9. Exhibits difficulty manipulating small objects
10. Is constantly engaged in gross motor activities; is difficult to "settle"
11. Can control motor impulses
12. Exhibits physical balance and awareness of personal space

#### **Self Regulation**

13. Exhibits inner control when not directly supervised
14. Is able to refrain from engaging in impulsive behaviours
15. Is able to complete set activities
16. Expresses pleasure/disappointment appropriately
17. Can remain engaged in a single task for 10 minutes or more

18. Can take responsibility for their own possessions
19. Is able to accept delayed gratification

### **Social Development**

20. Prefers activities which are solitary in nature
21. Usually responds group to activities willingly
22. Is able to empathize with others
23. Has at least one regular friend or companion
24. Takes turns easily
25. Uses non-verbal gestures (e.g., smiles, nods, waves) appropriately to interact
26. Can initiate partnerships with other students

### **Affective Orientation**

27. Usually presents with a positive mood or attitude
28. Is able to appreciate humour
29. Copes with rejection or negation appropriately
30. Does not appear to be unduly self-conscious
31. Does not overreact to minor setbacks
32. Does not appear to be oversensitive