Chapter 3

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REVIEW OF RELATED LITERATURE

The review of related literature involves the systematic identification, location and analysis of documents containing information related to the research problem (Gay, 1996). These documents include periodicals, abstracts, reviews, books and other research reports. The major purpose of reviewing the literature is to determine what has already been done that relates to the problem. This knowledge avoids unintentional duplication and also provides the understanding and insights necessary for the development of a logical framework into which the problem fits. The review tells the researcher what has been done and what needs to be done. This gives the researcher an understanding of the research methodology, which refers to the way, the study is to be conducted.

The present study was intended to ascertain the relative effectiveness of MIA and CMDI on the achievement in biology of secondary school students. The investigator had done an extensive review in the field related to MIA, because it was developed as a theory of the mind, and not as an educational intervention. Gardner (1983) addressed only a few pages in *Frames of Mind* to the educational implications of MI theory, leaving it to professional educators to interpret in terms of what should be taught, and how it should be taught and assessed. Consequently, hundreds of books, articles, videos and workshops, which interpret, and sometimes misinterpret, the theory in terms of suggested classroom applications have been created (Gardner, 1999; 2004, 2004a).

There is a vast body of literature pertaining to MI theory, much of it written by educators for educators, offering practical applications of the theory in classroom programmes, with a view to improving student learning. These works
may include an extensive coverage of the theory, but include little or no criticism (Willingham, 2004). They are generally written for the primary school setting.

For the purpose of this study, the literature regarding MI theory has been reviewed to ascertain whether MI applications have been found to be associated with improved student outcomes in the secondary school setting, and if so, to ascertain the reasons why the theory, which has found such a ready audience amongst primary school educators, has had very limited influence in secondary school settings. Hence the investigator reviewed the research studies as well as scholarly works and classified these into three major areas: A) The positive outcomes of the MI theory; B) Barriers to MI theory implementation and C) The critic’s view of the MI theory. The outline of the classification is given below.

A) The positive outcomes of the MI Theory

1. Outcomes associated with MI theory based practice.
   a. Academic improvements
   b. Affective outcomes
   c. Talent development

2. Changes in teaching strategies
3. Changes in assessment practices

B) Barriers to MI theory implementation

C) The Critic’s View of the MI Theory

1. Criticism of MI within the Field of Psychology
2. Criticism of MI in the Educational Practices
3.1 The Positive Outcomes of the MI Theory

3.1.1. Outcomes associated with MI theory based practice.

Kornhaber et al. (2004) in the course of their three-and-a-half year investigation identified and documented a number of fundamental practices common to schools which associated MI with benefits for students. Campbell and Campbell (1999) suggested that as a result of implementing MI, schools changed as much as those who work within them change.

a) Academic improvements

Abdallah and Mahmoud (2008) in the study “Multiple ways to be smart: Gardener's theory of MI and its educational implications in English teaching and oral communication” highlighted the educational applications and implications of MI theory in English language teaching.

Neto et al. (2008) undertook a study and found that there were sex differences in self-estimated IQ. Males rated themselves higher on overall, mathematical, spatial, intrapersonal, spiritual, and naturalistic IQ compared with females. Factor analysis of the ten, eight and seven self-estimates scores did not confirm Gardner's classification of multiple intelligences.

Onika et al. (2008) studied the effects of the MI teaching strategy on the academic achievement. The results suggested that performance on a post mathematics assessment for students exposed to MI showed considerable increase when compared to those taught using direct instruction.
Carol and Shafer (2007) found out the value of classroom practices based on MI theory by modelling instruction wherein students participated in classroom activities that addressed the various intelligences.

Ebru and Akyol (2007) proved that the interaction of institution type and gender causes differences in the verbal-linguistic, musical-rhythmic and bodily-kinaesthetic intelligences. The musical-rhythmic intelligence grades of the girls were higher than those of the boys, and the bodily-kinaesthetic intelligence grades of the boys were higher than those of the girls.

Ozdemir and Tekkaya (2006) claimed that in the study, utilizing the MI in the classroom led the students to better retention of knowledge.

Corley and Saldana (2005) found that when more options were offered, students completed their assigned tasks. They argued that differentiated instruction is the solution to maximizing student learning potential while recognizing individual differences.

Rettig (2005) identified four ways to teach to the “whole brain”. First, immerse the children with toy and playthings that lend themselves to the MI. Second, incorporate the different MI into lesson planning. Third, introduce learning centres that focus on the MI in the classroom. Lastly, when using MI spotlight the different careers which use each intelligence.

Kornhaber et al. (2004) had done a comprehensive investigation in the Project SUMIT schools, where MI theory implemented for more than three years and found that 78% of schools reported improvements in standardised test scores and 49% of schools associating this improvement with MI. In addition, 80% of
schools reported improvements for students with learning differences/disabilities and 78% associating this improvement with MI.

However, Willingham (2004) questioned the statistical basis of these findings, and criticized the lack of a control group in the investigation to provide a comparison to other schools in their districts. He also noted that because of the complexity of educational practices, it is impossible to precisely attribute improvements to MI.

McMahon et al. (2004) found that the Teele Inventory of MI (TIMI) subscales was found to have poor to moderate reliability. Students with higher scores on logical-mathematical intelligence were more likely to demonstrate at or above grade-level reading comprehension scores compared with students who scored lower on logical-mathematical intelligence, but none of the other MI scales was predictive of student achievement.

Davis (2004) assessed the effect of MI learning centres on student achievement and found that after a 3-month period, students’ test scores increased an average of 66.25% to 82.25%. Students showed an increase in their desire to work with the classmates and reported a significant increase in their desire to perform better in science.

Diaz-Lefebvre (2004) conducted a study among 2,400 students who completed classes that incorporated MI instead of traditional classes and found increased student achievement.
According to McMahon et al. (2004) Gardner’s MI theory had created much interest in more diverse teaching strategies, balanced programming, and matching instruction to learning styles.

Haley (2004) in an action research study found that students in experimental groups receiving MI based instruction outperformed those in control groups, in which instruction was mostly teacher-centred, and relied heavily on rote learning and memorization, with no co-operative learning and hands-on activities.

Kornhaber et al. (2004), Campbell & Campbell (1999), Vialle (1997) and Weber (1996) claimed that MI fosters increased parental participation because the theory validates the thinking and skills found across a wide range of real-world roles and occupations which is a factor that has been associated with increased student achievement.

Chan (2003) conducted a study on perceived MI and learning preferences and found that students perceived their strengths in interpersonal, intrapersonal, and verbal/ linguistic intelligences and their weaknesses in bodily/ kinaesthetic and naturalistic intelligences. Students who reported having a greater number of learning preferences also gave higher ratings on personal intelligences and verbal-linguistic intelligence.

Cluck and Hess (2003) reported that the use of multiple intelligences in the classroom resulted in the improved assignment completion, class participation and engagement of learners.

Mbuva (2003) found that MI theory is an effective teaching and learning tool at all levels. The researcher concluded that traditional ways of understanding
pedagogy, and static methods of teaching, are giving way to the new classroom examination and application of the MI.

**Rule** and **Lord** (2003) edited an activity book which was designed to help learners who need special help including gifted students with enhanced instruction. Bloom’s taxonomic levels and Gardner’s eight multiple intelligences were the basis of the activities.

**Gaines** and **Lehmann** (2002) conducted a study and found that the use of MI strategies improved the students’ reading comprehension ability and it enhanced their academic performance as well.

**Kallenbach** and **Viens** (2002) conducted a study across different adult literacy contexts. The major findings of the study were as follows: (1) MI efforts resulted in high levels of adult learner engagement; (2) choice-based activities increased students’ confidence about learning; and (3) connecting MI reflections activities to broader learning goals seemed important.

**Rubado** (2002) claimed that providing a variety of activities incorporating MI for students to choose helped the students to actively participate in the activities of the classroom.

**Snyder** (2000) conducted a study and found that the majority of high school students were tactile/kinaesthetic and global learners. The researcher concluded that an awareness of how students learn is in fact indispensable to successful classroom.

The results of **Campbell** and **Campbell’s** (1999) in-depth case study investigation of schools that had been implementing MI for at least five years,
found that students had made significant gains as measured by respected standardized tests, state assessment tests, and anecdotal comments from informed educators. Significantly, they also found that the disparity among white and minority student achievement was reduced or eliminated. Further they reported that half of the schools in their study were primarily motivated to adopt MI due to concerns for lagging student achievement.

**Eilers** et al. (1998) studied the loss of commitment to schoolwork exhibited by middle level students and the effect of a variety of strategies. They found a modest increase in student achievement, as well as increased confidence and self-image, as a result of MI activities.

**Smagorinsky** and **Coppock** (1995) conducted a study and found that the use of MI based instruction enabled the students to make sophisticated interpretations of literature.

3.1.2. Affective outcomes.

**Pociask** and **Settles** (2007) studied whether use of MI theory influenced student engagement and academics. Researchers found a dramatic decrease in inappropriate behaviours and an increase in students’ motivation towards learning, improved self-esteem, and higher retention rates. Parents reported that their children were more willing to share their learning experiences because of their improvement in the classroom.

The results of the study done by **Ozdemir** (2006) provided evidence that student learning is enhanced through MI instruction. The students were more involved during the instruction; they gained more insights, and self efficacy.
Haley (2004) reported that the teachers involved in the MI based second language action research study found that behaviour problems were minimised, and students in MI based classrooms reported a higher degree of satisfaction and more positive attitude towards their second language study, than those in the control groups.

Viens and Kallenbach (2004) also suggested that this practice helped students to identify effective learning strategies and were valuable for career exploration.

Kornhaber et al. (2004) analysed the Project SUMIT results and found that 81% of schools reported improvements in student discipline, 54% of the schools associating this improvement with MI. One primary school in a low socioeconomic area in the study reported a decrease of 50% in in-school suspension referrals. Latham (1997) argued that the reaction of students to an MI based curriculum and changes in teaching practices are of more significance.

Campbell and Campbell (1999), Emig (1997) Goodnough (2001), Lambert (1997), Simeone (1995), Smagorinsky (1995), Sweet (1998) and Weber (2005) reported that students participated more fully in class, and demonstrated improved confidence and a greater sense of competence, when they were given the opportunity to use their areas of strength.

Campbell and Campbell (1999), Kallenbach and Viens (2002), Lambert (1997) and Shearer (2004) in their studies suggested that teachers proposed the inclusion of MI theory as lesson content, and as a basis for students to reflect on and identify their own individual strengths, needs and preferences helped resistant students, and improved their sense of self-efficacy and career aspirations.
Bounds and Harrison (1997), Long and Bowen (1995) and Shearer (2004) suggested that providing students with the opportunity to reflect on their own intelligence profiles improved their self-understanding and a greater sense of control of their own learning, which in turn improved self-management.

Mettetal et al. (1997) investigated the impact of a MI curriculum in an elementary school and concluded that (a) students, teachers, and parents were very positive about the concept of multiple intelligences; (b) they were positive about school-wide implementation, including flow time, activity room, and enrichment clusters; and (c) classroom implementation of MI concepts was uneven across classrooms.

Campbell (1990) conducted a study on incorporating MI into a third grade classroom. The findings from the study showed an increase in student independence and a decrease in inappropriate skills and cooperation skills, leadership skills and student’s retention of material were improved. Campbell also reported that the teacher started working with students instead of for them and became a resource person instead of a guide or taskmaster for students.

3.1.3. Talent development.

Baum et al. (2005), Bounds and Harrison (1997), Campbell (1997), Campbell and Campbell (1999) suggested that teachers who were implementing MI based programmes noticed students exhibited special abilities in diverse areas. A variety of approaches were noted in the literature which included specific acceleration classes, in-school clubs, the provision of specific experiences, apprenticeships and mentoring programmes.
Kornhaber et al. (2004) reported that while many Project SUMIT schools emphasised the importance of learning in art as a separate discipline, the arts were also used as a means of developing students’ skills and understanding in other curricular areas. Teachers in Project SUMIT schools claimed that learning experiences that involved the arts powerfully engaged students.

3.2. Changes in Teaching Strategies

McCoog (2007) conducted a study and analyzed the changing environment of educational technology and the incorporation of the MI theory. The author explained and matched up each intelligence with an effective technology tool and provided examples from scholarly publications and actual classroom practice.

According to Ozdemir (2006) teachers need to incorporate more intelligences rather than traditional verbal linguistic and logical-mathematical.

Corley and Saldana (2005) suggested that teachers must make sure to tap into all of their students’ interests to ensure engagement and persistent learning. Once teachers know their different learner profiles, they are able to offer choices for demonstrating mastery.

According to Lombardo (2005) the ideal reading environment for a boy was with peers, through dancing, singing, and activities that satisfy the need to build and create. Song, role play, posters and bookmarks were also some techniques that students enjoy.

Glazer (2005) reported that encouraging students to write down what they were saying and feeling at any moment helped class discussions, as well as
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involving the class to make connections. These lead students to relate in and be in the part of the learning experiences.

Loori (2005) conducted a study and concluded that there were significant differences between males’ and females’ preferences of intelligences. Males preferred learning activities involving logical and mathematical intelligences, whereas females preferred learning activities involving intrapersonal intelligence.

Webber (2005), Karen (2001), Mckenzie (2002), Campbell (2003) and Ribot (2004) reported that MIA has been experimentally proved by various psycho-educational researchers as a strategy of instruction for the development of reflective thinking skills in varied educational set up. These studies showed that, there were much advantages in human personality by using MI in classrooms and in higher education such as students learned to ask researchable questions, identified varied resources, created realistic time lives, initiated and implemented learning activities, prepared students for their adult lives, interacting actively with the content and concepts they were studying, active in planning and assessing learning process, increased self-confidence and identified personal strengths.

Eisner (2004) suggested that MI theory based teaching helped the teachers to see children in a different light and they changed their ‘one size fits all’ mentality.

Shearer (2004) and Campbell and Campbell (1999) reported that teachers who understand and agree with MI theory believed that students are intellectually competent in multi-faceted ways. These teachers became astute observers of students, with the ability to adjust their instruction accordingly.
Shearer (2004) also claimed that teachers as well as students, benefited from completing their own MI profile, as this helped teachers to enhance relationships with students, and to develop empathy with students who are struggling.

Kallenbach and Viens (2004), Campbell (1997), Simeone (1995) and Smagorinsky (1995, 1996) found that multiple exit points allowed students to use their strengths to demonstrate their understanding of a topic.

Kornhaber et al. (2004) noted that when Project SUMIT schools began using MI, teachers were at first likely to try to adapt their work to fit with the theory. Within a couple of years, most schools reported that they rethought this approach, and began to use MI theory as a means to help diverse students achieve learning objectives. They also reported that in schools where MI theory is associated, a supportive and collaborative school culture was developed: Collaboration on the formal basis and also through informal basis.

According to Armstrong (2003) intrapersonal learning had a valuable role in the reading process. He proposed that phonics and blending be taught using comic strip words that contain emotional vitality such as, thud, bonk, and scrunch.

Stanford (2003) suggested that in the MI classroom, teachers continuously shifting teaching styles. They responded to individual needs and remembered that every child has a special ability. According to him using MI helped teachers to broaden their range of methods and techniques to reach a more diverse range of learners.
Uhlir (2003) found that the MI teaching strategies were used to increase reading achievement and reading skills. Reading centres were developed to use the MI to provide student choice and stimulate student motivation. Lesson plans were designed around the use of MI.

According to Kallenbach and Viens (2002), Bounds and Harrison (1997), Campbell (1997), Lambert (1997) and Weber (1998) MI based classrooms were using problem-based curricula and projects that simulate real world activities, and provided students with the opportunity to pursue independent projects of personal interest. Reports suggested that this approach made learning more authentic, meaningful and relevant to students, and promoted self-directed learning and the development of self-management skills.

Osciak and Milheim (2001) stated that utilizing the principles of MI theory and the dynamics of the internet allowed instructional designers to develop learning experiences that were diversified, exploratory, guided, and soundly constructed. They also argued that web-based instruction is a much flexible type of instruction on the basis of which all intelligences could be represented and cultivated regardless of the physical location of the student.

Goodnough (2001), Campbell and Campbell (1999), Emig (1997), Evans (1995), and Simeone (1995) reported that teachers used MI theory to plan multiple entry points into lesson content, thus enabling a wider range of students to access the knowledge, concepts and skills of the disciplines.

Armstrong (2000) demonstrated how a MI approach can take place informally in a traditional style class, where the teacher lectures with rhythmic emphasis (musical), draws pictures on the board to illustrate points (spatial), makes
dramatic gestures as she talks (bodily/kinaesthetic), pauses to give students time to reflect (intrapersonal), asks questions that invite spirited interaction (interpersonal), and includes references to nature in her lectures (naturalistic).

Campbell and Campbell (1999) agreed that MI approach to teaching and learning took many formats, and implemented in many different ways and at many different levels. Because MI is a construct about human intelligence, it does not mandate any prescriptive educational approach. They also proposed that in MI based classrooms, teachers’ beliefs about students’ abilities were made explicit, and communicated directly to the students themselves.

Bellanca (1997) and McCarthy (2000) agreed that MI practice is related to an active learning methodology. Campbell (2000) also concluded that active learning was one of the elements of successful MI Programs.

The research literature included numerous examples of MI theory being used as a framework for curriculum integration, with a view to providing a variety of learning activities relating to a central topic. These activities were designed to engage students’ different intelligences so that diverse students were able to access lesson content. However, while interdisciplinary integration is popular in the primary school setting (Campbell & Campbell, 1999), it is much less common in secondary schools due to the organisation of disciplines as separate and isolated identities (Weber, 1996). As an alternative, Weber (1996) suggested that MI based curriculum integration need not be interdisciplinary. Working within a discipline, the mandated curriculum can be organised around one central theme. Hearne and Stone (1995) pointed out that, unlike primary schools, secondary schools are in the position of having specialist teachers of art, music, drama, dance
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and physical education, who can help other teachers to integrate these disciplines into traditional academic subject areas.

Lazear (1991), Bellanca (1997) and Armstrong (2000) believed that any subject content can be taught with any of the intelligences and they used many of the same practical techniques, methods, tools and media for accessing the eight intelligences.

3.3. Changes in Assessment Practices

Sternberg (2008) in Assessing What Matters argued that conventional assessments do not meet the cognitive demands of the world today. WICS, an acronym for wisdom, intelligence, creativity and synthesis can provide a more meaningful model.

Stanford (2003) argued that journals, graphic organizers, checklists, rubrics, and portfolios are a great alternative assessment.

Chan (2003) assessed MI in a group of Chinese secondary school teachers in Hong Kong. As for teachers relative strengths in interpersonal and intrapersonal intelligences and weaknesses in visual/spatial and bodily/kinaesthetic intelligences were generally reported. Chan discussed the implications of the findings in light of the current Hong Kong education reform movement and the inadequacy of teacher education programs in Hong Kong.

According to Fasko (2001), Campbell and Campbell (1999), Gardner and Hatch (1990), Hearne and Stone (1995) in the MI context, assessment is viewed not just as an end-product, but also as an episode of learning. Teachers
often expressed frustration with the limited forms of recognition available to students in traditional curricula where linguistic and mathematical skills dominate.

**Supon** (1999) explained the use of the MI theory and rubric design to evaluate student learning. It is argued that weaving the MI into a rubric design provided the teachers with challenging and rewarding tools for assessing learners’ performance.

**Weber** (1996) and **Campbell and Campbell** (1999) argued that the diverse nature of MI based assessment, which included performance-based measures, traditional tests, feedback from numerous sources and active student self-assessment was useful.

**Eisner** (1999) proposed that performance-based assessment, which requires students to demonstrate their knowledge in different ways and ‘real-world’ contexts, better qualifies them to excel in real-life situations beyond school. (**Gauld,** (1996), **Weber** (1998, 1999). However, **Eisner** (1999) pointed out that performance assessment, while better providing for the assessment of individuals, does not provide global comparative data which enables schools, classrooms and students to be compared, which is a strong motive behind the standards movement.

**Kornhaber** (1999) investigated three alternative assessments for identifying students who were different in terms of their gift. Each of these assessments was based on the MI theory. Qualitative data were collected and it was found that no assessment met all eight criteria; each met a different subset of the eight.
Zessoules et al. (1988) reported that Arts PROPEL has developed a series of modules, or ‘domain projects,’ that served the goals of both curriculum and assessment. These projects featured sets of exercises and curriculum activities organized around a concept central to a specific artistic domain such as notation in music, character and dialogue in play writing, and graphic composition in the visual arts. Although the emphasis thus far had fallen on local classroom assessments, efforts were also under way to develop criteria whereby student accomplishment can be evaluated by external examiners.

According to Hatch and Gardner (1986), Malkus, Feldman and Gardner (1988), Wexler-Sherman, Feldman and Gardner (1988), Project Spectrum had developed a number of curriculum activities and assessment options suited to the child-centred structure of many preschools and kindergartens. There were fifteen different activities, each of which taped a particular intelligence or set of intelligences. Throughout the year, a Spectrum classroom is equipped with ‘intelligence-fair’ materials.

The research literature showed that as children do not learn in the same way, they cannot be assessed in a uniform fashion. Therefore, it is important that a teacher create an ‘intelligence profiles’ for each student. Knowing how each student learns will allow the teacher to properly assess the child’s progress. This individualized evaluation practice will allow a teacher to make more informed decisions on what to teach and how to present information (Lazear, 1992). Supporters of Gardner’s theory claimed that a better approach to assessment is to allow students to explain the material in their own ways using the different
intelligences. Preferred assessment methods include student portfolios, independent projects, student journals, and assigning creative tasks.

From the above reviewed literature it can be concluded that MI approach may provide a better opportunity for students to find out their dominant intelligence and utilize it throughout their learning. Some schools had applied MI theory to their curricula and had reported success in improving performance on achievement tests. MI informed classroom programmes were reported to provide students with options for learning and for demonstrating their knowledge, which are meaningful to both the student and the wider society. This is based on the belief that by providing diverse students with a choice of MI based learning activities; their constructive engagement in their learning is likely to be fostered. It is also suggested that these choices enable students to draw on a range of intelligences to build their understanding of lesson content.

3.4. Barriers to MI implementation

Cuban (2004) claimed that the MI theory had the greatest influence on educators’ beliefs and talked about differences in students’ intelligence, moderate to high influence on curricular and instructional materials, and least influence on mainstream teaching and assessment practices.

However, Kornhaber’s (2004) research challenged Cuban’s claim and argued that the extent to which change occurred was related to the kind of practice that existed in the school prior to the adoption of MI.

Shearer (2004) reported that lack of acceptance by teachers and administrators, who became cynical about too many passing fads in education
along with the lack of acceptance by students, particularly those who disengaged from the learning process, acted as barriers to MI implementation.

**Gardner** (2004) concluded from the research that students formed their own beliefs about the nature of secondary education and may felt that projects and ‘hands-on’ learning activities were condescending to their intelligence.

**Kornhaber** et al. (2004), **Campbell** and **Campbell** (1999), **Hoerr** (2000) and **Viens** and **Kallenbach** (2004) found that the extra workload and time commitment required in planning and implementing multi-modal lessons, as well as collaborative team-planning for school-wide or interdisciplinary programmes, was suggested as another reason for lack of acceptance by staff.

**Viens** and **Kallenbach** (2004) argued that if students understand the connection between MI-based activities and their learning goals, they are more likely to accept MI-informed approaches.

**Kornhaber** (2004) collated the results of various studies to reveal a well-defined set of reasons for the adoption of MI theory in both individual classroom and school-wide settings, including pre-schools, primary and secondary schools: (a) MI theory validates what educators already know; (b) MI theory complements educators’ existing philosophies and beliefs; (c) Educators already use some practices that fit with the theory; (d) MI theory provides a framework for organising educators’ practice and (e) Educators report that MI theory helps to extend their practice.

**Hyland** (2000) found that the easy introduction of MI in second level schools in Ireland was inhibited by several factors, such as the prevailing view of
intelligence, the influence of terminal examinations, rigid subject boundaries and short class periods.

On the other hand, Hanafin (2000), agreed with Fitz Gibbon, Fleischmann and McNiff (2000) that many external factors such as lack of planning time, dominance of traditional examinations, timetabling restrictions and lack of whole school support had negative impact on the introduction of MI into secondary schools, and identified that external factors were not really as significant as internal resistances in the minds of partners in education to the theory of MI. She believed that some, who may regard themselves as advocates of MI would still use phrases such as ‘weak pupils’ or ‘poorly motivated’, which showed that their mindsets have not yet fully accepted the theory of MI.

According to Campbell and Campbell (1999) insufficient emphasis was given in teacher training programmes to the philosophical and theoretical nature of intelligence and human potential by which teachers were left to create their own implicit beliefs about students’ learning potential which might be optimistic or pessimistic, they were usually unconscious, and might work against students’ welfare.

Eisner (1999) argued that criteria for admission to university, which were reflective of social class advantages, affected secondary school practices in the most conservative of ways, which created further barriers to MI implementation and other curriculum innovations.

Weber (1998), Viens and Kallenbach (2004) reported that coupled with the demands for curriculum coverage, and state assessment requirements, the literature suggested that teachers simply found it easier to continue prescriptive,
teacher-centred practices. Weber (1998) also argued that if teachers’ mental models of teaching and learning do not change, teaching strategies will ultimately end up as ‘business as usual.’

Weber (1998), Bolanos (1996), Campbell and Campbell (1999) and Kornhaber et al. (2004) proposed that the culture of the secondary school did not encourage or support teachers to raise critical questions or to seek quality responses. It has been found that prior to successful MI implementation, sufficient time and effort must be directed towards building staff understanding of MI theory and its implications for learning and teaching. Weber (1998) pointed out that changed attitudes usually precede reformed practices.

Smagorinsky (1995) argued that in the entrenched culture of the secondary school writing has established exclusive rights ‘as a unique mode of learning’ in the English/language arts classroom. Non-written interpretations of life and learning were not valued - another powerful barrier to MI implementation.

3.5. The Critic’s View of the Multiple Intelligences Theory

There are various criticisms of, and problems around, Gardner's conceptualization of multiple intelligences. Indeed, Gardner himself has listed some of the main issues and his responses (Gardner 1993, 1999). Gardner (2003) continues to cast further doubt in MI when he discussed how he came to name his theory, “I decided to call these faculties ‘multiple intelligence’ rather than abilities or gifts. This seemingly minor lexical substitution proved very important; I am quite confident that if I had written a book called ‘Seven Talents’ it would not have received the attention that Frames of Mind received.”
Gardner (1995b) admittedly avoided addressing criticism of his theory for nearly a decade after the publication of Frames of Mind. However, in a 1995 article that appeared in Phi Delta Kappan he responds to several “myths” about the MI Theory. These myths provided a summary of the major commentary on and criticism of Gardner's theory. The first myth is that if there are seven intelligences we must be able to measure them with seven specific tests. Gardner is vocal about his disdain for a singularly psychometric approach to measuring intelligence based on paper and pencil tests. Secondly, he responds to the belief that an intelligence is the same as a domain or a discipline. Gardner reiterates his definition of an intelligence and distinguishes it from a domain which he describes as a culturally relevant, organized set of activities characterized by a symbol system and a set of operations. For example, dance performance is a domain that relies on the use of bodily-kinaesthetic and musical intelligence (Gardner, 1995).

3.5.1. Criticism of MI within the field of psychology.

Morris (2008) gave a list of various established writers and professors with in the field of psychology that disagreed with Gardner’s MI theory that Gardner’s efforts (are seen) as often simply constructed efforts to represent a general framework, or taxonomy, and that Gardner ignores the evidence and does not deal well with the concept of ‘g’, or general intelligence. Nor do they feel that he deals with the view of mental ability held by the majority of working psychologists, namely the hierarchical model.

McGuiness (2007) pointed out that Gardner’s MI theory is not unique because other psychologists have ‘identified’ up to 150 intelligences. He discussed the findings of Guskin, Peng, & Simon (1992) in Gifted Child Quarterly which
showed that children who scored highly on one ‘intelligence’ tend to score highly on some others: this is exactly what you would expect if there was some kind of ‘general’ intelligence and is what you would not expect if these ‘intelligences’ were all separate and distinct.

Willingham (2004) discussed the fact that a massive review, by John Carroll, published data collected over the course of 60 years from 130,000 people around the world, supported a hierarchical model. He also discussed that Gardner’s MI theory can not be a valid theory of intelligence. He pointed out that the past 100 years of data consistently showed that performances on intellectual tests are correlated. Therefore, if ‘g’ doesn’t exist then Gardner needs to, in some way, account for performances on intellectual tasks being correlated. His main complaint concerning Gardner’s criteria was that many of the separate intelligences share many of the same cognitive processes, which by Gardner’s criteria, are often considered separate intelligences. Moreover, Willingham stated that by using Gardner’s identification process, argument could be made that there is humor intelligence, memory intelligence, an olfactory intelligence, a spelling intelligence, etc.

Carson (2003) answered the question of why Gardner’s MI theory had little impact on psychology. Carson discussed five specific points: “he has ignored almost all research and theory contributed by vocational psychologists; despite all the books, there has yet been relatively few serious, empirical, theory-testing publications of MI theory; he tends to make broad claims about how his MI theory makes sense and seems to imply that competing theories and (theories of ‘g’ in particular) are lacking in substance…this despite decades of empirical research
supporting the latter; he almost never collaborates or interacts with other psychologists; and he seems romantically inclined rather than philosophically inclined.”

According to Traub (1999) Gardner’s MI theory is based on the premise of a modular picture of the brain particularly that, mental activities are parcelled out into various regions of the brain, and are more autonomous from one another than previously thought. But, one of the biggest criticism of MI by psychometricians that Gardner has not conducted any empirical research to test that his ‘intelligences’ are indeed autonomous faculties, opposed to what most neuroscientists continue to believe in the central processing capacity, which has traditionally been called ‘general intelligence’ or ‘g.’

Eyesenck (1999) argued that assuming a relationship between cognitive performance and brain damage may be unwarranted. He claimed that some of the impact of brain damage on cognitive functioning may be camouflaged because patients develop compensatory strategies, designed to help them cope with their brain damage which suggested that each side (of the brain) may have a dormant capacity to assume functions of the other. This idea of compensation and/or transfer challenged Gardner's idea of an intelligence being situated in a specific area of the brain.

White (1998) made the same argument as Willingham concerning Gardner’s criteria for categorizing intelligence. Having challenged Gardner's idea of symbols, White used his own inability to find symbols in the Interpersonal intelligence as a basis for questioning the interpersonal as an intelligence. He further queried why having established eight criteria for inclusion as an
intelligence, that Gardner later concedes that if an ‘intelligence’ satisfies the majority of the criteria that it can be included as an intelligence.

Neither did Sternberg (1999) found Gardner’s criteria for defining intelligences satisfactory. He argued in favour of using the word ‘talents’ rather than the word ‘intelligences’. He asked why Gardner includes some human abilities as intelligences and omits other human abilities. Sternberg calls the MI model ‘a theory of talents, not one of intelligences’.

According to Morgan (1996) the fundamental criticism of MI theory was the belief by scholars that each of the seven multiple intelligences are in fact a cognitive style rather than a stand-alone construct. Morgan referred to Gardner's approach of describing the nature of each intelligence with terms such as abilities, sensitivities, skills and abilities as evidence of the fact that the ‘theory’ is really a matter of semantics rather than new thinking on multiple constructs of intelligence and resembles earlier work by factor theorists of intelligence like Thurstone (1938) who argued that a single factor (g) cannot explain the complexity of human intellectual activity.

Ceci (1996) a developmental psychologist at Cornell, also questioned the validity of Gardner's theory and its lack of supporting scientific data and he pointed out that Gardner's approach of constructing criteria and then running candidate intelligences through them, while suggestive, provided no hard evidence that his colleagues could evaluate.

Carroll (1993) found it interesting that the kinds of intelligences described by Gardner show a fairly close correspondence with the broad domains of ability as suggested by Raymond Cattell and John Horn. For example, Carroll believed
that Gardner's linguistic intelligence corresponds closely to the concepts of Cattell and Horn's crystallized intelligence. Carroll also viewed Gardner's logical-mathematical and visual-spatial intelligence suspiciously similar to the concept of fluid intelligence and visual perception, respectively.

Brody (1992) argued that Gardner's list of intelligences is arbitrary and that his attempt to restructure the theory of intelligence to omit a general factor is no more successful. Moreover, Brody had problems with Gardner's evidence of the independence of intelligences resulting from Gardner's study of 'rare' cases of prodigies and savants. He argued that the independent functioning of intelligences following brain damage may be of little relevance to understand the performance of intact individuals.

3.5.2. Criticism of MI in educational practice.

Blumenfeld (2009) used the bodily-kinaesthetic intelligence as the point of critique. The author provided a detailed discussion of the act of dancing as counterpoint to Gardner's understanding of the intelligence. The author critique Gardner's exemplar and evolutionary criteria as inadequately conceptualized. Finally, he argued for a more democratic approach to educating for the intelligence and a specific form of dance to best fulfil those educational prospects of dance.

McEwan-Adkins (2008) stressed that categorizing children and then prescribe something for them based on this categorization is very dangerous, especially when a child is a low-performing child. Adkins asked the big question if one adopts the MI theory, 'Do you play to the child’s strengths or to a child’s weaknesses?’
Henry (2007) reported that Greenfield, the director of the Royal Institute and professor of pharmacology at Oxford University stated that the method of classifying pupils on the basis of ‘learning styles’ is a waste of valuable time and resources and Frank Coffield, a professor at London University’s institute of education, who reviewed 13 models of learning styles, insisted that the approach is theoretically incoherent and confused.

Willingham (2004) summed up Gardner’s view, ‘the individual low in logic- mathematical intelligence but high in musical intelligence cannot somehow substitute the latter for the former and understand math through music...but the musically minded student must eventually use the appropriate representation to understand math.’ He discussed how Gardner wrote the preface to Thomas Armstrong’s book, Multiple Intelligences in the Classroom. But, Gardner has also expressed concern that some educators have shallow understanding of what it takes to really engage intelligence. Gardner wrote, “It well may be easier to remember a list if one sings it (or dances to it). However, these uses of the ‘materials’ of an intelligence are essentially trivial.” Gardner’s contradictions are hard to understand. Gardner’s lack of application has led to, Gardner himself, criticizing how his MI theory is being applied in the classroom, while at the same time supporting these independent educationalists pushing MI in classroom pedagogy.

Traub (1998) discussed Gardner as a moral philosopher and reformer. MI legitimizes the fad for ‘self-esteem,’ the unwillingness to make even elementary distinctions of value.

McNerney (1999) reiterated Traub’s notions of Gardner in his critic. McNerney stated that MI creates a desired result for all stakeholders, namely that
every student or parent’s child is intelligent. McNerney stated, parents, teachers, and students are all presented with a win-win situation. Self-esteem is guaranteed.

Stahl (1999) discussed the fact that finding out what student’s learning styles are or which ‘intelligences’ they have and then matching instructional methods to them, has absolutely no effect on their learning.

Traub (1999) criticised Gardner, in his defence of MI, has become a “prominent spokesman for progressive education generally... and he favours a highly individualized ‘child-centred’ pedagogy.” Traub then pointed out that Gardner has become a moral philosopher and “wants to change the way we measure human worth... (and are) moving into a world where a different, and broader, set of human attributes will be prized.”

According to Collins (1998) Gardner and other researchers said that it is not necessary to have empirical confirmation of the MI theory as long as its implication can show good results in the classroom. The problem is Gardner has never laid down a detailed plan for applying his theory in schools, and the consultants and publishers who offer training in MI operate independently of him.

For over ten years after proposing the theory of MI, Gardner did not involve himself with MI practice in schools. Levin (1994) criticized Gardner for not offering a clear program for educators to use in implementing MI theory in everyday classroom conditions, but Gardner (1995b) counter argued by stating that the practitioners of Piaget's and Dewey's theories had little guidance from their originators. He also says that it would be impossible for him to try to control how his theory would be used. It is not possible or appropriate for the originator of a theory to attempt to control the ways in which it is used.
**Gardner** (2004) cautions that misinterpretation of MI theory can lead to MI based lessons scoring higher on the enjoyment dimension than on the dimension of complex thought processes. When MI becomes the goal, rather than the means to help achieve educational goals, teachers may include superficial intelligence-based activities which water down standards, rather than enabling richer learning across the student population. This is a common criticism of MI theory (Fasko 2001; Kornhaber et al., 2004).

The expectations of teachers, who adopt Gardner's non-hierarchical view of MI differ in nature from those of teachers, who view intelligence as a single, general capacity that every human being possesses to a greater or lesser extent (Gardner 1993a). Teachers, who adopt Gardner's view of intelligence, accepted that each student has an individual profile of MI, which has the potential to be fully developed.

Nonetheless, Gardner advocated for a whole school approach to the introduction of an MI teaching and learning environment in a school. His description (1993b) of a MI school described a very utopian situation, where education is individually configured for each student.

**Conclusion**

The above reviewed literature and studies supported and also criticized the claim that MI theory is associated with a number of positive outcomes in the secondary school setting.
(a) The positive outcomes are:

1. For Students

   (a) Improved academic outcomes, including for minority students and students with learning disabilities.
   
   (b) Improved student motivation and participation.
   
   (c) Improved self-confidence, self-efficacy and self-management.

2. For Teachers

   (a) Positive influence on teachers’ beliefs about intelligence, instruction and student achievement.
   
   (b) Enhanced student/teacher relationships.
   
   (c) Change from teacher-centred to student-centred practices.
   
   (d) MI theory organises and extends teachers’ practice.

3. For Schools

   (a) Development of a supportive school culture.
   
   (b) Improved parental participation.

(b) Powerful barriers:

The literature identified a number of powerful barriers which may explain the low levels of MI implementation at secondary school level. These barriers fall into two main categories:

   (a) Entrenched structures, hierarchies and cultures.
(b) Insufficient emphasis given to the philosophical and theoretical nature of intelligence and human learning potential, both in pre-service training, and within the school setting.

(c) Critic's view within the field of psychology and education:

According to Morgan, (1996) identifying the various abilities and developing a theory that supports the many factors of intelligence has been a significant contribution to the field.

Gardner (1995) staunchly defended the empiricism of the theory by referring to the numerous laboratory and field data that contributed to its development and the ongoing re-conceptualization of the theory based on new scientific data. Regarding the claim that MI theory cannot accommodate ‘g’, Gardner argues that ‘g’ has a scientific place in intelligence theory but that he is interested in understanding intellectual processes that are not explained by ‘g’. In response to the criticism that MI theory is incompatible with genetic or environmental accounts of the nature of intelligence, Gardner states that his theory is most concerned with the interaction between genetics and the environment in understanding intelligence.

Finally, the notion that MI theory has expanded the definition of intelligence beyond utility produces a strong reaction from Gardner. He argues passionately that the narrow definition of intelligence as equal to scholastic performance is simply too constrictive. In his view, MI theory is about the intellectual and cognitive aspects of the human mind. Gardner is careful to point out that MI theory is not a theory of personality, morality, motivation, or any other psychological construct (Gardner, 1995, 1999a, 1999b).
Creating and delivering classroom programmes is a complex and creative process. Experienced teachers can draw on many different teaching strategies and approaches, which mean it is difficult to make valid or reliable judgments about a particular pedagogical model (Alton-Lee, 2003). The fact that MI theory is only one of many influences on teaching practice must be kept in mind when considering this review of the research literature. Criticisms of the statistical basis of these findings included in the review are acknowledged. Most of these investigations did not include control groups for comparison, although the very complexity of the learning/teaching process may in fact make the use of control groups questionable.

Many of the findings included in this review were from single case studies or action research projects. While the sample size in these studies may be small, they provide rich detail about the complexities of the learning and teaching process in diverse contexts which have valid implications for teaching practice. In terms of research quality, the consistency of the findings across the literature gives an indication of their validity.

This literature review discussed positive outcomes of the MI theory as well as critic’s view within the field of psychology and education. This review of the literature has provided clear justification for undertaking this study and has also established important background understandings which helped to frame the overall research design.