This chapter will outline the basic elements of Teaching for Understanding and Multiple Intelligences Theory. These theories serve SOTL well and will be drawn upon in the analysis of the data contained in the thesis. Both theories emphasise the importance of flexibility and variety in teaching and these are key to good teaching practice when teaching students with disabilities.

A performance of understanding

Project Zero at Harvard University has set up many research projects to help understand and enhance learning at all levels. These projects include a strand of research called Teaching for Understanding. The TFU framework was developed from research at Harvard and took place between 1988 and 1995 in collaboration between a group of researchers and several teaching settings outside the college. Understanding a topic was defined in terms of being able to perform flexibly with the topic and being able to explain, relate and apply the knowledge concerned (McCarthy, 2011, 52).

Perkins highlighted the lack of real understanding taking place in teaching and learning in both the humanities and the Sciences (Perkins, 1993, 30). He promoted a performance view of understanding which reflects the general spirit of a constructivist approach to teaching. By putting a performance spin on a constructivist approach to learning he claimed that to understand knowledge fully cannot mean that the learner understands the knowledge in a representational way, but that the learner must be able to perform or play with the knowledge freely and easily. Perkins describes this as understanding performances or a performance of understanding (Perkins, 32, 33). Perkins claims that most classroom activities are too routine to be understanding performances and though these activities have their own role to play they are not
performances of understanding. They do not enhance understanding in the student and take the learner beyond what he already knows.

The mainstay of learning must therefore be actively engaging with the topic, in a way that involves reflective thought and feedback. It is important to be able to think in different ways with the knowledge and be able to apply the knowledge to different situations. Perkins highlights that this does not happen on its own, but takes careful planning and thought. Engagement with the knowledge must involve guided performances with regular feedback to ensure real understanding can take place.

The elements of TFU

How does a college teacher ensure that teaching for understanding is taking place in His/her classroom? Research at Harvard has demonstrated that it is important that a TFU approach contain four key elements (McCarthy, 2011, 76-89):

1) Firstly, the teacher must decide what topics are worth learning. Generative topics are topics which generate knowledge about the course or module. These consist of concepts and themes that help students acquire a significant understanding of the topic. It is important that generative topics be central to the discipline, interesting to students, accessible to students via a variety of entry points and suitable for multiple connections with other topics on the course.

2) Secondly, the learning must take place over an extended period of time in which it is possible to set specific goals. It is good that these goals be centred around carefully drawn questions, which can help retain focus if repeated occasionally throughout the learning period. Goals need also be explained or presented to students in an unambiguous fashion in which no confusion is caused for the student.
3) Thirdly, it is key that the teacher employs teaching methods that promote a performance view of understanding in the classroom. This ensures that students are given opportunities to perform with and apply their newly acquired knowledge. In turn this provides opportunities to allow students to demonstrate and develop their understanding of the subject. The actions of doing and thinking ensure a solid grounding and clear understanding of the knowledge concerned. It must be kept in mind, however, that the performance tasks chosen reflect the short term or long term goals of the module or course. These activities also provide evidence of the students learning and promote a SOTL approach in which the success of particular teaching methods can be analysed and measured.

4) The fourth element demands that assessment take place throughout the learning period and not just at the end of the module or course. Formative as well as summative assessment is crucial to inform the teacher of a student’s progress and also to provide the student with an opportunity to reflect upon their learning. Formative assessment is where performances of understanding can be measured and provides the opportunity for intervention should it be necessary. Peer assessment or self assessment can also be used once clear criteria of assessment are laid down and this helps take undue pressure off the teacher. If the TFU classroom includes regular formative assessment it will also open the door to a SOTL approach to learning by providing opportunities to investigate the learning process.

**Dimensions of understanding**

The teaching for understanding model insists on four different dimensions of understanding within a discipline if a performance view of understanding is to take place and these dimensions are *knowledge, methods, purposes and forms*. These four dimensions are important in the understanding of a discipline. The *knowledge* dimension involves assessing where the student is and being aware that students come from different backgrounds with different assumptions. Some of these will conflict with the discipline and disciplinary knowledge needs, therefore, to be
modelled and provided if the student is going to perform with the knowledge. The methods dimension involves opportunities to discuss and test knowledge. The teacher uses various methods of encouraging students to discuss, question and analyse knowledge in a new and more systematic way. This involves rational methods and careful dialogue. The purposes dimension opens a student’s eyes to how the knowledge of a discipline is applied in the world. This encourages a student to see how knowledge is created, how to take ownership of knowledge and how to apply it in a practical way to all sorts of issues. The forms dimension relates to the forms in which knowledge of a discipline is presented. Knowledge can be presented in many ways for many reasons and it is important to be familiar with the forms and how they can be drawn upon and applied within a discipline. The forms chosen will be determined by the particular performance of knowledge taking place. (McCarthy, 2011, 91-95)

Levels of understanding

Each student is at a different place in the learning journey and the research team at Harvard suggest four different levels of understanding. These are naive, novice, apprentice and master. The naive level of learning is based on intuition and it would be usual that a student’s sharing of knowledge occurs in an unreflective and non thoughtful manner in which no ownership of the knowledge is evident. The novice level turns to the discipline, but rather than drawing upon discipline criteria to support argument, external sources of authority are used. Common and more familiar concepts of the discipline are drawn upon and presented in a step by step manner. At the apprentice level a student is capable of employing concepts and ideas from the discipline in a flexible, imaginative and complex manner. With guided support a student at this level will also demonstrate their ability to relate and apply knowledge to everyday life and events. Students at the master level demonstrate integrative, creative and critical thinking. Complex knowledge is manipulated and conflicting theories can be handled successfully as the student uses the knowledge of the discipline to interpret and address the world about them. The resulting outcomes can be presented in creative and imaginative ways. (McCarthy, 2011, 95-98)
The different elements of teaching and learning provided by TFU help break up teaching into its constituent parts and provide teachers with a method of looking more carefully at their teaching. The four dimensions of knowledge and the four levels of understanding provide the structural tools to enable teachers to facilitate a performance of understanding to encourage a student to view and apply the knowledge of the discipline to the world around them. The method also provides for a SOTL approach to teaching and learning as it presents important opportunities to investigate one’s teaching.

**Multiple intelligences theory**

Howard Gardner developed multiple intelligences theory in a move which both challenged and rejected the accepted assumption that intelligence consisted of a single general intelligence which could be measured in an IQ test. The theory also challenged the assumption that a person was born with a certain level of intelligence which remained static throughout their lives (Gardner, 1983; McCarthy, 2011, 103). At a time when Howard Gardner was working with some brain damaged adults and some gifted children he became acutely aware that people have a wide range of capacities and a person’s ability in one area does not ensure an ability in other areas. Some students can be very capable in one area of study such as music and may have difficulties in another area such as technical drawing. Gardner, therefore, perceived the brain not as an instrument having one general ability, but as having a whole range of individual capacities working in unison and interacting together in a non-predictable way (Gardner, 2009, 3-5; McCarthy, 2011, 106-7).

In defining intelligence Gardner moved away from the assumption of a general intelligence and instead asked what are the mental abilities that support the wide range of adult roles found over time and across cultures? This definition looked at the culture of a people and the everyday skills and demands from the society that created this culture, and defined intelligence in these terms. This looked at the intelligence of everyday life and unlike conventional opinions on intelligence did not look at problem solving skills alone, but also the skills required to build and create. Gardner’s final definition of intelligence is as follows:
The bio-psychological potential to process information that can be activated in a cultural setting to solve a problem or fashion a product that is valued in one or more community or cultural settings. (McCarthy, 2011, 108-9)

In setting criteria to identify the intelligences Gardner turned to several disciplines including psychology, neurology, biology, sociology, anthropology and the arts and humanities. Before attempting to identify the intelligences Gardner was stringent to set clear empirical criteria by drawing on these disciplines, the details of which will not be discussed here. The eight intelligences finally identified by Gardner are as follows: logical/mathematical, visual/spatial, bodily/kinaesthetic, musical, interpersonal, intrapersonal and naturalist. A ninth intelligence, described as existential intelligence, is currently being considered as being a separate intelligence also (Gardner, 2009, 5-6; McCarthy, 2011, 110-117).

**MI and teaching**

When Gardner published his *Frames of Mind (Gardner, 1983)* and first shared his theory with the world it began to attract great attention from educationalists. Though published as a psychological theory its impact upon education was to be far greater than its impact upon psychology (Gardner, 2009, 6-7). The MI meme or way of approaching intelligence began to work its way into many educational cultures and has impacted educational policy in a variety of ways in a variety of settings (Kornhaber, 2009). Different educational cultures and settings approached the MI meme according to their background and readiness to accept new ways of thinking (Chen, 2009, 386-96). However, Gardner did feel it was important to dispel common misunderstandings taking place in education with regard to MI theory by pointing out that an intelligence is not a learning style. Styles are the ways in which a student may approach different tasks whereas an intelligence is a computational capacity whose strength varies across individuals. Neither is an intelligence a domain or discipline, as a discipline is a social construct. Various intelligences can be employed in a number of disciplines and strength in a particular
intelligence does not determine what discipline it will be used in. Neither does a level of strength in an intelligence remain static, but can be developed depending on character and learning environment. A person should never be described in terms of a particular intelligence. We all share the whole spectrum of intelligences and intellectual strengths change over time depending on experience and practice (Gardner, 2009, 7-8).

Multiple intelligences theory does not provide or suggest any set method of teaching, but is rather a set of tools or a mindset that a teacher can draw upon. These tools provide several entry points to learning for the teacher in which a curriculum and its delivery can better reach a wider range of students in the classroom. Different students learn in different ways and a teacher is required to adopt variety of entry points to learning if the widest range of students is to be reached. A teacher cannot be sure that a set teaching method or style is going to achieve this, but needs to be willing to experiment in order to see what is working best to reach as many students as possible. An awareness of MI and a variety of entry points to a topic is, therefore, best employed if a teacher is not to cater for students strong in logic and linguistic intelligence only. It is also important that a teacher remain conscious that a student’s understanding of the key concepts is more important than the amount of material covered, as this alone ensures true understanding of a topic (McCarthy, 2011, 119-23).

After twenty years of studying the educational impact of MI theory upon education Howard Gardner felt that two impacts were of the greatest importance (Gardner, 2009, 9). Firstly, teachers should take differences in students seriously and craft their teaching to ensure optimal learning opportunity for each student. It is also worth noting that Gardner also points out that technology can play an important role in making this challenge possible. Secondly, any skill or concept of significance should be thought in a variety of ways. Such teaching methods should address different intelligences or combinations of intelligences. This has the positive impact of ensuring that a variety of approaches will reach a variety of students and also provides for a deeper more rounded understanding of a topic. Also, if a student can think of a topic in several ways they demonstrate a true understanding of that topic.
MI and students with disabilities

Kornhaber has claimed that as an instrument of policy, when soundly implemented, MI acts as an agent of cognitive equity enabling diverse groups to use their minds well (Kornhaber, 2009, 375). It ensures the development and expression of ideas by groups that otherwise may not be heard. In educating children with disabilities teachers who have adopted an MI approach to teaching have moved away from a deficit approach to their students and become more positive in recognizing a wider range of learning potentials. This has been confirmed in evidence relating to teaching children with disabilities in Australian schools (Vialle, 2009). Teachers who have adopted an MI approach have claimed that they examine their students more closely and look for the student’s strengths rather than responding automatically to a student’s deficits.

This thesis looks at what student interviews reveal about the factors that create an inclusive learning experience for students with disabilities. During this process the thesis will draw upon the TFU model and MI theory during the analysis of the data. While creating a more positive learning experience for all students it is expected to identify ways in which an MI approach within the pedagogical framework of teaching for understanding can also enhance the learning experience of students with disabilities. Within this context and within the context of research discussed in the literature review recommendations will be suggested to facilitate a performance of understanding for all students.