



Can Gardner's theory of Multiple Intelligences be positively utilised within the classroom to develop children's weakest cognitive domains in learning?

BA PRIMARY EDUCATION WITH QTS

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Frontispiece

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Acknowledgements

I would like to take this opportunity to sincerely and gratefully thank all placement schools and the elective experience which was recently undertaken. Special thank you to the university and the lecturers for their continued support, informative and engaging lectures throughout the 3 years' experience, but most importantly Dr. Sioned Hughes who provided detailed module content, relevant literature, academic support and challenged me in my final year for this research project.

I would also like to thank all those who kindly responded to my electronic questionnaire, as their results and information have largely contributed to this research project and further developing my understanding of the implementation of Multiple Intelligences.

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Chapter One: Introduction

An ongoing discussion that is deemed substantial within education and pedagogical learning styles is the theory of Multiple Intelligences (MI) (Gardner, 1983). This theory has been debated with questions around how many intelligences there may be, how it can be utilised within the classroom and whether it is an accurate vision of how individuals learn (Holt, 1983; Vosniadou, 2001). Research emphasises the importance of recognising and nurturing the varied human intelligences and how educators should teach children to recognise and develop their intelligences (Gardner, 1991).

The purpose of this research project is to identify whether the theory of MI can be positively utilised within the classroom to develop children's weakest domains in learning (Gardner, 1995). This topic was chosen due to personal research undertaken, after information was discussed within a lecture and secondary quantitative research that commenced on the second year of Professional Teaching Experience (PTE) which utilised the MI theory. This extended personal professional development and Knowledge and Understanding from the Qualified Teaching Status Standards (QTS) (see appendix 1) WAG (2009). It is important the theory of MI is used within education as children should be made aware of their intelligences and how they can strengthen their domains (Millard, 2000; Diezmann and Watters, 2000). MI is valued within education as teachers can discover their strengths in particular intelligences to support effective teaching and utilise within the classroom to develop an awareness of how pupils learn (DfEE, 2001; Liesveld, Miller and Robinson, 2005).

It is important to explore this type of teaching approach due to the changing curriculum from a pedagogy to heutagogy approach (Canning, 2010) that is currently being pioneered in Wales through *Successful Futures* (Donaldson, 2015). To ensure children can take initiative in their learning, they primarily need to comprehend how they are able to learn, their strengths, weaknesses and how to overcome and challenge themselves, which the theory of MI supports. Bruner (1961) believes that activities of this nature promotes autonomy and independence. Wilson (2018) and Papa (2011) further

state that currently there are major academic shifts which will impact on teaching such as adopting behaviourist theories, cognitive constructivism, social constructivism, motivation, intelligence and andragogy which the theory of MI distills.

To frame hypothesis for this research project, is that teachers understand that children can learn in a variety of contexts and that children do not fit one learning style or intelligence (Pritchard, 2014). However, it is rarely seen that teachers cater for individuals in the classroom but concentrate on the differentiation of ability groups. It would be interesting to further study whether children who are grouped within their weakest MI in the classroom would have a positive effect of developing their areas of intelligences, which is the result of the research project presented. Given this, the implementation of MI within the classroom allows children to harness their strengths in intelligence and utilise it to adapt and progress in their education. Donaldson's (2015) 12 pedagogical principles concentrate on the aspect of a teacher's pedagogical approach to learning and promotes authentic learning contexts, employ a broad range of teaching approaches and promote problem solving and creative thinking which can be argued are all concepts and areas of intelligences of MI in a classroom context.

The research methods used to explore the question included previous quantitative data used within the second year of PTE, observations of children in the classroom environment, online teacher questionnaires obtained from a range of educational fields across the world and MI questionnaires for children to answer. A combination of both primary and secondary synthesis of literature was also conducted to provide a comprehensive understanding of the theory.

Chapter Two: Literature Review

This chapter will focus on the theory of MI in action, the benefits and limitations to the theory and the additional links to literature and theory. The foundations of Gardner's theory delved from Binet and Simon's (1916) work in 1904 of developing an intelligence test to determine how intelligence could be measured into a score or single 'general ability' (g-factor), to support those who were academically failing, which Gardner challenged due to Intelligence Quotient tests being too narrowed (Gardner, 1983). This is where Gardner discovered the seven intelligences and further developed an eighth (1995) and the possibility of a ninth (Gardner, 1999). Gardner's MI theory ensured that whilst assessing an individual's IQ they were taken out of their natural and comforting environment that served purpose to how they achieved.

Theory in action

Many definitions of MI have stated that intelligence is not a single entity, but a broad spectrum of abilities distilled into individuals (Garlick, 2002 and Kohn, 2004). The theory of MI is a range of intelligences situated within every individual, however specific intelligences may be stronger or weaker than others and can be adapted by the individual to meet or conform to the environment or context that they are situated in. The principle of the theory is to understand that everyone learns in a different way which is linked to Piaget's cognitive development theory (1936).

In 1999 Gardner described a list of eight specific principles that a candidate intelligence area must achieve to be acknowledged as a 'true' intelligence these being:

1. **Potential for brain isolation by brain damage.** For example, stroke victims may be left with intelligence undamaged despite impairment to other cognitive abilities e.g. speech.
2. **Place in evolutionary history.** Previous role played in the survival of humans and our capability to adapt to different environments.

3. **Presence of a core set of operations.** For example, musical intelligence core operations are pitch, rhythm, harmony and timbre.
4. **Susceptibility to encoding.** Symbols that are associated to the intelligence can be developed to express culturally-relevant information.
5. **Distinct development progression.** The way in which an individual can develop their intelligence by practicing and studying.
6. **Existence of savants, prodigies and other exceptional people.**
Individuals who excel naturally in a specific intelligence to those of an average ability i.e. children with autism who excel in musical or artistic talents (Gardner, 1991).
7. **Experimental psychology support.**
8. **Psychometric findings.** An individual trying to perform two tasks from the same intelligence will cause interference due to the reliance on the same mental capabilities (Gardner, 1999; Gilman, 2001).

The theory of MI has been widely argued of the validity of the research and how the number of intelligences has increased, argued and debated over time. Gardner first stated that there were at least seven areas of human intelligences, although from further studies he then added the Naturalistic and Existential Intelligence (1999). Moreover, additional intelligences have been proposed but have not been agreed upon which include: spiritual intelligence, teaching-pedagogical, moral-ethical, humour, cooking and sexual intelligence (Gardner, 2016). The definitions of each intelligence are displayed in **Figure 1** (Gardner, 1993a; Armstrong, 2018). However, the existential intelligence is still currently being debated as it does not meet all the criteria that Gardner suggests in adding intelligences (Gardner, 2006).

Figure 1 - Definition of Multiple Intelligences



Source: Children and Learning, date unknown

Benefits and Limitations

Byard (2004) questions the government initiative of developing a school system that embraces diversity (Williams, 2017; Estyn, 2017; Donaldson, 2015; DfES, 2001) but on the other hand have teachers that devote their teaching time and pedagogical approaches to conform to assessment and results. Gardner (1993a) argues that the curriculum hinders individuals' abilities to develop their strongest intelligence within education as it is narrowed to the importance of the core curriculum areas and states that children's self-esteem is delayed due to the inability for children to properly express themselves in their strongest intelligence domain. However, the current recommendations of education in Wales through *Successful Futures* (Donaldson, 2015) is to ensure that there is no importance on one area of learning but through cross-curricular pedagogy and thematic approaches which allows children to use their intelligences in more than one area of learning (Barnes, 2012,2015; Kelly, 2002; Kenner and Ruby, 2011; Savage, 2011; Allen and Whalley, 2011). CCEA (2003) advocates this view of how the curriculum should be integrated, well planned using methodologies that are practical, engaging and interactive. This type of pedagogy is supported by Piaget (1936) of children constructing

their own knowledge, Dewey (1938) children learning through experience and Vygotsky's (1978) social constructivism. Although, the rapidly changing world that children are experiencing within schools can limit their multiple needs and abilities which can hinder their success (Gardner, 1991). As Gardner states that 'educational institutions need to reach the broadest number of students and that they must therefore be responsive to different forms of learning, performance and understanding' (1991:18). Manic and Randelovic (2017) state that MI has a great importance in education as the results of an individual's strongest areas of intelligence allows an insight to their abilities and interests to tailor an engaging, purposeful and authentic learning experience (Estyn, 2016,2017; Flutter, 2007; Fielding, 2001; MacBeath et al, 2003; Rudduck, Chaplain and Wallace, 1996; Rudduck and Flutter, 2004).

It can be argued that Gardner's theory has its weaknesses in how it has been conducted, the validity of his research, the disagreement of how MI can determine academic attainment over IQ tests and the difficulty in assessing the intelligences (Waterhouse, 2006; Gottfredson and Deary, 2004; Collins, 1998 and Eisner, 2004). Contrast to this, the MI theory has been positively adapted in schools mostly in the United States of America (USA) (see appendix2), and is a theory that does not solely concentrate on one intelligence but how it can foster and develop all intelligences to support academic achievement and life skills that allow children to take lead in their development (Matthews and Foster, 2014) which is the aim of research conducted in Chapter 4. Gardner (1993a) noted the difficulties in assessing each area of intelligences, therefore researchers have created their own self-report to measure the success of the MI within each individual (Shearer, 1996; Teele, 1992) but further research suggests that the measurements utilising the self-report correlate only with maximum performance measures (Borkenau and Liebler, 1993; Furnham and Fong, 2000).

Armstrong (1994) listed environmental factors that can benefit or hinder the development of multiple intelligences these being: opportunity to access resources for example, children from low income backgrounds may not have the availability to musical instruments; historical/cultural factors of the individual's school ethos prioritising the

core subjects than the Arts; geographical factors such as rural areas develop children's naturalistic intelligence than a child living in the city; family aspirations and support from family to develop a specific intelligence and lastly situational factors such as individuals who live in crowded families will have limited time to develop their interpersonal skills (Sternberg, 1997; Perkins, 1995).

Gardner (2016) posed that when regarding personal identification of MI there are two paths that can be taken: promoting your area of strength or enhance your weakest domain. For the purpose of this research it will focus on your weaker domain which is explained further in Chapter 4. It can be argued that if a career requires specific skills that is identified within one domain, then it should be utilised to nurture that intelligence (Cigman, 2001; Drum and Figler, 1976). However, if too much attention is devoted to one intelligence then one will not have enough time to focus on the other cognitive domains. Furthermore, Byard (2004) and Allebone (1998) note that individual intelligence profiles that are not demanded by the core curriculum domains may be disadvantaged due to the heavy emphasis on the Literacy and Numeracy strategies, PISA results and government initiatives. Byard (2004) further states that a child who does not excel in Literacy or Numeracy may be subjected to constant difficulty, develop low self-esteem and experience frustration and not only that but have the misfortune of attending additional classes to nurture the logical-mathematical and verbal-linguistic whilst their strongest intelligence profile may decrease significantly. This idea is also advocated by Davies and Edwards (1999) who predicted that schools would remain focusing on the core curriculum subjects which they state do not serve the needs of children or the political, social and economic needs for society (Robinson, 2006; Ofsted, 2002; Cambridge Primary Review, 2009). However, Wales has taken the initiative on developing a broad and balanced curriculum that does not narrowly focus on Literacy and Numeracy but ensures that all skills are developed within each of the Areas of Learning Experiences (AOLEs) (Donaldson, 2015).

Contrarily, the theory of MI has been widely criticised from other professionals within the field of psychology. The strongest argument is the lack of practical evidence of

how MI is separate from the idea of IQ (Gottfredson and Deary, 2004). However, advocates of MI acknowledge that the ‘g-factor’ exists but that it is not superior to other forms of cognitive intelligence and is mainly expressed as the Logical-Mathematical intelligence combined with other intelligences. Collins (1998) also criticised the MI theory and stated that there is no solid research that supports the theory within an educational environment. Nevertheless, Armstrong (2009) argued that the current education system was based on assessment methods that inefficiently measure learning styles. Thus, Williams et al (2002) and Gardner, Feldman and Krechevsky (1998) have provided substantial research of how the theory has been successfully implemented into education in the USA and internationally. Additionally, critics do not support the ‘trivial ideas’ of how you can educate an intelligence within the classroom (Willingham, 2004; Collins, 1998) such as a Bodily-Kinaesthetic individual may not be able to rely on their strongest intelligence for specific topics, themes or skills that need to be covered within the curriculum. Lastly the idea of the children understanding which intelligence is their strongest and weakest may have a detrimental effect to their attitude and mindset to learning (Barnett, Ceci and Williams, 2006; Fleetham, 2007).

MI link to creativity

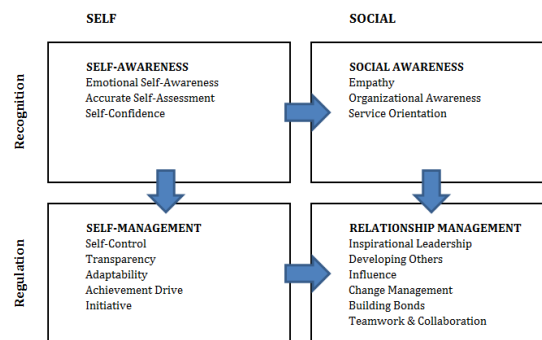
Walsh and Gardner (2005) and Watson (2000) state that children’s learning should be holistic and develop a number of skills and knowledge, what they state is multiple skill acquisition (Gardner, 1993b, 1999) which is essential to develop transferable skills in education. Furthermore, Willis and Johnson (2001) and Gul and Rafique (2017) highlight the importance of the theory of MI and how it promotes creativity in pedagogy and how didactic teaching can hinder creativity. Gardner (1993b) also believed there was a strong link between intelligence and creativity and how individuals display a style of behaviours and thinking (Gardner, 2006; Papa, 2011; Wodtke, 1964). According to Gardner (2006) creativity is a classification to those whose abilities that are viewed as original within a domain but are recognised as acceptable in society. Additionally, Han and Marvin (2002) and Freeman (2006) state that a domain

perspective of creativity portrays a useful and flexible way to identify individual's strengths and abilities.

Links between Intelligences and other theories

The Intrapersonal and Interpersonal intelligence have strong links with Emotional Intelligence (Goleman, 1995,1996) and Maslow's Hierarchy of Needs and the level of self-actualisation (Maslow, 1943). According to Mayer, DiPaolo and Salovey (1990) combining emotions and intelligence allows an individual to accomplish a more sophisticated information process than if they were unaided. Goleman (1995) suggested that emotional intelligence is composed of four components see **Figure 2**.

Figure 2 - Emotional Intelligence



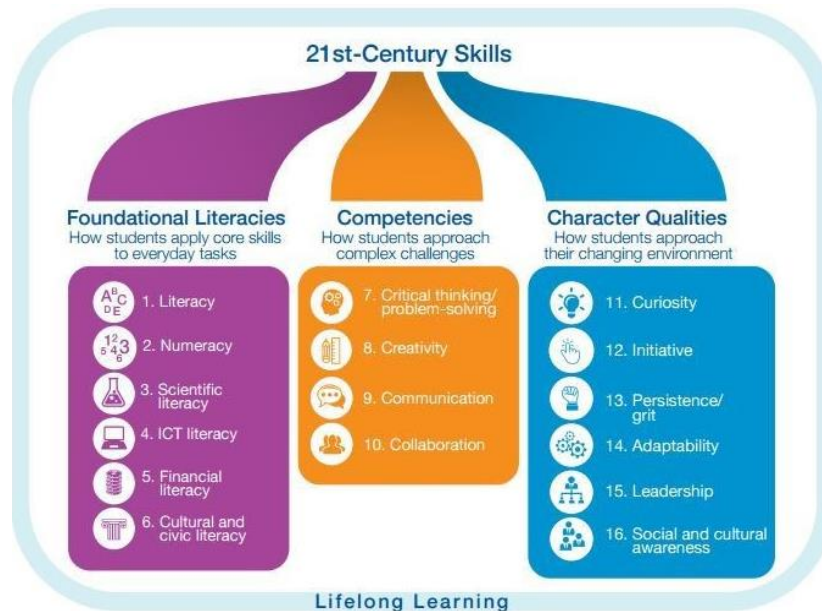
Source: Institute of Education, 2019

Goleman (1995; Schutte et al., 2001; Vandervoort, 2006; Gottman, Katz and Hooven, 1997) noted that academic intelligence is needed for success, but emotional intelligence is paramount. Goleman (1995) defined emotional intelligence as the ability to socialise with others, persistence, empathy and regulating one's mood which is associated with the Intrapersonal intelligence of MI (Gardner, 1993a; Armstrong, 2018).

The 21st Century Skills as seen in **Figure 3** presents that adaptability is a key character quality that should be distilled within individuals to enable them to strive in a progressively developing economy. This is linked to how the theory of MI ensures that

individuals may use specific intelligences to adapt to their environment (cognitive flexibility) (Spiro et al., 1988; Krems, 1995).

Figure 3 - 21st Century Skills



Source: Soffel, 2016

Additionally, it can be argued that there is a clear link between MI theory and three-stratum theory (Carroll, 1993, 1997) where intelligence is best viewed as a hierarchical structure. The three layers are structured by narrow, broad and general cognitive ability where each layer describes the differences between individuals when performing tasks (Johnson and Bouchard, 2005). Carroll (1993) noted the correlations between linguistic intelligence and the factor of crystallised intelligence, Musical to auditory perception ability, Logical/Mathematical to fluid intelligence and Spatial to visual perception (Visser, Ashton and Vernon, 2006).

Summary of findings

From the literature review, MI can be represented by having a range of intellectual abilities that can be strengthened by activities that promote each area of intelligence. The literature review investigated a range of limitations and benefits of MI and how it can be positively utilised within the field of education. From the secondary

research undertaken it is apparent that investigations on whether MI can positively impact on an individuals' weakest domain in learning has not been queried, implemented or tested. Therefore, there is a requirement to examine whether an individual's weakest domain in learning may differ depending on the amount of input educators pose on that area of intelligence. As a result, primary research will be conducted in a primary setting where children will be tested to determine their weakest domain of intelligence and the teacher will then implement a series of challenges which relates to that area of intelligence. The children will then be tested post-challenge to see whether the results of their area of intelligences varies.

Chapter Three: Methodology and Research Design

Throughout the construction of the research project the British Educational Research Association (BERA) guidelines (2011, 2018) have been adhered to ensure that appropriate ethical practices were conducted correctly. The university's ethics form (see appendix3) was completed prior to participating in the elective experience to ensure that all considerations were carefully prepared, and consent was obtained before the research was carried out. The elective handbook (see appendix4) contained the protocols to safely carry out ethical research to ensure that all participants were willing and understood what the research was used for. Rubin and Rubin (1995) highlight the importance of the ethical implications the researcher must comprehend within a research project to protect all active participants (Walliam, 2011; Johnson and Christensen, 2014). Ethical standards endorse the values which are necessary to collaborative work such as accountability, trust and justice and are a set of guidelines that are informed by codes of practice (Robson, 2002; Mertens, 2010; Thomas, 2009; Resnik, 2015). The research adhered to the university, YrAthrofa school procedure and the Education Workforce Council professional code of practice (EWC, 2017). Through the collection of information ensuring the rights of the child was at the forefront of this research, as Article 12 states that children have the right to have their views, feelings and wishes respected (UNCRC, 1990; Bronfenbrenner, 1979).

Whilst collecting data for the project it was vital that participants understood their details would remain confidential and they were voluntary giving consent to participate. Confidentiality is not releasing information given by a participant that can identify or trace them (Wiles et al, 2006). A letter of consent was sent to the elective school (see appendix5) and participants were reminded they had the right to withdraw and were able to have a copy of the research if requested (BERA, 2018). Alderson (2000) draws our attention to consent of children and young people and respecting their views and rights due to their vulnerability in comprehending the research. Whilst Coady (2010) talks about assent and how children are willing to consent to research and practice however do

not necessarily understand the full intent of their participation. For the research project, consent was provided by the approval of the ethics form and a letter signed by the elective school to ensure all individuals who provided information understood the procedures.

Qualitative and quantitative data was obtained using a variety of research methods these being: online questionnaires, individual tests, observations and examples of pupils' work. Qualitative data is research that is analysed in a naturalistic approach to interpret what research states (Denzin and Lincoln, 1994; Punch, 2009) and quantitative data is the research gathered in numerical form to measure or classify (Antonius, 2003). According to Welsh Government (2017a), Hill (1997) and Adams and Cox (2008) questionnaires reach a large audience quickly which is time effective and low in cost. However, Ackroyd and Hughes (1981) note that using a questionnaire can lead to bias answers or personal opinions clouding judgement. Although, for the purpose of this research project using an online questionnaire proved sufficient due to the theory of MI rarely utilised within education in the United Kingdom therefore a wider range of research was required (see appendix 6). The online questionnaire ensured that participants had the right to anonymity which is when an individual cannot be identified from the information that they provide (Corti, Day and Backhouse, 2000).

For the nature of this research project testing a class of children before and after was essential to ensure a comparison of data was provided. Welsh Government (2017a) suggest that tests allow for generalisations however, they only reveal the response at the time and can sometimes diminish true reflection. Cohen, Manion and Morrison (2007) suggest that testing is a powerful process of data collection to gather quantitative data. Observations provided a valuable overview of the tested children as their answers sometimes did not reflect on observation which Robson (2002) distinguished. This type of unstructured naturalistic observation (Salkind, 2010) allowed a secondary overview between the answers from the test and true reflections of the children in their natural learning environment. Consequently, Coffey (1999) notes that when observing children

personal judgements and opinions may conflict interpretation of what the child is truly demonstrating.

Aubery et al (2000) state that qualitative and quantitative research should not be partitioned but should collaborate to produce a clear representation of the research data and to secure validity and credibility (Campbell and Fiske, 1959; Formosinho and Formosinho, 2012; Clough and Nutbrown, 2012). Through the research undertaken a triangulation of data was obtained to develop a variety of dimensions on the implementation and utilisation of the theory of MI, this is the process of using more than one approach which provides in-depth understanding of a research topic or question (Creswell, 2003; Heale and Forbes, 2013; Kasunic, 2005; Roberts-Holmes, 2014). According to MacNaughton and Hughes (2009) triangulation can be partitioned into four categories: triangulation of data; of methods; of investigators and of theory. Due to the nature of this research project the triangulation of data, methods and theory have been utilised to provide a deeper understanding of the theory of MI. Creating a triangulation between data provides sound analysis and holistic understanding of the topic which develops confidence and validity of the information obtained (Gorard and Taylor, 2004). On the other hand, Patton (1980) suggests that triangulation does not ensure consistency or regulation of the data.

The research undertaken will reflect personal pedagogical practice of how to adapt the learning environment to meet the abilities and strengths of all learners within the classroom which MI advocates. A recommendation for further research into MI is to delve into children with Additional Learning Needs (ALN) and whether there is a correlation between specific learning difficulties and strengths or weaknesses in particular areas of intelligence.

Chapter Four: Results and Discussions

This chapter will focus on the definition and benefits of reflection in pedagogy, the results obtained from the elective experience, the research undertaken whilst on PTE in the second year and the evidence of the quantitative research undertaken.

Reflective Practitioner

The aim of the research project is to reflect upon practice and theory that informs, investigates and evaluates personal pedagogy and practice that previously may not have had an obvious solution (Kolb, 1984; Schon, 1983; Moon, 2005, Pollard et.al, 2008). Roberts-Holmes (2014) states that reflective practice provides a deeper understanding of your values, furthers professional development, enhances pedagogic skills and knowledge and supports a greater understanding of theoretical knowledge. He also posed three questions to consider upon reflection: what am I doing, what is the purpose of doing it this way and how can I improve which are key elements of a reflective practitioner. Educators consistently reflect upon their teaching and ethos within the classroom environment to empower lifelong learning (Grigg, 2015) through the use of journals, websites, conferences to name a few (Babiuk, 2007). Dewey (1933) stated that reflective thinking forms the foundations of learning through experience and is an intentional action that we generate to continually reevaluate, improve and develop (Boyd and Fales, 1983). Schon (1987) developed the concept of reflection in action (reflecting while doing) based on Dewey's learning through experience theory (1933) and reflection on action (reflecting after) (Cowan, 2006). Donaldson (2015) affirms that there is a need for growth for practitioners to become more reflective in their holistic development which is also advocated by Furlong (2015) Schleicher (2012) and Williams (2017).

Elective Experience

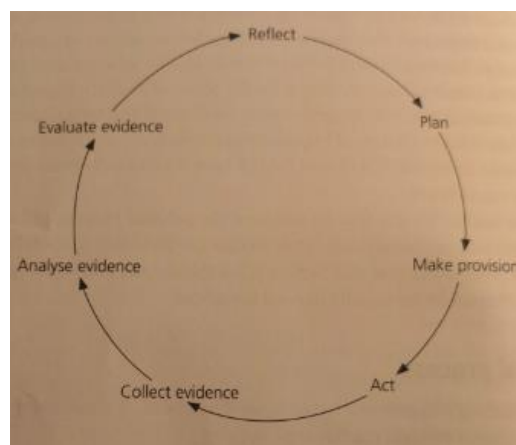
Whilst on the elective experience the research of whether MI can be positively utilised within the classroom to develop children's weakest cognitive domains in learning was not obtained due to the time limitation which Lang (1994) and Franklin and Hart

(2006) believes can be detrimental to obtaining both qualitative and quantitative research. Therefore, the research undertaken focused on whether children with specific ALN had a preferred or stronger area of intelligence and whether children who receive Free School Meals (FSM) displayed weaker areas of intelligence (see appendix7). From the results (see appendix8) the targeted Year 1 class as a whole scored highest in the Visual-Spatial intelligence, children who received FSM differed in preferred intelligences and children who were classed as 'Basic Skills' scored lowest in musical and intrapersonal intelligence. Consequently, there were limitations to this type of research due to the time limit, children's age, children's understanding (Scott, 2000), and the true representation of the children's abilities and needs were not fully understood by the researcher.

Research from PTE 2

Within this research project Stenhouse (1975) instructed that teachers should become researchers of their own classroom practice and should develop their learning through a practical-enquiry approach to self-monitor and reflect upon best practice (Stenhouse, 1975; Carr and Kemmis, 1986; Elliott, 1996; Pring, 2000). Pollard (2008) further suggests to become a successful reflective practitioner then following the cycle for reflective teaching see Figure 4 allows the teacher to ultimately judge personal classroom practice and implement the correct provision for that class.

Figure 4 - Cycle of Reflective Teaching



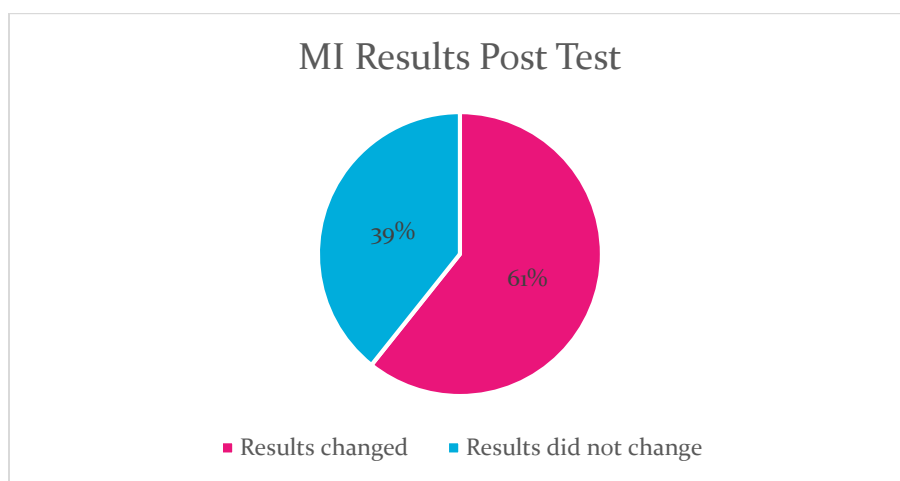
Source: (Pollard, 2008)

MI Test Results

The aim of the research conducted whilst on PTE in Year 2 was to develop an understanding and to question whether using MI can develop children's weakest domains in learning by creating challenges within their weakest area of intelligence. The data was taken from a mixed Year 1 and 2 class. The process involved firstly testing/questioning the children using a premade MI test (see appendix9) to find their weakest and strongest areas of intelligence. From this, a table was created with the list of children which allowed a clear insight into the children's weakest domains in learning (see appendix10). Challenges targeted at the children's weakest areas of intelligences was then implemented within lessons to ensure that the children were immersed in that environment with the resources to succeed (see appendix11). Lastly, towards the end of PTE2 the children were tested again to see whether the results differed (see appendix12). As you can see from the results Pupil DJ in appendix 10 scored lowest in the Naturalistic intelligence, after a range of challenges that enhanced the naturalistic intelligence pupil DJ differed their lowest intelligence to the Verbal-Linguistic intelligence in appendix 12.

As seen in Figure 5 61% of the class' results changed from one weaker area of intelligence to another.

Figure 5 - Results from MI test



However, 39% of the class' results did not differ and their weakest area of intelligence remained. It is interesting to note the majority of children whose results did

not change were labelled as being situated in the middle or lower ability groupings. Therefore, a recommendation to further this study would be to research whether friendship or classroom groupings has an effect on children's areas of intelligence. Limitations towards this research included: time as the PTE was only 5 weeks therefore a true reflection of the children's holistic development and abilities was not established; outside factors such as class trips; challenges were not sufficiently implemented as frequently as was needed to make a difference to the results; additional administrative support, difficult to accommodate every lesson to implement MI, planning and disengagement with the MI activities (Shearer, 2004; Shepard, 2004; Fogarty, 2005).

For the children whose results differed this established that ensuring optimum opportunities to learn in multiple ways can meet all intelligences and create successful learning experiences. Therefore, the research question was proved in some instances to be correct, however to ensure that this was a true representation a period over a year is recommended to ensure that this hypothesis is a true reflection on whether MI has a positive impact on children's areas of intelligences.

Secondary Qualitative and Quantative data

Reflective teaching is constructed by teacher judgement, informed by evidence-based enquiry and varied perceptions and opinions from other research (Pollard, 2008). To ensure a triangulation between the primary research undertaken an online questionnaire was distributed to numerous educational Facebook groups to allow a broader view of the theory (see appendix6). From this questionnaire a variety of open and closed questions were created to produce clear regularities and enabled comparisons to be made (Oppenheim, 1992).

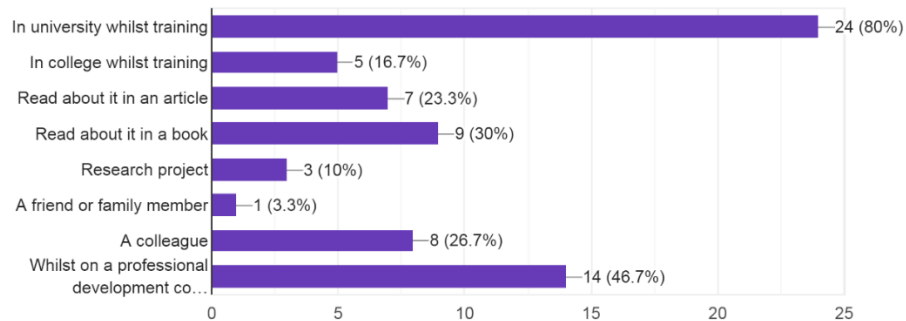
The data communicated that out of 30, 22 responses came from outside the United Kingdom, mainly USA. Furthermore, the majority of the participants when asked 'Have

you heard of the theory of Multiple Intelligences’ stated that they heard about it whilst training in university see [Figure 6](#).

Figure 6 - Results from Questionnaire

If yes or maybe then please state where? You can choose more than one.

30 responses



When asked whether they had utilised the theory before 86.7% stated they had heard about the theory and utilised it within their practice. Additional comments when asked ‘Is there anything you disagree with about the theory?’ stated that: ‘there are too many categories’; ‘misleading for adults and students that each intelligence has equal weight’ and ‘differentiation between skill and intelligence were not established’ were common themes reported from all participants.

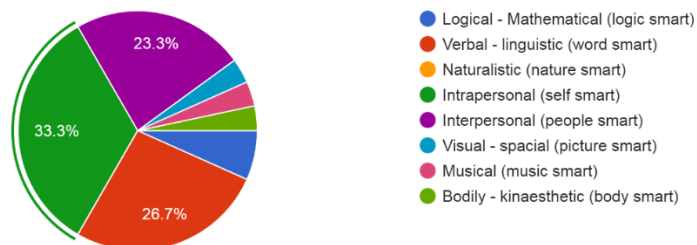
Due to the implementation of the Literacy and Numeracy Framework (LNF) (Learning Wales, 2014) and the importance of developing these skills for assessment and tests, a question was posed to the participants asking for their personal opinion on which area of intelligence they believed is most important to distil within children. The hypothesis for the results was the expectation of participants choosing Verbal-linguistic

or Logical-Mathematical as the most important, however as you can see from **Figure 7** the Intrapersonal intelligence took the majority of the votes.

Figure 7 - Intelligence Importance

Which of the areas of intelligence do you think is the most important intelligence to develop within children?

30 responses



This supports the philosophy for the new curriculum in Wales and the four purposes of developing ambitious, capable learners and enterprising, creative contributors (Donaldson, 2015) as Intrapersonal learners are aware of their own motivations and attributes.

The last questions posed to the participants included a Likert scale question asking to score between 1 and 5, with 1 being not important and 5 being very important for each intelligence to express their opinion of importance of developing these

intelligences within children. A Likert scale question allows a reliable judgement, is time effective and less frustrating for participants to complete (Fink, 1995; Dawes, 2008).

From the results the Interpersonal intelligence scored highest with 19 out of 30 participants choosing very important **Figure 8** and Intrapersonal scoring 18 out of 30 **Figure 9**.

Figure 8 - Interpersonal

On a scale of 1 - 5, with 1 being not important and 5 being extremely important. Can you rate each area of i...ur opinion of importance? Interpersonal
30 responses

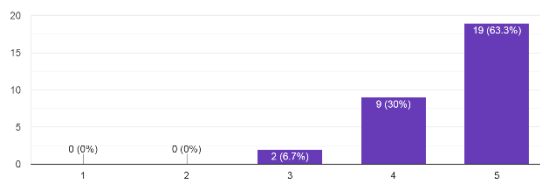
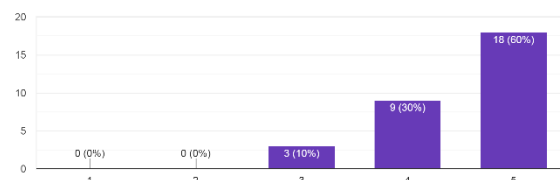


Figure 9 - Intrapersonal

On a scale of 1 - 5, with 1 being not important and 5 being extremely important. Can you rate each area of i...r opinion of importance? Intrapersonal
30 responses

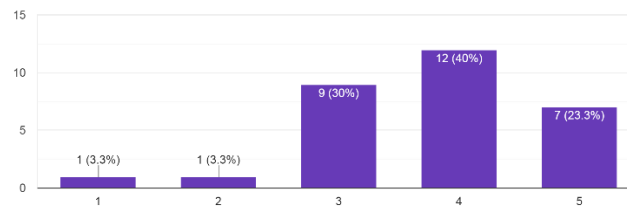


The lowest intelligence was chosen as Bodily-Kinaesthetic with only 7 out of 30 stating that they think it is very important **Figure 10**. This comes at an interesting time in Wales as a report submitted in March stated that Wales is facing a national crisis in terms of children's physical health as the World Health Organisation (date unknown) regards the UK with having the highest levels of childhood obesity (National Assembly for

Wales, 2019) and recommends that children receive 2x45 minute sessions of physical activity a week.

Figure 10 - Bodily-Kinaesthetic Result

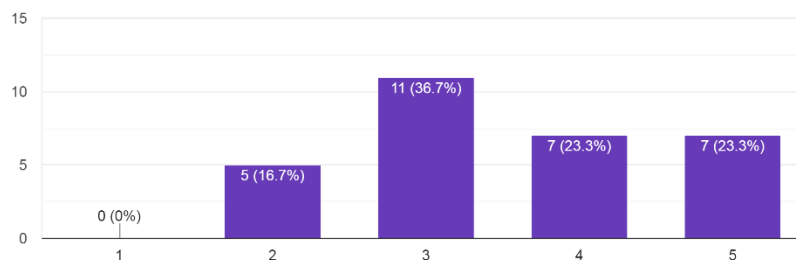
On a scale of 1 - 5, with 1 being not important and 5 being extremely important. Can you rate each area of i...ion of importance? Bodily-kinaesthetic
30 responses



Furthermore, personal hypothesis for a high score for the naturalistic results were inconsistent with the findings as the results indicated that over half of the participants chose 2 and 3 being not so much importance and a middle entity which displays their view of promoting the naturalistic outdoors as not as important within children **Figure 11**.

Figure 11 - Naturalistic results

On a scale of 1 - 5, with 1 being not important and 5 being extremely important. Can you rate each area of in...ur opinion of importance? Naturalistic
30 responses



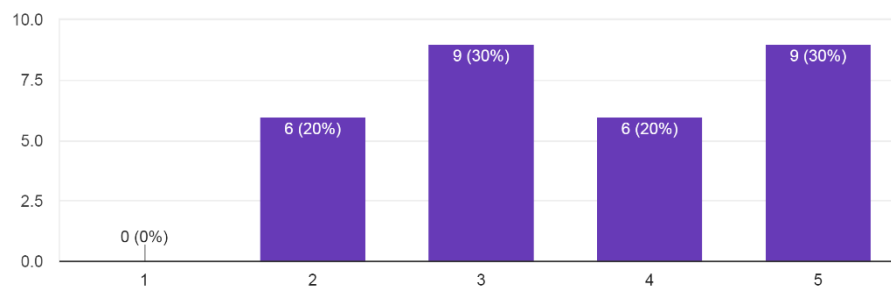
This conflicts with the philosophy of the Foundation Phase (FP) within the Welsh curriculum and how Wales is the leading country in the UK for the development of outdoor education (DCELLS, 2009). Estyn (2011), Bird (2007) and Thomas and Thompson (2004) state the importance of the outdoor environment on the holistic development of children in education. Within Wales the importance of teaching children in the outdoor environment has also been applied to the QTS Standards of planning

opportunities for children to learn in out of school contexts (WAG, 2009). Palmer (2015) also raises her concerns of how the modern age of technology is damaging our children and creating a cotton wool culture which has seen a decline in play, health and healthy risk-taking (O'Malley, 2015).

The Musical Intelligence remained in the lower results of importance with exactly half of the participants choosing 2 and 3 as not so much importance and a middle entity and the other half choosing 4 and 5 as being very important **Figure 12**.

Figure 12 - Musical Results

On a scale of 1 - 5, with 1 being not important and 5 being extremely important. Can you rate each area of i...y your opinion of importance? Musical
30 responses



The National Assembly for Wales: Culture, Welsh Language and Communications Committee (2018) suggested 18 recommendations to ensure the positive development of music education in Wales through a National Action Plan for Music to save the music sector from crisis. Donaldson (2015) identified how the Arts provides inspiration and motivation to stimulate children's individual creativity (Hallam, 2010) and how the future of education needs to favour away from the core curriculum subjects, and certify sufficient time is also spent on the Arts (Daubney, 2017).

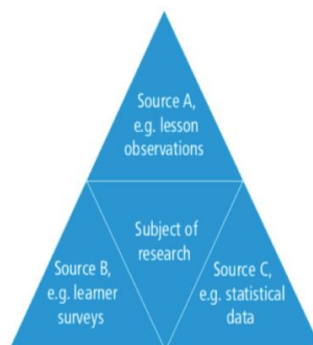
Gardner did not initially plan for his theory of MI to be implemented in the education sector as it did not come with a programme for educators to utilise within the classroom (Viadero, 2003). However, the results from the questionnaires and the research undertaken utilising the theory of MI has displayed that MI can have a positive effect on children's domains in learning. Although, what has been seen from the results is that not

every participant viewed each intelligence as equal and favoured the Intrapersonal and Interpersonal Intelligences rather than the Naturalistic and Bodily-Kinaesthetic Intelligences.

The significance of the results obtained showed that each educator has different philosophies of what they deem to be important within education and how different cultures have different opinions of the importance of each area of intelligence. The results also revealed that the core subjects were not favoured as much as the self and people smart intelligences and that the two artistic intelligences: Bodily-Kinaesthetic and Musical were deemed as not very important which correlates with the argument that there is a significant lack of time given towards the Arts within the curriculum (Bernard and Murphy, 2013).

To conclude, the research undertaken exhibited clear evidence of triangulation between the research conducted from PTE2, the qualitative data presented by theorists and educators and the opinions and views of professional facilitators in education **Figure 13**.

Figure 13 - Triangulation of research



Source: Grigg et al. 2014

The secondary research confirms that implementing the MI theory has a positive holistic impact on children's areas of intelligences. However, further research and investigations are needed to confirm this to ensure that the results are reliable. A recommendation would be to utilise the theory (once qualified) within the classroom over

a period of a year to ensure a holistic overview of individual children's intelligences are obtained.

Chapter Five: Conclusion

The aim of the study was to investigate whether the theory of MI could be positively utilised in the classroom to develop children's weakest domains in learning. From the literature review the focus was to obtain information about relevant theories and literature to inform a deeper understanding for the results obtained in Chapter 4 and the benefits and limitations of the theory of MI. From the results, for the majority of individuals it had a positive effect on their weaker area however, due to time limitations it does not show a true depiction of the validity of the research. The research has shown there are many challenges that MI faces with lack of validity and scope of how it should be implemented effectively within the classroom environment (Waterhouse, 2006; Sternberg and Grigorenko, 2004). However, there is an importance of tailoring the curriculum to meet the best interests and abilities of the child which MI creates (Callanan et al., 2017).

The depth of qualitative and quantitative data provided a sound basis of the importance of developing MI within the classroom. However, research lacks evidence of whether the implementation of MI has a positive effect on academic achievement. Throughout the research project a diverse range educational literature has been evaluated to ensure the triangulation between the personal research conducted and research from other educators has a clear connection to whether the implementation of MI has a positive effect on children's attainment. It is recommended that further investigations of whether implementing challenges within the children's weakest areas of intelligences ultimately has a positive effect on overall development. Whilst combining the primary and secondary research it became evident that there is a lack of research in this field within the UK, therefore an additional research area can be undertaken to see why this is considered highly effective in the USA but is not implemented as often within the UK.

The enquiry undertaken has provided the researcher with valuable insight to become a successful reflective practitioner and how it is important to reflect upon teaching approaches and question new initiatives to consider the benefits of children's

holistic academic development (Roberts-Holmes, 2014). The findings of the research project have positively developed a passion into further utilising the theory of MI in teaching practice to investigate whether results will differ after a longer period of time of implementing MI within classroom practice and whether children with specific ALN have stronger areas of intelligence.

As a result of undertaking the action research, professional learning has been obtained as a result of extending knowledge by reading, researching and acquiring data. The research has developed professional pedagogy to inform practice which is one of the five new Professional Standards for teaching and leadership in Wales (Welsh Government, 2017b). The research project found there are numerous implications of the theory of MI, however the two biggest factors were the majority of the research was conducted in the USA and the time restraint on the research undertaken.

To conclude, after analysing all of the research undertaken in this project, from the online questionnaire results, literature review and research personally undertaken, it has shown that utilising the theory of MI can, to an extent, have a positive impact on children's weaker domains in learning, although further research should be developed to have a wider understanding to ensure the results are valid. Due to this, the researcher will continue in future teaching practice to develop a wider understanding into the implementation of MI within the classroom environment and whether it has a true positive effect on attainment. From the literature evidence it has shown that the theory of MI has not been implemented as much as it could be within education. This research project has sparked a passion to continue further with the theory of MI and has developed personal understanding of a reflective practitioner and the advantages of reflecting practice and pedagogy.

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Appendices

Appendix 1 – QTS standards Knowledge and Understanding

	Unsatisfactory	Adequate	Good	Excellent
S.2 Knowledge and Understanding	gaps in personal subject knowledge or lack of confidence in their own understanding apparent in their planning and delivery	adequate personal subject knowledge apparent in their planning and delivery	ability to use own subject knowledge in an appropriate way to motivate learners	exceptional ability to use own subject knowledge in an appropriate way to motivate learners
	a lack of commitment to carrying out personal research during preparation of lessons/session	a willingness to carry out personal research during preparation of lessons/session	personal research supports planning, teaching and assessment effectively	personal research supports planning, teaching and assessment in a creative and innovative way
	limited awareness of appropriate learning and teaching approaches leading to little variety of approach	awareness of appropriate learning and teaching approaches – possibly mirroring the class teacher's methodology or using a limited range of approaches	demonstrates an understanding of effective learning and teaching approaches that offer breadth and diversity of provision	demonstrates knowledge and understanding of innovative learning and teaching approaches that offer breadth and diversity of provision
	limited understanding of how learners' physical, intellectual, social, cultural and emotional development can affect their learning	some understanding of how learners' physical, intellectual, social, cultural and emotional development can affect their learning	secure understanding of how learners' physical, intellectual, social, cultural and emotional development can affect their learning	exceptional understanding of how learners' physical, intellectual, social, cultural and emotional development can affect their learning
	unsatisfactory use of ICT within the teaching and learning of subjects / areas of learning, or over-reliance on particular equipment or programmes	ability to use ICT within the teaching and learning of subjects / areas of learning, possibly a reliance on particular equipment or programmes	ability to use ICT effectively to enhance the teaching and learning of subjects / areas of learning	exceptional ability to use ICT effectively to enhance the teaching and learning of subjects / areas of learning

Appendix 2 – Results from Online Questionnaire presenting the number of educators from the United States of America

Local authority?	Washington, USA UTAH, USA Michigan, USA North Yorkshire Bury LEA Lancashire Philadelphia, USA Georgia, USA NYC, USA x 4 New Hampshire, USA Ontario, Canada South Africa Edmond Public School South Australia	Rhode Island, USA Out of USA Indiana, USA Dorset Elmbridge Portsmouth Louisiana, USA Rochdale Hull, UK Virginia, USA Brandon Sydney, Australia x 2
Position in school?	Education Programme Coordinator Trainee teacher x 3 PGCE Trainee Manager x 2 Teacher x 15 Learning Specialist x 3 Teaching Assistant Supply/Relief Teacher	

Appendix 3 – Ethics Form

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APPLICATION FOR ETHICAL APPROVAL

In order for research to result in benefit and minimise risk of harm, it must be conducted ethically. A researcher may not be covered by the University's insurance if ethical approval has not been obtained prior to commencement.

The University follows the OECD Frascati manual definition of **research activity**: "creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications". As such this covers activities undertaken by members of staff, postgraduate research students, and both taught postgraduate and undergraduate students working on dissertations/projects.

The individual undertaking the research activity is known as the "principal researcher".

Ethical approval is not required for routine audits, performance reviews, quality assurance studies, testing within normal educational requirements, and literary or artistic criticism.

Please read the notes for guidance before completing ALL sections of the form.

This form must be completed and approved prior to undertaking any research activity. Please see Checklist for details of process for different categories of application.

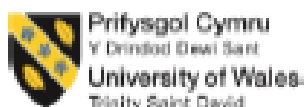
SECTION A: About You (Principal Researcher)

Full Name:	Miss Jennifer Ann Evans		
Tick all boxes which apply:			
Member of staff:	☐	Student:	☒
		Honorary research fellow:	☐
Faculty/School/Centre:	SWWCTE: Yr Athrofa		
Campus:	Carmarthen		
E-mail address:	1601295@student.luwtsd.ac.uk		
Contact Telephone Number:	07789556738		
For students:			
Student Number:	1601295	Undergraduate	☒
Programme of Study:	BA Primary Education with QTS	Taught Postgraduate	☐
Director of Studies/Supervisor:	Dr Sioned V Hughes	Research	☐

SECTION B: Approval for Research Activity

Has the research activity received approval in principle? (please check the Guidance Notes as to the appropriate approval process for different levels of research by different categories of individual)		YES	☒	NO	☐
		Date			
If Yes, please indicate source of approval (and date where known):	Research Degrees Committee	☐			
	Faculty Research Committee	☐			
	Other: Module Coordinator, ECAD6003, ITET	☒	08/02/19		

Approval in principle must be obtained from the relevant source prior to seeking ethical approval.



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SECTION C: External Ethical Guidance Materials

Please list the core ethical guidance documents that have been referred to during the completion of this form (including any discipline-specific codes of research ethics, and also any specific ethical guidance relating to the proposed methodology). Please tick to confirm that your research proposal adheres to these codes and guidelines.	
<i>The research is within the bounds of the normal classroom and in accordance with the Yr Athrofa school guidelines for parental consent as per Yr Athrofa letter</i>	☒
<i>The research will be conducted within BERA (British Educational Research Association) guidelines – Ethical Guidelines for Educational Research, (2018)</i>	☒
<i>The research will adhere to the University research guidelines</i>	☒
<i>The research will follow the EWC revised code of practice</i>	☒

SECTION D: External Collaborative Research Activity

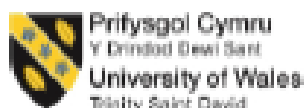
Does the research activity involve collaborators outside of the University?	YES	☐	NO	☒
If Yes, please provide the name of the external organisation and name and contact details for the main contact person:				
Institution				
Contact person name				
Contact person e-mail address				

Where research activity is carried out in collaboration with an external organisation

Does this organisation have its own ethics approval system?	YES	☐	NO	☒
If Yes, please attach a copy of any final approval (or interim approval) from the organisation				

SECTION E: Details of Research Activity

Indicative title:	Can Gardner's theory of Multiple Intelligences be positively utilised within the classroom to develop children's weakest cognitive domains in learning.		
Proposed start date:	11/02/2019	Proposed end date:	29/04/2019
Purpose of research activity (including aims and objectives)			
Outline the purpose, aims and objectives of the research activity, including key research questions. Show briefly how existing research has informed the proposed activity and explain what the research activity will add and how it addresses an area of importance. (Maximum 300 words)			
The research aims to provide further knowledge and understanding for the author of how children's intelligences can either support or prevent children from learning. From the research interviews the children and teachers within the school will be questioned to find out whether they have heard or utilised Howard Gardeners theory of multiple intelligences within the classroom practice. Gardeners theory involves the viewpoint that we all have 8 areas of human intelligences or ways of understanding the world, these being: naturalistic, verbal-linguistic, bodily-kinaesthetic, logical-mathematical, visual-spatial, interpersonal, intrapersonal and musical-rhythmic. Gardner pointed out that each individual has one or two dominant intelligences however it is possible to strengthen them all. Therefore, the author wishes to develop understanding of whether strengthening a particular area such as a child's lowest intelligence domain can in turn increase to a higher intelligence by using the area of learning to support them. For example, if a child is showing that their weaker area of intelligence is within their naturalistic intelligence, then by providing time, support and challenges within the outdoor environment, will this change the child's area of intelligence. This area of interest was developed from a previous research activity whilst on professional teaching practice last year in my second year of teaching. The research undertaken			



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will provide myself with a deeper understanding of whether this is being utilised within schools and the reasons behind why it is or is not being used.

The purpose of the research is to develop the author's knowledge and understanding of how the theory of multiple intelligences can develop children's weakest domains in learning. The author would like to see whether implementing activities in a child's weakest area can in turn improve and develop that domain of learning. The author has previously read research from Howard Gardener, Campbell, Campbell and Dickinson - Teaching and learning through multiple intelligences and Armstrong - 7 Kinds of smart.

Proposed methods

Provide a brief summary of all the methods that **may** be used in the research activity, making it clear what specific techniques may be used. If methods other than those listed in this section are deemed appropriate later, additional ethical approval for those methods will be needed. (Maximum 600 words)

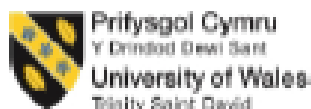
Interviews – children from a Foundation Phase FP class will be involved within the ethical research interview where they will be invited (if they consent) to respond to questions involving the multiple intelligences. For example, do you love to read books? Do you enjoy playing sports? Do you like to do jigsaw puzzles? The children will be within an informal setting that is familiar to them and I will make notes of their responses to the questions. The children will not be forced to participate, and no direct individual questioning shall take place if a child does not wish to respond. **EXIT** – children will be given red, amber and green fans beforehand, so they have the option to leave at any time. All children will be asked if they wish to participate. I will ensure that I take the time to check in regularly to ensure that their wellbeing is accounted for and wish to continue with the interview. No names will be mentioned or will be used in writing.

I will also interview a range of teaching staff such as teaching staff, support staff, phase leads and senior management within the school both in the FP and KS2 to see whether they have heard of the theory of Multiple Intelligences or whether they have seen anything in practice. This type of questioning will be different due to the pedagogical and professional nature of the interview. **EXIT** – staff participation will be voluntary and they have every opportunity to withdraw from the interview or not respond to a question at any time without providing notice.

Observations/Field Notes – I will observe a range of different FP classes (depending on time) to observe the naturalistic environment that they use which can benefit their naturalistic intelligence and this opportunity will also enable myself to observe good practice. I will make notes of the children's engagement and curiosity of using the outdoor environment during all observed sessions and will record the information in my observational book/diary. Both the children and any staff member involved will have access to the diary and be made aware of these observations. **EXIT** – following the observation I will share the notes with the class teacher and any child involved. The child can place a tick or cross on a post-it notes to me know that their information can be used for further research.

Questionnaire – For the creation of the questionnaire, I will adhere to and follow the training provided by the university during my second year of study, when the design and distribution of a questionnaire was necessary for a specific module. The questionnaire will focus on both the quantitative and qualitative data for the purpose of this research. The questionnaire will be distributed to teaching staff who will not require to give any personal data within the questionnaire, however, they may be asked to share their role within education for analysis.

A cover letter will accompany the questionnaire which explains to the participant the reason and nature of the research questionnaire. The questionnaire will be distributed via physical means and online means only. The online means of the questionnaire will involve a distribution to an online copy of the physical questionnaire to participants that are willing to participate from an educational group online (Twinkl). Once participants have completed their questionnaire, their responses will be gathered anonymously and placed within the response pool for analysis. The questions posed within the questionnaire will involved numerous ways for the individual to respond such as quantitative and qualitative data with the option, if necessary, for the individual to further comment their opinion or experience. **EXIT** – before the participant submits their questionnaire they have the right to retain their information. However, once the participants response has been received it will



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then be added to the pool which will have no means of identifying their response in order for the return. This will also be explained within the cover letter.

Learning walk – to support my research further I may conduct a learning walk throughout the school to observe displays, observe how children work and discuss certain aspects of provision with members of staff or pupils. These learning walks may be self-directed or facilitated by a learner or groups of learners or staff. Prior to conducting the learning walk I will ensure consent is obtained from a member of staff. **EXIT** – prior to evidencing the walk (by means of written, photographic and audio methods) I will ask the participant who is hosting the walk and the school for their consent to use the information they provide in my research.

Examples of pupils' work – I may request samples of work if I feel that these examples would support my research. **EXIT** – Prior to gathering examples of work, I will ensure that I have the class teacher's consent and the consent of the pupil/s to which the work belongs to. Whilst gathering samples I will take upon the responsibility of the work and ensure that confidentiality and security is upheld. At no times will the children's and adults' names be recorded.

Location of research activity

Identify all locations where research activity will take place.

The proposed study/research activity will be conducted in (assigned elective school) and a partnership primary school (school details have yet to be released by the faculty office). Information contributing to this research has already been undertaken in a previous partnership school which was conducted with permission granted.

Research activity outside of the UK

If research activity will take place overseas, you are responsible for ensuring that local ethical considerations are complied with and that the relevant permissions are sought. Specify any local guidelines (e.g. from local professional associations/learned societies/universities) that exist and whether these involve any ethical stipulations beyond those usual in the UK (provide details of any licenses or permissions required). Also specify whether there are any specific ethical issues raised by the local context in which the research activity is taking place, for example, particular cultural sensitivities or vulnerabilities of participants.

Not applicable.

SECTION F: Scope of Research Activity

Will the research activity include:	YES	NO
Use of a questionnaire or similar research instrument?	☒	☐
Use of interviews?	☒	☐
Use of diaries?	☒	☐
Participant observation with their knowledge?	☒	☐
Participant observation without their knowledge?	☐	☒
Use of video or audio recording?	☒	☐
Access to personal or confidential information without the participants' specific consent?	☐	☒
Administration of any questions, test stimuli, presentation that may be experienced as physically, mentally or emotionally harmful / offensive?	☐	☒
Performance of any acts which may cause embarrassment or affect self-esteem?	☐	☒
Investigation of participants involved in illegal activities?	☐	☒



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Use of procedures that involve deception?	☐	☒
Administration of any substance, agent or placebo?	☐	☒
Working with live vertebrate animals?	☐	☒
Other primary data collection methods, please explain in this box - Primary data collected on previous placement - Pupil work	☒	☐

If NO to every question, then the research activity is (ethically) low risk and **may** be exempt from **some** of the following sections (please refer to Guidance Notes).

If YES to any question, then no research activity should be undertaken until full ethical approval has been obtained.

SECTION G: Intended Participants

Who are the intended participants:	YES	NO
Students or staff at the University?	☐	☒
Adults (over the age of 18 and competent to give consent)?	☒	☐
Vulnerable adults?	☐	☒
Children under 18?	☒	☐
Prisoners?	☐	☒
Young offenders?	☐	☒
Those who could be considered to have a particularly dependent relationship with the investigator or a gatekeeper?	☐	☒
People engaged in illegal activities?	☐	☒
Others (please identify):	☐	☒

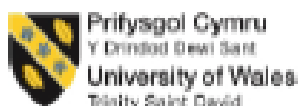
Participant numbers and source

Provide an estimate of the expected number of participants. How will you identify participants and how will they be recruited?

The estimated number of participants within the classroom environment will be 30 children aged between 3 and 7 years old in a Foundation Phase class. 1 head teacher, 1 deputy headteacher, 3 teachers and estimated 9 support teachers which will also be interviewed. I will ensure I gain consent from the senior mentor and class mentor prior to undertaking research in my professional teaching experience elective class.

Also, the estimated number of participants that will access the online questionnaire should be between 10 and 30 participants. Prior to the research I will ensure I gain consent from all participants and ensure that they understand the aims, terms and conditions of the research and make available all the information required for them to participate or not participate if they wish.

Information for participants:	YES	NO	N/A
Will you describe the main research procedures to participants in advance, so that they are informed about what to expect?	☒	☐	☐
Will you tell participants that their participation is voluntary?	☒	☐	☐
Will you obtain written consent for participation?	☒	☐	☐



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Will you explain to participants that refusal to participate in the research will not affect their treatment or education (if relevant)?	☒	☐	☐
If the research is observational, will you ask participants for their consent to being observed?	☒	☐	☐
Will you tell participants that they may withdraw from the research at any time and for any reason?	☒	☐	☐
With questionnaires, will you give participants the option of omitting questions they do not want to answer?	☒	☐	☐
Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	☒	☐	☐
Will you debrief participants at the end of their participation, in a way appropriate to the type of research undertaken?	☒	☐	☐
If NO to any of above questions, please give an explanation			

Information for participants:	YES	NO	N/A
Will participants be paid?	☐	☒	☐
Is specialist electrical or other equipment to be used with participants?	☐	☒	☐
Are there any financial or other interests to the investigator or University arising from this study?	☐	☒	☐
Will the research activity involve deliberately misleading participants in any way, or the partial or full concealment of the specific study aims?	☐	☒	☐
If YES to any question, please provide full details			

(this box should expand as you type)

SECTION H: Anticipated Risks

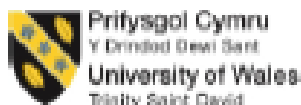
Outline any anticipated risks that may adversely affect any of the participants, the researchers and/or the University, and the steps that will be taken to address them.	
If you have completed a full risk assessment (for example as required by a laboratory, or external research collaborator) you may append that to this form.	
Full risk assessment completed and appended?	
Yes	☐
No	☒
Risks to participants	
For example: emotional distress, financial disclosure, physical harm, transfer of personal data, sensitive organisational information	
The risk to participants is that they be involved in the research without their consent. Therefore, I will ensure that all consent procedures are in place by informing the children and staff of my research. I will explain to the children and staff that they have the right to withdraw and can leave the research or express that they do not wish for any data or information to be used at any time. For example, I will ask the children if I can use their answers from their interviews to be analysed for my research and share my notes. I will also ensure I monitor all the children's who participate with their wellbeing and stop any activity that causes a child to become distressed or uncomfortable.	

If research activity may include sensitive, embarrassing or upsetting topics (e.g. sexual activity, drug use) or issues likely to disclose information requiring further action (e.g. criminal activity), give details of the procedures to deal with these issues, including any support/advice (e.g. helpline numbers) to be offered to participants. Note that where applicable, consent procedures should make it clear that if something potentially or actually illegal is discovered in the course of a project, it may need to be disclosed to the proper authorities
Not applicable
Risks to investigator For example: personal safety, physical harm, emotional distress, risk of accusation of harm/impropriety, conflict of interest The risk to the researcher is that I may be accused of unprofessional practice. I will manage the risk by adhering to the BERA, university and EWC guidelines and following my ethical practice plan.
University/institutional risks For example: adverse publicity, financial loss, data protection There should be no risk to the University if I manage the risk to the participant and the researcher as detailed above. I will conduct the research and represent the results honestly. I will always comply with ethical, legal and professional frameworks, obligations and standards as required by the statutory and regulatory authorities, as well as with the University's Research Integrity and Ethics Code of Practice.
Adverse outcomes List measures put in place to limit any adverse effects or outcomes of research activity where appropriate. Include any emergency protocols. I will manage the risk by adhering to the BERA guidelines and following my plan of ethical practice. I will always comply with ethical, legal and professional frameworks, obligations and standards as required by the statutory and regulatory authorities, as well as with the University's Research Integrity and Ethics Code of Practice. Loss of data – upon collection of research I will assume full responsibility for the safekeeping of the data. To ensure the participant's response is safe it will be kept in a folder on my person until the research has been analysed and utilised at which time the data will be destroyed. If in the event that a participant's response is lost at the fault of the author or a third party then the individual will not be able to be identified as no personal details will be listed upon the questionnaire.

Disclosure and Barring Service			
If the research activity involves children or vulnerable adults, a Disclosure and Barring Service (DBS) certificate must be obtained before any contact with such participants.	YES	NO	N/A
Has a DBS certificate been obtained?	☒	☐	☐

SECTION I: Feedback, Consent and Confidentiality

Feedback What feedback will be provided to participants, how will this be done and when? I will not be providing feedback to participants as it is not relevant for the research. If the participants request feedback from the responses then I, as the author, will provide a summary of the data collected.
Informed consent



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Describe the arrangements to inform potential participants, before providing consent, of what is involved in participating. Describe the arrangements for participants to provide full consent before data collection begins. If gaining consent in this way is inappropriate, explain how consent will be obtained and recorded.

Participation consent – children

I will converse with my class and senior mentor to inform them of the research I will undertake, providing reason and rationale behind the research. However, I will verbally ask children identified to participate whether they agree to participate to the research by using traffic light fans to support the children's emotions. If they show the green face then they are happy to undertake the research, if they show the red face then I will stop and understand that the child does not want to undertake or participate. This will be an individual exercise for children to be encouraged to engage and respond honestly with their interest and wellbeing at the forefront. Children will be informed that they can approach myself at any given time to discuss the information that they gave to myself for the research and whether they wish to partake.

Participation consent – adults (teachers)

I will ask the class teachers to sign a document if they agree and consent to take part in the research. If they are not willing to sign the document, then I shall not use them within my research. The consent form will include a box for the participant to tick if they agree with the statements e.g. I confirm that I have read and fully understood the information sheet dated 11/02/2019 for the above study. I have had the opportunity to consider the information, ask questions and had these answered satisfactorily. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. I understand that any information given by me may be used in future report, articles or presentations by the research team. I understand that my name will not appear in any report, article or presentation. I agree to participate in the above study.

Confidentiality / Anonymity

Set out how anonymity of participants and confidentiality will be ensured in any outputs. If anonymity is not being offered, explain why this is the case.

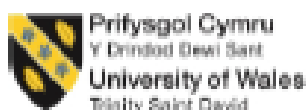
I will ensure that no individual information (raw scores, individual identifiable performance outcomes) are made available to schools/parents etc. Only non-identifiable summary/aggregate information can be provided in this way.

I will also place a statement on the consent form indicating that 'if you decide to remain anonymous, then maintaining your anonymity will be a priority and every practical precaution will be taken to disguise your identity. If you prefer anonymity, there will not be any identifying information on audiotapes and transcripts without your prior consent. All materials generated from this or any interview will remain confidential.'

SECTION J: Data Protection and Storage

In completing this section refer to the University's Research Data Management Policy and the extensive resources on the University's Research Data Management web pages (<http://uwtsd.ac.uk/library/research-data-management/>).

	YES	NO
Does the research activity involve personal data (as defined by the Data Protection Act)? "personal data" means data which relate to a living individual who can be identified— (a) from those data, or (b) from those data and other information which is in the possession of, or is likely to come into the possession of, the data controller, and includes any expression of opinion about the individual and any indication of the intentions of the data controller or any other person in respect of the individual.	☐	☒
If YES, provide a description of the data and explain why this data needs to be collected:		
(this box should expand as you type)		



PG2 / E1 FORM

Does it involve sensitive personal data (as defined by the Data Protection Act)? "Sensitive personal data" means personal data consisting of information as to – (a) the racial or ethnic origin of the data subject, (b) his political opinions, (c) his religious beliefs or other beliefs of a similar nature, (d) whether he is a member of a trade union (within the meaning of the Trade Union and Labour Relations (Consolidation) Act 1992), (e) his physical or mental health or condition, (f) his sexual life, (g) the commission or alleged commission by him of any offence, or (h) any proceedings for any offence committed or alleged to have been committed by him, the disposal of such proceedings or the sentence of any court in such proceedings.	☐	☒
If YES, provide a description of the data and explain why this data needs to be collected:		
(this box should expand as you type)		

Will the research activity involve storing personal data on one of the following:	YES	NO
Manual files (i.e. in paper form)?	☒	☐
University computers?	☐	☒
Private company computers?	☐	☒
Home or other personal computers?	☒	☐
Laptop computers/ CDs/ Portable disk-drives/ memory sticks?	☒	☐
"Cloud" storage or websites?	☐	☒
Other – specify:	☐	☐

For all stored data, explain the measures in place to ensure data confidentiality, including details of password protection, encryption and anonymisation:

Confidentiality will be upheld by not requesting participant names on any piece of data collected. Data will be stored in a locked cupboard and password protected computer. Any correspondence between my tutor and myself will be through a password protected e-mail account.

Will the research activity involve any of the following activities:	YES	NO
Electronic transfer of data in any form?	☐	☒
Sharing of data with others at the University?	☐	☒
Sharing of data with other organisations?	☐	☒
Export of data outside the European Union or importing of data from outside the UK?	☐	☒
Use of personal addresses, postcodes, faxes, emails or telephone numbers?	☐	☒
Publication of data that might allow identification of individuals?	☐	☒
Use of data management system?	☐	☒
Data archiving?	☐	☒

If YES to any question, please provide full details, explaining how this will be conducted in accordance with the Data Protection Act (and/or any international equivalent):



PG2 / E1 FORM

(this box should expand as you type)

SECTION K: Declaration

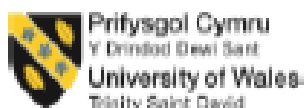
List all who will have access to the data generated by the research activity:	
The researcher – Miss Jennifer Ann Evans	
List who will have control of, and act as custodian(s) for, data generated by the research activity:	
The researcher – Miss Jennifer Ann Evans	
Give details of data storage arrangements, including where data will be stored, how long for, and in what form. Will data be archived – if so how and if not why not.	
Participants that have provided responses will have their data stored securely by the researcher. Once the data has been analysed by the researcher then it will be destroyed so that there is no physical trace of the data. This process will also be in accordance to the Data Protection Act (1998).	
The data collection period will range from 11/02/2019 until 29/04/2019. Following the 29/04/2019 there will no longer be a use for the data and all data will be destroyed at this point in time.	
The information which I have provided is correct and complete to the best of my knowledge. I have attempted to identify any risks and issues related to the research activity and acknowledge my obligations and the rights of the participants.	
In submitting this application I hereby confirm that I undertake to ensure that the above named research activity will meet the University's Research Ethics and Integrity Code of Practice	
Signature of applicant:	JAEVANS Date: 08/02/2019

For students:

Teacher / Senior Mentor / Headteacher:	Dr Sioned V Hughes
Signature:	<i>S.V. Hughes</i>
Date:	09/02/2019
Supervisor:	
Signature:	
Date:	

Checklist: Please complete the checklist below to ensure that you have completed the form according to the guidelines and attached any required documentation:

☒	I have read the guidance notes supplied before completing the form.
☒	I have completed ALL RELEVANT sections of the form in full.
☒	I confirm that the research activity has received approval in principle
☐	I have attached a copy of final/interim approval from external organisation (where appropriate)

**PG2 / E1 FORM**

☐	I have attached a full risk assessment (and have NOT completed Section H of this form) (where appropriate)
☒	I understand that it is my responsibility to ensure that the above named research activity will meet the University's Research Ethics and Integrity Code of Practice.
☒	I understand that before commencing data collection all documents aimed at respondents (including information sheets, consent forms, questionnaires, interview schedules etc.) must be confirmed by the DoS/Supervisor, module tutor or Head of School.

RESEARCH STUDENTS AND STAFF ONLY

All communications relating to this application during its processing must be in writing and emailed to pgresearch@uwtsd.ac.uk, with the title 'Ethical Approval' followed by your name. You will be informed of the outcome of your claim by email; therefore it is important that you check your University and personal email accounts regularly.

STUDENTS ON UNDERGRADUATE OR TAUGHT MASTERS PROGRAMMES should submit this form (and receive the outcome) via systems explained to you by the supervisor/module leader.

This form is available electronically from the Academic Office web pages:

<http://www.uwtsd.ac.uk/academic-office/>

Appendix 4 – Elective Handbook

Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Yr Athrofa
Institute of Education
Addysg i Gymru Education for Wales

Primary Learning Partnership



Electives experience Handbook Level 6 2019

Rationale/ Methodology:

The electives experience is a professional development opportunity for students to spend a fortnight in a school/ setting gaining a deeper knowledge and understanding of an area/ subject or theme of interest by means of observations, professional dialogue, research and data collection.

Having undertaken the placement, the students will disseminate their findings in order to show their understanding and to inform the school of the experience and new knowledge gained (following the Estyn good practice model <https://www.estyn.gov.wales/effective-practice/improving-wellbeing-and-standards-attainment>) .

The electives experience will ensure all stakeholders namely: students, school staff, Yr Athrofa staff and pupils contribute to, and build upon existing partnerships, contribute to the national reform journey and experience new ways of collaborating

The placement will be undertaken by the BA Ed Primary QTS 3rd year cohort in February 2019.

(11th February – 22nd February)

Overarching theme:

The experience is linked to a research module undertaken by the students ECAD6003/C The Reflective Practitioner. Research ethics, observation methods, methodologies and information gathering will have been part of the module prior to, during and after the electives take place.

EWC Code of Conduct:

An expectation of professionalism as outlined in the EWC's code of conduct is expected from all stakeholder participants throughout the placement.

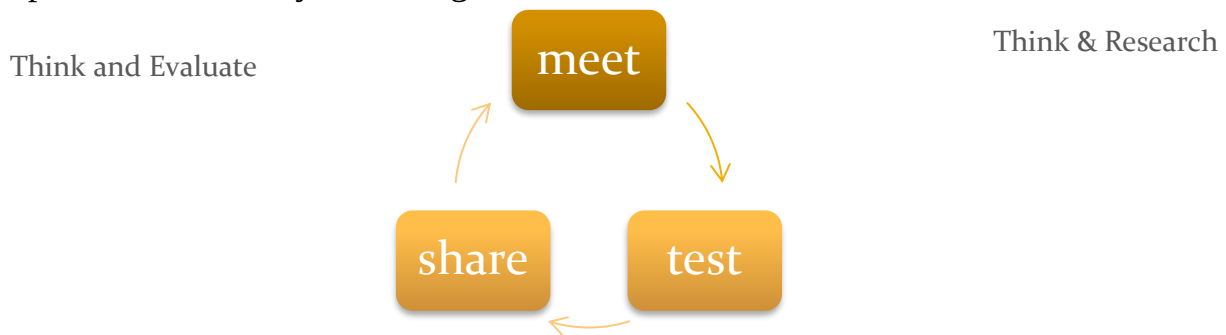
<https://www.ewc.wales/site/index.php/en/fitness-to-practise/code-of-professional-conduct-and-practice-pdf/file.html>

Making links with current education policy changes are critical therefore the four purposes proposed by Donaldson (2015) are the overarching principles that will guide the students' thinking.



Donaldson (2015)

Additionally, the students will undertake the activity in a reflective practitioner role by following the model outlined below:



Think and Reflect

Yr Athrofa (2017)

During the visit, time will be allocated for different types of activity in order to ensure each individual has a broad range of experiences within a given subject/ theme. The intention is for students to receive a comparable experience, enriching their understanding and giving them an USP when applying for posts in schools.

Each experience will differ slightly depending on the setting however the expectation is that each individual spends the ten days in the school/ setting and that members of staff will have been allocated the role of professional advisor for the duration of the electives visit. This will allow time for professional engagement through dialogue and a sharing of ideas and reflections.

Overview of expectations by school / students/ Yr Athrofa staff

Student Role:

- to prepare a rationale for the choice of elective
- to engage fully with the electives experience in order to enhance their knowledge and understanding
- to undertake personal research linked to the area/ subject
- to share the experience with a variety of audiences in a professional manner

School Role:

- to ensure the students are supported throughout the experience by key staff members
- to provide a wide range of opportunities for students to gather information
- to engage in reflective dialogue with the students at various points
- to welcome observations and comments made by students

Yr Athrofa Role:

- to ensure students are prepared for the electives opportunities
- to support the students and school in a triad of reflective dialogue
- to advise students on information sources in order to extend their thinking and understanding (theory – to practice).

Student rationale for the choice of elective

These are questions that the students will be required to discuss with the school staff leading the elective experience. Students will need to show a good engagement with the experience from the outset, undertaking research in their chosen area prior to the experience.

What are your reasons for the choice of elective?

What key reading have you undertaken already?

What do you hope to gain from the experience?



Day 1: Monday 11 th February (Meeting)

The first day will be an induction day - getting to know the school and the local area eg expectations as regards arrival/ base room (if appropriate), school information – timings etc, a learning walk around the school, school vision, priorities, work in the community – and any additional information the school feel appropriate to share on the first day.

The students will also formally share their rationale for the area chosen as their focus on this first day and ensure their register/ permission to.. has been signed by the appropriate members of staff.

Students need to ensure they gather all relevant information about the school at this point as it will form the first part of their feedback 'reflective report' on the final day.

Days 2 & 3: Tuesday 12 th February – Wednesday 13 th February (Meeting & Testing)
--

During these days the students will gain an understanding of the ethos and values held by the school, students gather information by undertaking observations in various classes – the data gathering strategies will have been discussed prior to the visits with University staff and ethical considerations involving pupil participation/ consent/ children's rights covered within the research module.

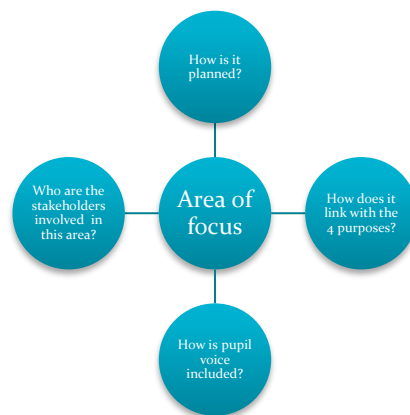
Possible methods of data collection:

- narrative notes
- movement charts (or sociogram)
- classroom plan
- photographs
- bubble maps

Day 4: Thursday 14th February (Testing)

This day will be a reflective day to give staff and students the opportunity to discuss the information gathered to date. During this time there should be opportunities for students to draw on the background reading undertaken (books/ articles/ websites) linking them to the practice observed and developing a critical analysis initially through discussion that can potentially support the students' research project.

Staff could plan a suite of activities for the next few days enabling the students to answer questions relating to their focus area.



During the electives a member of staff from the Athrofa will visit the school/ setting to support the students in regard to – linking the theoretical and practical elements of the research.

Days 5 - 8: Friday 15th February – Wednesday 20th February (Meeting &

The next few days will be dedicated to a more focussed investigation of the area of interest. Students will work in collaboration with school/ setting staff to gather data directly related to their chosen field. During this time the reflective report will continue to be populated with relevant information, activities undertaken could include: these are possible suggestions but this is not an exhaustive list, such focus could be supported through discussion between student, school and University)

- Interviewing the relevant co-ordinator/s
- Reading policies/ documentation for that area/ related areas
- Shadowing a staff member
- Collecting evidence of pupil voice
- Consideration of wider working in that area– community links/ multi agency work/ parental links
- Investigate CPD opportunities in that field locally/ nationally
- Consider capturing information by means of: questionnaire/ textual or visual data/ interviews
- Linking the learning to the four purposes
- Considering links to cross-curricular responsibilities (e.g. literacy, numeracy, digital competence) if appropriate?
- Considering wider issues relevant to area e.g.

Testing)

Day 9: Thursday 21st February (Sharing)

This is the final reflection day allowing students to gather the information to complete their reflective reports. During this time any questions that remain unanswered or check any aspect that requires further clarification can be explored. This would also be a potential opportunity to share findings with individuals' findings and to discuss opportunities for further research in the final placement school.

Day 10: Friday 22nd February (Sharing)
--

The final day of the electives is dedicated to sharing findings with school staff/ stakeholders by following the 'Estyn best practice' format discussed.

Students should take advantage of this additional opportunity to hone their communication skills further by articulating clearly and in a
--

Day	Date	Focus	Staff member	Activity focus
1	11/2/19	Induction		Meeting
2 & 3	12/2 + 13/2	Getting to know the school		Meeting/ Testing
4	14/2/19	Reflection day		Testing
5 - 8	15/2 – 20/2	Focussed area data capture		Meeting/ Testing
9	21/2/19	Reflection day		Sharing

10	22/2/19	Sharing		Sharing
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Appendix:

Personal Register

Name:

Student Number:

School/ Setting:

Date	Activity Undertaken	Signature (mentor, senior mentor or head)
11/2/19		
12/2/19		
13/2/19		
14/2/19		
15/2/19		

18/2/19		
19/2/19		
20/2/19		
21/2/19		
22/2/19		

Classroom- based research with student teachers

Ethical Research

Student teachers may be required to undertake small-scale classroom-based research in order to complete assignments. The following letter should be made known to parents/guardians so that informed consent or a request to withdraw from the research being undertaken is allowed:

This school is a partner with the professional learning partnership that sits within the Athrofa at University of Wales Trinity Saint David in Carmarthen and Swansea. This school offers placements to students who are learning to be teachers. When student teachers work within the school they are always under the supervision of the class teacher. The purpose of this letter is to inform you that as part of their University-based assessment, the student teachers will be required to evaluate classroom practice. This sometimes takes the form of a written evaluation or assessment of children's work and can also involve asking staff and children about their views. This activity does not differ from usual classroom practice

If you would like more information about the work taking place in your child's class please don't hesitate to ask the class teacher. If, following this discussion, you decide you don't want your child to be involved in any classroom-based evaluation undertaken by student teachers please inform the class teacher.

If you would like more information about the initial education and training of new teachers please contact SWWCTE through its senior administrator, Christine Rees.

Thank you for taking the time to read this information.



CONSENT FORM

Trainees must gain the following written consent of the head teacher before taking photographs, filming or audio recording learners.

I agree to _____ as a representative of Yr Athrofa to:

Take photographs	Interview	
Take video	Quote school policy documents	
Tape-record accordingly)	Questionnaires	(Tick
Name of Head teacher _____ Signed _____		
Name of school _____		

To be completed by the trainee:

If I am granted such permission, I agree to abide by the ethics embodied within the EWC Code of Conduct and will not distribute any such material to audiences beyond the University authorities without their permission.

Name of trainee:
Signed:
Telephone number:
Email address:

Programme (e.g. BA Ed/ PGCE Primary/PGCE Secondary):
Date:

<u>Reading & Research from information sources:</u> 1. 2.
--

3.

4.

5.

General observations/ data collection:

Date	Event	Comments

Appendix 5 – Letter of Consent**CONSENT FORM**

Trainees must gain the following written consent of the head teacher before taking photographs, filming or audio recording learners.

I agree to _____ as a representative of Yr Athrofa to:		
Take photographs	Interview	
Take video	Quote school policy documents	
Tape-record	Questionnaires	(Tick accordingly)
Name of Head teacher _____		Signed _____
Name of school _____		

To be completed by the trainee:

If I am granted such permission, I agree to abide by the ethics embodied within the EWC Code of Conduct and will not distribute any such material to audiences beyond the University authorities without their permission.

Name of trainee:
Signed:
Telephone number:
Email address:

Programme (e.g. BA Ed/ PGCE Primary/PGCE Secondary):
Date:

Appendix 6 – Online questionnaire

Dissertation piece - Google Forms

https://docs.google.com/forms/d/18J96s_IdZZnmGksX06eQPASad_Vr9kb8388lbs9oEc/edit

Apps HP Connected UWTSD Moodle 20... Library and Learnin... ERIC - Education Re... Google Forms: Sign... (PDF) Estimates of T... Twinkl Lesson Plan - "Don..."

Dissertation piece

QUESTIONS RESPONSES 30

Dissertation piece of utilising the theory of Multiple Intelligences.

Dear Participant:

My name is Jennifer Evans and I am a student on the BA Primary Education (QTS) course at the University of Wales Trinity Saint David Carmarthen.

I would like to invite you to participate in my research project. This project will look at how children use their multiple intelligences within the classroom and aims to discover how developing a child's weakest cognitive domain in learning may have a positive impact on the children's learning experiences. Through your participation in the questionnaire and interviews, I hope to ascertain different views on the learning styles and cognitive intelligences of Gardner's theory.

All questionnaires and interviews will be kept strictly confidential to the researchers involved and at NO time will individual questionnaires be released to the general public. Your participation in this study is completely voluntary so you can withdraw from the questionnaire/interview at any stage.

My questionnaire/interview should take about 5-10 minutes to complete, but there is no time constraint. There are also no right or wrong answers. After careful and precise analysis of the data obtained from this questionnaire, I will be happy to provide you with a copy of the findings at your request. The results of this questionnaire and interview processes will hopefully enhance my understanding of whether the multiple intelligences is implemented within schools.

I thank you in advance for your time and participation. If any questions do arise, feel free to contact me at your convenience.
Email: 1601205@student.uwtsd.ac.uk

c/o Dr Sioned V Hughes
University of Wales
Trinity Saint David
Carmarthen
SA31 3EP

Which local authority is your school within? *

Short answer text

QUESTIONS RESPONSES 30

What is your current position/role within your school? *

Short answer text

Have you ever heard of Howard Gardener's theory of Multiple Intelligences? *

☐ Yes

☐ No

☐ Maybe

☐ Other...

If yes or maybe then please state where? You can choose more than one. *

☐ In university whilst training

☐ In college whilst training

☐ Read about it in an article

☐ Read about it in a book

☐ Research project

☐ A friend or family member

☐ A colleague

☐ Whilst on a professional development course/workshop

Is this something that you may consider looking into and using it within the classroom? *

☐ Yes

☐ No

☐ Maybe

☐ Other...

Is there anything that you disagree with about the theory? *

Long answer text

	Which of the areas of intelligence do you think is the most important intelligence to develop within children? ☐ Logical - Mathematical (logic smart) ☐ Verbal - linguistic (word smart) ☐ Naturalistic (nature smart) ☐ Intrapersonal (self smart) ☐ Interpersonal (people smart) ☐ Visual - special (picture smart) ☐ Musical (music smart) ☐ Bodily - kinaesthetic (body smart) On a scale of 1 - 5, with 1 being not important and 5 being extremely important. Can you rate each area of intelligence by your opinion of importance? Logical-mathematical <table><thead><tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr></thead><tbody><tr><td>Logical-mathematical (logic smart)</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr></tbody></table>		1	2	3	4	5	Logical-mathematical (logic smart)	☐	☐	☐	☐	☐	
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Logical-mathematical (logic smart)	☐	☐	☐	☐	☐									
	On a scale of 1 - 5, with 1 being not important and 5 being extremely important. Can you rate each area of intelligence by your opinion of importance? Verbal-Linguistic <table><thead><tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr></thead><tbody><tr><td>Verbal - linguistic (word smart)</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr></tbody></table>		1	2	3	4	5	Verbal - linguistic (word smart)	☐	☐	☐	☐	☐	
	1	2	3	4	5									
Verbal - linguistic (word smart)	☐	☐	☐	☐	☐									
	On a scale of 1 - 5, with 1 being not important and 5 being extremely important. Can you rate each area of intelligence by your opinion of importance? Naturalistic <table><thead><tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr></thead><tbody><tr><td>Naturalistic (nature smart)</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr></tbody></table>		1	2	3	4	5	Naturalistic (nature smart)	☐	☐	☐	☐	☐	
	1	2	3	4	5									
Naturalistic (nature smart)	☐	☐	☐	☐	☐									
	On a scale of 1 - 5, with 1 being not important and 5 being extremely important. Can you rate each area of intelligence by your opinion of importance? Intrapersonal <table><thead><tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr></thead><tbody><tr><td>Intrapersonal (self smart)</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr></tbody></table>		1	2	3	4	5	Intrapersonal (self smart)	☐	☐	☐	☐	☐	
	1	2	3	4	5									
Intrapersonal (self smart)	☐	☐	☐	☐	☐									
	On a scale of 1 - 5, with 1 being not important and 5 being extremely important. Can you rate each area of intelligence by your opinion of importance? Interpersonal <table><thead><tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr></thead><tbody><tr><td>Interpersonal (people smart)</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr></tbody></table>		1	2	3	4	5	Interpersonal (people smart)	☐	☐	☐	☐	☐	
	1	2	3	4	5									
Interpersonal (people smart)	☐	☐	☐	☐	☐									
	On a scale of 1 - 5, with 1 being not important and 5 being extremely important. Can you rate each area of intelligence by your opinion of importance? Visual-Spatial <table><thead><tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr></thead><tbody><tr><td>Visual - special (picture smart)</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr></tbody></table>		1	2	3	4	5	Visual - special (picture smart)	☐	☐	☐	☐	☐	
	1	2	3	4	5									
Visual - special (picture smart)	☐	☐	☐	☐	☐									
	On a scale of 1 - 5, with 1 being not important and 5 being extremely important. Can you rate each area of intelligence by your opinion of importance? Musical <table><thead><tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr></thead><tbody><tr><td>Musical (music smart)</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr></tbody></table>		1	2	3	4	5	Musical (music smart)	☐	☐	☐	☐	☐	
	1	2	3	4	5									
Musical (music smart)	☐	☐	☐	☐	☐									
	On a scale of 1 - 5, with 1 being not important and 5 being extremely important. Can you rate each area of intelligence by your opinion of importance? Bodily-kinaesthetic <table><thead><tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr></thead><tbody><tr><td>Bodily - kinaesthetic (body smart)</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr></tbody></table>		1	2	3	4	5	Bodily - kinaesthetic (body smart)	☐	☐	☐	☐	☐	
	1	2	3	4	5									
Bodily - kinaesthetic (body smart)	☐	☐	☐	☐	☐									

Appendix 7 – Rationale for Elective Experience**Research Project****Research question:**

Can Gardener's theory of Multiple Intelligences be positively utilised within the classroom to develop children's weakest cognitive domains in learning?

Main areas of study:

- **Cognitive flexibility** – the ability to switch between two different concepts and to think about a range of concepts simultaneously. This can ensure that one or two intelligences can work simultaneously or the ability to use several intelligences to work together on an activity or task.
- **Human intelligence** - Children have one or two dominant areas of intelligences however it is possible to strengthen all eight intelligences. Therefore, I would like to investigate if children can develop and improve their weakest intelligence if the environment caters for it. Simultaneously it would be interesting to gather the data of the children's additional learning needs to see whether there are any correlations, for example: if a child's weakest intelligence has been displayed as the verbal-linguistic and if they have an additional need that may support this difficulty.
- **Mindset – set** – Carol Dweck's research on the fixed and growth mindset can support the development of how children who have challenges or tasks put within their lower intelligence environment. This would be interesting to observe within a child, to observe whether their growth mindset can overcome their weakest intelligence.
- **Outdoor Learning environment** – it would be interesting to observe a child whose weakest intelligence is the naturalistic intelligence and observe how they interact within that environment.

Rationale

The rationale towards my decision to use Howard Gardeners theory of Multiple Intelligences within the classroom and to use it within my research project was first developed in a lecture of how to implement Assessment for Learning (AFL) within the classroom. The lecture delved slightly into Multiple Intelligences and how children have 8 intelligences that should be promoted within the classroom. Therefore, I was eager to delve into it further and expand my own knowledge of how this could be promoted within the classroom. Research was undertaken by reading a few articles and books from Gardener and others who supported his theory and others who disapproved or continued to develop it.

From there, I discovered an assessment tool that enabled myself to acquire the information from the pupils on the 8 areas of the multiple intelligences. This allowed myself to discover where the children within my second-year placement class in FP portrayed their strongest and weakest areas of learning. As the lecturer who provided the information about MI was also my university tutor who was observing myself on placement, the lecturer supported myself in how I could develop this further within my practice.

Therefore, what I decided to do was implement challenge areas after certain lessons/sessions that I taught. I ensured that each child's weakest area of intelligence was then supported in the challenge area with an activity. For example, if a child's lowest scoring intelligence was the naturalistic intelligence, then their challenge activity would ensure that they were exploring the outdoor learning environment with supported activities.

Towards the end of the placement I then reassessed their intelligence areas and noticed a difference in most of the children's weakest intelligence area. Therefore, the findings confirmed that the children benefitted from developing their weakest intelligence within the challenge time.

This research was very enjoyable to conduct and widened my thoughts and views of the cognitive processes that children can naturally develop and improve. Furthermore, developing my interest in whether schools implement this within the school, in their classes or whether this is something that they may consider for the future has sparked my interest in what other studies may say. I have chosen the Foundation Phase to look at for electives as I have found that the continuous provision area lends itself well to developing the 8 intelligences of Gardeners theory.

To conclude, I would like to implement this once again in my final PTE class as I found the study very interesting to undertake. I think this approach allows a range of cognitive intelligences to be utilised within the classroom and that children should comprehend the different intelligences that they may succeed with.

Appendix 8 – Results from Elective School Year 1 Class

Name	ALN	Verbal/Linguistic	Logical-mathematical	Musical	Visual/Spacial	Bodily/Kinesthetic	Interpersonal	Intrapersonal	Naturalistic
ER	EFSM	15	14	15	16	17	10	11	15
ED		16	14	18	18	17	17	14	13
VH	Basic Skills	15	18	10	12	10	15	18	12
OE	Basic Skills	17	16	12	17	16	17	13	17
SS	Basic Skills	18	18	18	18	18	17	16	18
MB	EFSM	17	17	17	17	18	14	13	18
LO		12	12	8	14	12	12	16	11
LH	EFSM	17	16	12	14	15	14	16	15
DW	Basic Skills	18	17	14	16	18	15	15	16
PG		12	13	15	14	15	13	10	13
SG		12	13	10	15	13	11	13	16
O	Basic Skills	10	17	8	18	15	10	16	12
RK	Basic Skills	12	14	12	17	15	13	11	16
JK	Basic Skills	14	14	13	15	14	17	13	13

HB		11	13	17	18	18	18	11	17
KD		18	18	17	17	16	16	14	17
KS	EFSM	14	15	15	18	15	15	11	16
DL	Basic Skills	13	17	8	18	18	13	12	16
TP		12	18	18	18	17	16	13	11
OH	EFSM	17	17	11	18	15	16	13	16

Appendix 9 – Multiple Intelligences Premade Test



Multiple Intelligences Worksheet

Complete each section by placing a number **1, 2, or 3** next to each statement which you think applies to you:

- If you think that the statement **STRONGLY** describes you, score it **3**.
- If you think the statement **MOSTLY** describes you, score it **2**.
- If you think the statement **SOMEWHAT** describes you, score it **1**.
- If you think the statement does **NOT** describe you, then leave the space blank.
- Then, complete each section by adding up the total score.

Section One	
	I think I know a lot of words and/or enjoy learning new words.
	I remember things when I read or make notes.
	Telling or writing stories or poetry is pleasurable.
	I like to learn foreign languages.
	I find that I read for enjoyment most days.
	I am good at word puzzles such as crosswords and anagrams.
	Total score for section one

Section Two	
	One of my favorite classes at school is/was math.
	I can easily calculate sums in my head.
	Logic puzzles are fun and a strength of mine.
	I like to solve problems in a logical, step-by-step manner.
	I enjoy playing strategy games such as chess.
	I like to organize my things into logical categories.
	Total score for section two

Section Three	
	I like to sing or play a musical instrument.
	I cannot imagine a day going by without having listened to music.
	I pick up rhythms very easily.
	I know when a person or instrument is out of tune.
	I remember song tunes and lyrics easily.
	I prefer to watch a musical rather than a play.
	Total score for section three

Section Four	
	Art is one of my favorite classes.
	I have a good sense of direction and like map reading.
	Doing puzzles or construction-type toys is one of my hobbies.
	Fashion is something I notice and care about.
	I like to play videogames.
	I remember images and faces easily.
	Total score for section four

Section Five	
	Exercise is an important part of my life.
	I love playing physical games.
	I think I have good balance and coordination.
	Arts, crafts and hands-on activities appeal to me.
	I enjoy watching sports games or seeing dancers perform.
	I would rather play a sport than read or study.
	Total score for section five

Section Six	
	I have a large group of friends and think that I am well liked.
	My friends come to me if they are upset.
	I would rather be with friends than be by myself.
	I work best in a group or team setting.
	I care about what is happening in the world.
	Meeting new people is fun for me.
	Total score for section six

Section Seven	
	I would rather work alone than as part of a group.
	I am good at formulating and analyzing my own theories.
	I enjoy writing my thoughts in a journal.
	Spending a lot of time playing computer or video games alone is fun for me.
	I have deep personal and moral beliefs.
	I am confident of my own abilities and work well without direction.
	Total score for section seven

Section Eight	
	I love playing with my pets or wish I had pets to play with.
	I love to spend a lot of time outside enjoying nature.
	When I grow up, I think I would like to work in a nature or animal related field.
	Protecting the environment by recycling, conserving water, or exploring alternative sources of energy, etc., are things I believe in.
	I enjoy gardening and have or would like to have flowers or vegetables to take care of.
	I enjoy visiting zoos, aquariums and wildlife parks whenever I have time.
	Total score for section eight

Appendix 10 – Table of results of MI from children on 1st test

Name	Verbal/Linguistic	Logical-mathematical	Musical	Visual/Spacial	Bodily/Kinesthetic	Interpersonal	Intrapersonal	Naturalistic
DJ	10	14	15	13	12	10	12	9
TW	16	12	15	14	17	17	8	17
RW	16	14	17	17	18	18	16	17
JM	16	16	9	16	17	18	12	18
ET	18	16	16	13	14	13	16	12
LD	11	14	11	16	15	14	15	16
MM	16	17	17	14	14	15	15	15
BH	16	13	15	15	15	16	14	17
CJ	13	15	12	14	14	14	15	17
JC	13	18	16	18	16	18	14	14
AM F	16	15	13	16	18	15	10	18
MD								
DC	15	13	8	14	14	18	12	17
IT	11	13	14	15	18	18	13	18
MP	16	15	14	13	16	13	12	10
JJ	15	13	14	11	14	13	14	14
RD	16	17	13	15	15	15	14	17
AP	8	13	8	14	18	17	11	16
CJ	15	17	9	16	17	14	14	15
NT	12	10	13	13	15	16	15	15
ME	16	17	14	18	18	18	10	17
AB	15	6	16	12	17	13	12	14
JN	17	16	15	17	16	17	14	18
AG	12	13	11	14	15	14	10	16

G C B	16	14	11	14	12	12	12	16
CH	8	9	8	12	11	12	10	14
CG	10	10	13	14	16	12	8	15
TL	12	12	13	13	13	15	11	17
IT	13	12	8	16	17	16	9	15
IA	11	15	12	16	13	16	9	15

Appendix 11 – Challenges for MI implementation/HeiriauArdal Mathemateg

Can you identify the lines of symmetry in the road signs? There is an example to help explain symmetry. Can you think of anything else that has lines of symmetry?

Ardal Ddarganfor

Can you create a roadmap and use traffic signs to navigate the cars around your map?

Ardal Corfforol

Use the tape to make travelling lines and roads. Can you use resources to make a zebra crossing?

Ardal Dough

Can you use the playdough to create the challenges on the mats?

Heriau

2.2.18

Ardal Celf a Chrefft

Can you create a collage of a road map or village? What materials will you use? Can you use any outdoor materials?

Ardal Lluniad

Can you create a village using the Lego? What buildings will you need? Remember about your roads!



Appendix 12 - Table of results of MI from children at the end of PTE

Name	Verbal/Linguistic	Logical-mathematical	Musical	Visual/Spacial	Bodily/Kinesthetic	Interpersonal	Intrapersonal	Naturalistic
DJ	9	13	12	14	18	11	12	13
TW	16	16	14	16	16	16	11	16
RW	17	17	16	18	16	17	13	18
JM	16	17	16	12	14	14	12	17
ET	17	18	17	12	14	13	17	11
LD	16	17	14	16	14	14	12	16
MM	15	18	17	15	15	14	14	18
BH	17	14	17	17	16	15	13	16
CJ	14	14	14	13	12	13	13	18
JS	18	18	16	16	17	17	13	18
A MF	12	10	17	13	16	12	10	10
MD	14	16	14	17	16	18	9	18
DC	16	15	14	14	17	18	14	16
IT	13	13	17	15	16	15	16	18
MP	13	17	10	14	15	11	12	15
JJ	14	14	14	16	15	16	14	16
RD	15	16	11	13	16	13	13	17
AP	13	16	16	17	15	16	13	17
CJ	13	14	12	16	15	12	14	18
NT	10	15	14	13	13	10	13	16
ME	17	16	16	17	18	17	11	18
AB	14	14	12	12	16	11	12	12
JN	16	18	15	17	13	18	13	18
AG	15	12	8	16	18	14	13	13

G CB	14	18	11	18	12	14	13	18
CG	9	13	12	12	13	11	12	12
TL	17	17	14	17	13	14	14	17
IT	14	18	10	17	18	16	13	18
IA	13	17	13	14	14	15	13	13