# Chapter 2 - Literature Review

## 2.1 Introduction

In an attempt to find answers to the research topic that states:

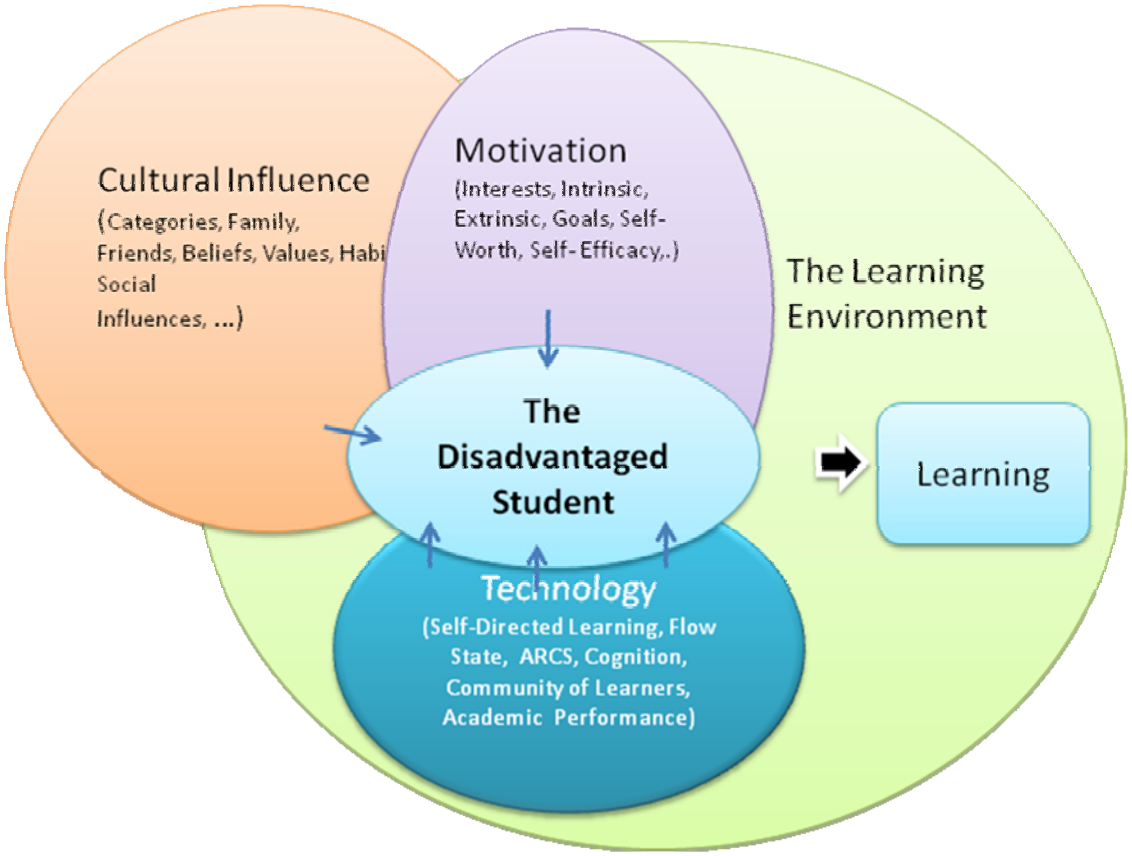
***The role of Information and Communication Technology (ICT) in a higher education institution: with specific reference to disadvantaged students, cultural aspects and motivation,***

the literature review examines the three inter-related variables that constitute the main focus areas in this study. First among these is **culture**—where the student comes from and his/her character, habits and traits are formed. Second, is **motivation** for learning, which, in this study, is assumed to be influenced by the student's culture. The third variable is the student's response to technology. Here, the perceived role of technology is examined to see if it does indeed act as a motivational tool and assists in the learning environment.

In Figure 2.1, below, I show how these three variables may influence the learning environment that surrounds the disadvantage student. The statement by Moos and Azevedo (2009, p. 578) summarizes the concept when they say "student's behaviour is based on the interaction between personal factors and the learning environment". One of the educational theories that this study aims to test is the notion that the students that come from a disadvantaged background will have a level of receptivity towards the educational environment that is influenced by his/her particular cultural background. The assumption is that it is the cultural background that to a large extent provides the reservoir from which the student draws his/her motivation, encouragement, hopes, direction and steadfastness in his/her course of study. A key component for success is the students' level of motivation, which is also developed and nurtured in the cultural setting that he/she grows up. An inevitable variable in a higher education environment, these days, is technology that a student typically has access to when he/she first starts his/her studies. A notion that is the subject of scrutiny in this study is to

measure how the cultural and motivational variables affect the use of technology and therefore learning.

Figure 2.1- Learning environment is influenced by cultural, motivational and technological elements.




Our understanding of students' source of success for academic achievement has moderated from the traditional way of thinking of intelligence as being the main contributor for success to a host of other possible contributors, with emphasis on "students' orientation and consequent motivation" (Beard and Senior, 1980, p. 20). However, since at least the 1980s there has been a sustained research focus on how motivational and cognitive factors interact and jointly influence student learning and achievement. In more colloquial terms, there is recognition that students need both the cognitive skill and the motivational will to do well in school (Linnenbrink and Pintrich, 2002, p. 1).

In the next section, I introduce some of these ideas, starting with my findings on culture and how it relates to motivation.

## 2.2 Cultural Influence on the Learning Environment

In this section of the literature survey, the influences that one's cultural background might have on one's motivation in general and motivation for learning, in particular, is explored. In relation to the disadvantaged students, I look to the literature to find if there is any evidence that students' motivation for learning is affected by their cultural background. An analysis of some early pioneering work is followed by a definition of culture and the subsequent development.

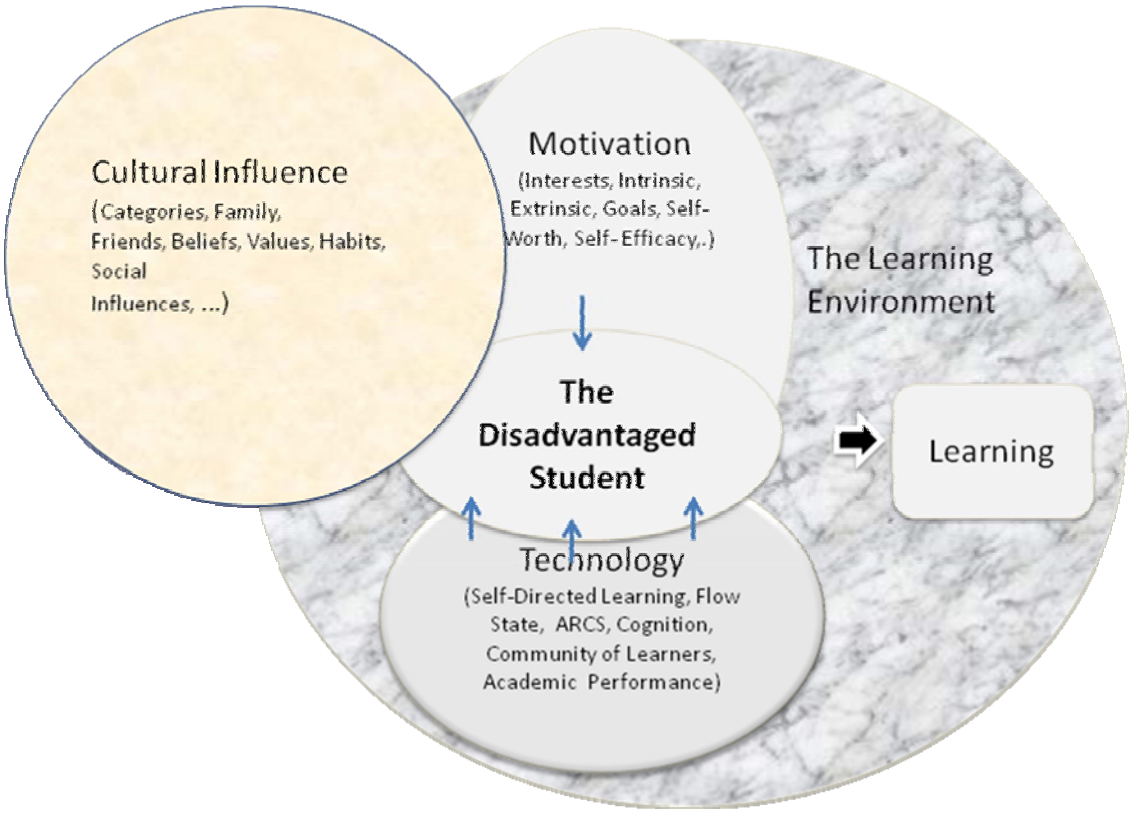
Figure 2.2 below, depicts how disadvantaged students' cultural background has a bearing on their motivation and therefore affects their overall educational experience. In particular, the literature survey will, in this section, focus on answering the following research questions,

**Does culture influence motivation and academic performance?**

**Do family and friends play a role in motivating ICT use and thereby influence academic results?**

**If so what is the implication for ICT service delivery in an educational environment?**

Figure - 2.2 – Depicts Cultural Influence on Student's Learning




## 2.2.1 Background

The question that has bedevilled minds from time immemorial is how and why individuals become motivated to do something and what their source of motivation is. In the computer laboratories at the University of Limpopo, where I have often taken the University's guests to observe, one sees a feature of this phenomenon, where dozens of students are seen sitting quietly behind the computers eagerly studying. One factor that is gaining momentum and is the focus of this study is one's cultural roots, i.e., to consider an individual's interest/motivation in a particular phenomenon one needs to examine the individual's upbringing and related social and cultural elements to find answers. This section looks for clues in the literature for possible answers.

Much of the research conducted in recent decades shows that learning is influenced by a student's culture and personality (McClelland, Atkinson, Clark and Lowell,1976; Anderman and Anderman, 1999; Nelson, O'Mara, McInerney and Dowson, 2006; Ramburuth and McCromick, 2001; Niles, 1995; Kennedy, 2002, Hwang and Kim,2007, Alavi, Kayworth and Leidner, 2006, Diamant, Fussell and Fen-ly, 2008, Moos and Azevedo, 2009). It should be noted that there are exceptions to this view and some studies have shown motivation to be independent of ethnic background (Passey, Rogers, Machell, McHugh, 2004).

### 2.2.2 Definition and Categorization

Hofstede (1980, p. 43) defined culture as the collective mental programming of the people in an environment. More recently, Goold, Craig and Coldwell (2007, p. 166) repeat an earlier definition that describes culture as 'that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society'. The implication of this is that the environment creates its own set of values and beliefs which, in turn, have a bearing on the individual members' motivational levels. Culture may affect not only the type of information provided by the various sources but also which information is selected and how it is weighed and integrated in people's self-efficacy judgments (Oettingen,1997, p. 151). Hofstede (1991, p. 14), in his study of different cultures, outlines four different categories of culture: individualism/collectivism, power distance, uncertainty avoidance and masculinity/femininity. In each of these categories the value system of an individual is affected by the culture of the environment. Of these categories, individualism/collectivism is of central interest in this study, as there seems to be a collective approach amongst students in almost all projects. Individualism pertains to societies in which the ties between individuals are loose. Collectivism pertains to societies in which people are integrated from birth into strong, cohesive "in-groups", which, throughout people's lifetimes, continue to protect them in exchange for unquestioned loyalty (Hofstede, 1991, p. 51). It would be

interesting to see if UL students' apparent display of this cultural attribute influences academic performance.

### 2.2.3 Cultural Influence on Motivation

A pioneer in the field to help with the question of, "**Does culture influence motivation and therefore academic performance?"** is McClelland (Maehr, 2008, p. 917, McClelland 1961) who examined extensively various factors that might have contributed to the economic prosperity of various people throughout history. Because of his prominent position in the field, his ideas deserve special attention.

McClelland examined race (1961, pp. 5–6), as an example, and found that the same people who were once prosperous, lost their advantage at another period in history. He examined climate (p. 6) and favourable weather and found that two almost geographically identical regions do not demonstrate any similarity in terms of economic success. His long search brought him to the conclusion that the main factor in success must be an achievement motive which he found is rooted in the religious (p. 406), moral and cultural beliefs of a given people that are initially developed during child-rearing practices in the family (p. 391) and that this translates itself into achievement motivation that drives them to economic success.

Subsequent developments have expanded this idea. More recently, writers have come to acknowledge that achievement motivation is not a universal construct and that motivation in a cultural context is multidimensional (Niles 1995, p. 369). In a study that Niles conducted, he demonstrated that "there are some similarities and differences between cultures in what motivates students and how they approach learning." McClelland's ideas were challenged by those who redefined achievement in the context of the same culture into three sub-groups: "ability orientated, task orientated and social-approval-orientated motivations" (Niles, 1995, p. 370).

### 2.2.4 Influence based on Family, Friends and Society

In this section, I document the role and influence that family, friends and society in general, as critical components of a culture, might have on motivation for learning. In this context, and in this study, "social" and "cultural" influences are interchangeable terms.

In response to the question of 'where does one finds the desire to study?', literature is clear on a host of contributors. Firstly, Mansfield explains that, social goals, such as relationships, responsibility and status, have been shown to influence students' motivation and engagement in learning contexts (2007, p. 2). However, social goals find their root in the family. Bread and Senior (1980, p. 4) record similar findings with special influence contributed from mothers, fathers and families in determining the levels of need for achievement motivation. Bandura, Bakbaranelli, Capraba and Pastorelli (1996, p. 1206) found that parents' sense of academic efficacy and aspirations for their children were linked to their children's scholastic achievement through their perceived academic capabilities and aspirations. Similar findings have been reported elsewhere (McClelland, Atkinson, Clark and Lowell, 1976; Covington, 1998, pp. 47–48; Bandura, 1997; Weaver, 2000).

It must be noted that culture, in an environment, reflects the values, habits and standards that families of that culture hold. Much of what has been said about the family in terms of its influence on motivation can also be said about culture, since family values and traditions are rooted in the culture they come from and vice versa. Parents of success-orientated children play a key role in cultivating the essential element for achievement motivation by the way they encourage, nurture, reward and punish their children as they grow up (Covington, 1998, p. 47–48). In fact, there is a direct correlation between students' academic performance and their parents' level of education (Weaver, 2000, p. 121). On

the other hand, the main contributor to low academic performance and high dropout rates amongst some ethnic groups is their cultural background that inculcates values that are not conducive to high achievement in the minds and hearts of children (Covington, 1998, p. 44–47). Weaver's conclusion regarding the need for achievement was that "scholars have moved, initially, from viewing ethnic differences in achievement motivation as matter of inferiority of some groups, and superiority for other, to seeing the issue in terms of diversity." While this view is fundamentally agreed upon by most, it does not adequately emphasize how this diversity needs to be accommodated in educational approaches for an effective response. Maslow (1970, p. 22) examines the same concept in a slightly different dimension. "There is now sufficient anthropological evidence to indicate that the fundamental or ultimate desires of all human beings do not differ nearly as much as do their conscious everyday desires. The main reason for this is that two different cultures may provide two completely different ways of satisfying a particular desire." In other words, human beings have similar desires, such as wanting to be loved, but, depending on one's cultural background, manner and values, this desire manifests itself differently. It is in these manifestations, which are often different in different cultures that we look for the source of motivation.

### 2.2.5 Implication for the Learning Environment

Covington (1998, p. 44) in his study of motivation concluded that investigators paid little attention to the contribution of ethnic differences in determining achievement motivation. However, from the late 1970s onwards, Covington says there is more awareness of the role that cultural background plays in determining one's level of achievement motivation. For example, he believes that words such as "independence", "competition" and "hard work" are closely associated with notions of success among white Americans and West Germans. Instead, words such as "family", "cooperation", and "tradition" have more association with success in young black Americans. His conclusion is that "we must arrange

school learning so that it encourages more varied achievement goals than the narrow set of values often associated with competitive excellence and high standardized test scores at all costs." Covington further emphasizes the fact that, in the process of reform, we must not ask students to give up their cultural identities. The reason being that while people like moderate doses of strange and unexpected events, they feel the closest affinity to things they already have some familiarity with or can relate to through specific images (Keller and Suzuki, 1988, p. 412). One must consider: What are the moderate doses of unexpected events and things that are familiar to our students? Keller and Kopp (1987, p. 295) prescribe an analysis of the audience "to determine how much emphasis to give to a particular area of motivation." In relation to the development of online courses Singh, O'Donoghue and Worton (2005; p.22) warn that this "diversity of the new student population requires that institutions carefully develop programmes that will satisfy a broad range of learning requirements". One interpretation of this statement is that an understanding of one's culture is an essential prerequisite if the educational experience is to remain interesting and learners motivated.

### 2.2.6 Studies Involving the Comparison of Various Cultures

McInerney, Jinkley and Dowson (1998), in their study of three different cultural groups in Australia—aboriginal, Anglo and immigrant students—found a remarkable similarity between students who adopted a mastery orientation towards their academic goals. However, Aboriginal students were found to be more influenced by social goals.

A slight and interesting variation is reported by Kennedy (2002, p. 434) in his study of the Chinese cultural influence on students who were living in Hong Kong. While there is the usual confirmation of the relationship between learning style and the Chinese culture, he reports that motivational variables, both intrinsic and extrinsic, have a different meaning, with most students having a mix of both motivations, and believes that a student must have an interest in learning the

intellectual aspects (intrinsic) as well as in the financial and practical outcomes of a course (extrinsic). "Western ways of categorizing motivation do not travel well, at least not to the Orient" (p. 434). He concluded that socio-cultural insights and an understanding of students' previous learning experiences can undoubtedly help teachers to develop more culturally sensitive pedagogies. "Chinese learning styles", he found, are "far more subtle and complex than they are often made out to be" (p. 442). This is a confirmation of Guild's views (1994, p. 16) that cultures do have distinctive learning styles or patterns but that the great variation among individuals within groups means that educators must use diverse teaching strategies with all students.

Another interesting observation reported by Kennedy (2002, p. 431) is the source of influence in the Chinese culture that is attributed to "Confucian values". It is interesting that McClelland, as mentioned above, found religion as the critical force in shaping, directing and sustaining motivational drives in people. However, developing countries generally, and disadvantaged communities in particular, have not been under extensive study, an issue which this study aims to address. What are the cultural and motivational characteristics prevailing in our students? How should that determine our educational technology solutions? Often educational remedies which have been adopted do not take into consideration the cultural requirements, particularly in the developing world. This view is echoed by Nelson, O'Mara, McInerney and Dowson (2006, p. 400): "There is a paucity of research on motivation and education in developing countries. Although psychological constructs relating to academic engagement and achievement have been identified and researched in a number of cross-cultural settings this body of research has rarely been extended to the developing world".

In summary, human thought, affect, and behaviour can be markedly influenced by observation (socio-cultural elements) as well as by direct experience (Bandura, 1977, p. vii). Human behaviour (learning) is explained in terms of

continuous reciprocal interaction between cognitive, behavioural (motivation) and environmental (socio-cultural) determinants (Bandura, 1977, p VII).

Thus, literature expects that disadvantaged students would be influenced by their cultures in terms of their desire, their level of motivation and their reasons for studying and using technology. On the other hand, the educational environment needs to look for culturally appropriate measures to ensure effective communication aimed at students in the learning process. In the next section, I explore how motivation plays a role in the learning process and in academic achievement.

## 2.3 Motivation and the Learning Environments

*"There are three things to remember about education. The first is motivation. The second is motivation. The third is motivation."*

-Terrel H. Bell

The above statement from the United States Secretary of Education, Terrel H. Bell, must be one of the most quoted statements in educational literature (Ames, 1990, p. 409; Covington, 2000, p. 171; Maehr and Meyer 1997, p. 372).

I documented in the previous section, the cultural influence on motivation for learning. How motivation is shaped, directed, encouraged and even sustained by cultural (social) factors. Thus the literature implies that in the findings and discussions, recorded in subsequent chapters of this study, there would be traces of cultural influence in the way UL disadvantaged students are motivated and respond to the technology that affect their learning.

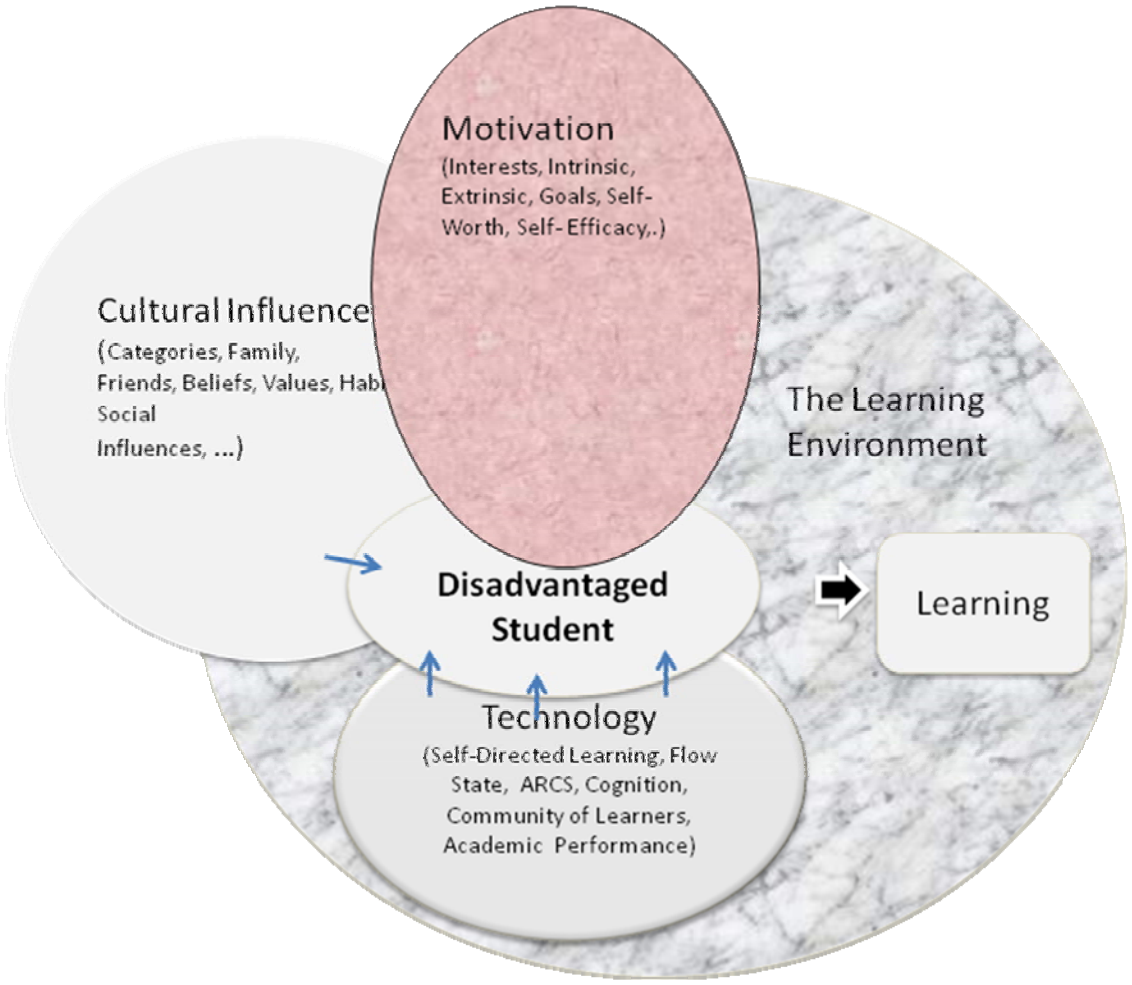
In this section, I explore what literature suggests are the possible motives behind students' academic pursuits, i.e., the link between various motivational

orientations and academic achievement. In particular, the research questions that are addressed in this section of literature survey are:

- **Why are students interested in technology?**
- **Is there evidence for self-directed learning, and if so, how does it affect ICT use and academic performance?**
- **How does intrinsic motivation play a role in ICT use and academic achievement?**
- **How does extrinsic motivation affect ICT use and academic achievement?**
- **What is the role of self-efficacy in the level of ICT use and academic achievement?**
-

In Figure 2.3, below, I illustrate, how motivation and desire for learning find their origin in the culture where the student comes from and how they then relates, in their manifold aspects, to the educational environment.

Figure 2.3 - Motivation Influence in the Learning Environment




I begin with a brief outline of some of the general and early discoveries in the field of motivation.

### 2.3.1 Introduction

For someone who comes from exact sciences such as mathematics and computing, like me, one is lost at the beginning of the literature to observe the diversity of thought and approaches in the field. One does not see a clear progression of ideas logically following each other but rather different views based on different personal experiences. For example, Alfred Adler (1870–1937)

was Freud's colleague and initially a defender of his ideas. Later in life, he developed his own rather independent concepts which are in contrast to Freud's theories. No wonder, then, that Wittgenstein (1968, p. 232), Murphy and Alexander (2000) claimed that psychology itself was a discipline marked by ''conceptual confusion''.

Kolesnik (1978, p. 3) had the same experience. "When we turn to psychology for elucidation about what makes people tick we find reputable psychologist are by no means in complete agreement with one another." "Although we actually do know a good deal about motivation, our knowledge on close inspection is quite uneven. We know how to arouse people to greater effort, especially for short periods of time—how, for example, to arrange incentives for factory workers so that production improves and absenteeism falls, and even how to rearrange the social organization of schools so that students are more willing to learn for its own sake. But knowing how to motivate people is not the same as knowing what motivation is" (Covington, 1998, p. 1).

It is for this reason that an initial survey of what has been said about motivation is necessary if one wants to understand what motivates students to learn. The study of literature will demonstrate how the understanding of motivation has evolved.

### 2.3.2 Definition and the Early Beginning

This section of the literature review covers the basics of what has been said about motivation in so far as it affects learning. It serves as an introduction and a base for what follows in subsequent sections. I start with a formal definition and continue with other dimensions of motivation reflected in the literature.
Keller and Litchfield (2002, p. 86) define motivation as:

> A person's desire to pursue a goal or perform a task, which is manifested by choice of a goal and an effort in pursuing the goal.

Simply put, it is why human organisms think and behave as they do (Weiner, 1992, p. 1). To be motivated means *to be moved* to do something (Ryan and Deci, 2000, p. 54). The term "motivation" is derived from the Latin term *movere*, which means "to move" (Roos, van Eeden, 2008, p. 54). Maehr, (2008, p. 917) complements this definition by adding the need to consider motivation as a process rather than a trait.

Freud must be the most quoted psychologist and therefore I begin with some of his findings on motivation. Freud maintained that most human behaviour is literally irrational. He believed that a person's motives for acting, as well as the real meaning of those acts, are often unknown, even to the individual himself (Kolesnik, 1978, p. 12). Sex is the dominant impulse in Freudian ideology (p. 22). One of Freud's most revolutionary and controversial theories has to do with the sex life of very young children and its effects on their later personality development and motivation. Or it is the procurement of pleasure and the avoidance of pain (Elliot, 2006, p. 111).

Unlike Freud, Erik Erikson puts less emphasis on sex as a source of motivation and more on social development (Kolesnik, 1978, p. 27). According to Erikson there are eight stages in one's life and each is characterized by a dominant problem that needs to be solved. The sixth stage, young adulthood, is relevant to this study, as it usually corresponds with the age of the typical student, namely from 18 to mid 30s; According to Kolesnik (1978, p. 27), the development in this stage centres on a sense of intimacy with other people as opposed to a sense of isolation. This is clearly visible in an average UL student's life as often there is a group-orientated approach to tackling any project.

"Alder maintained that it was potentially more productive to understand a person's goals" states Kolesnik (1978) "to understand his behaviour". Maslow (1970, p. 22), a well known and respected psychologist agrees when he said: "the study of motivation must be in part the study of the ultimate human goals or desires or needs."

Weiner (1992, pp. –17) regards Darwin's contribution to have a revolutionary effect on our understanding of motivation when God-like humans turned to become machine-like men by Darwin's theories. These two distinct origins, according to Weiner, continued to affect the various motivational models that are dominant today—one regarding man as affected by a creator and man as a machine (Weiner, 1992, p. 14).

Since at least the 1980s there has been a sustained research focus on how motivational and cognitive factors interact and jointly influence student learning and achievement (Linnenbrink and Pintrich, 2002, p.1). Over the past fifteen years there has been an increased research interest in motivation in a learning context (Mansfield, 2007, p. 2). An interesting and relevant contribution of his study is the idea that "motivation is a dynamic, multifaceted phenomenon" that can be managed, directed and developed. The assumption that students are grouped as "motivated" or "not motivated" in some global fashion no longer holds. Rather, "students can be motivated in multiple ways and the important issue is the understanding of how and why students are motivated for school achievement" (Linnenbrink and Pintrich, 2002, p. 1). Having covered a few basic facts and definitions about motivation, I now aim, in subsequent sections, to cover some pertinent aspects of motivation that are relevant to this study.

### 2.3.3 Maslow's Contribution

Since this is a study of students that come from backgrounds where their basic needs, e.g., food, shelter and security, are often not met, I looked for a school of

thought that best explains the conditions that such a student experiences and the implications that these conditions have for learning.

A psychologist who has profound impact in this field is Abraham Maslow (1908–1970), also referred to by some as Mr. Humanistic Psychologist. Maslow identified five broad areas of needs, which he arranged in a hierarchal order. They are: 1) – Physiological, 2) – Safety, 3) – Love, 4) – Esteem, 5) – Self-Actualization (Maslow, 1970, p. 35–46). In other words "basic human needs are organized in hierarchy of relative prepotency" (p. 38).

Maslow (1970, p. 24) summarizes his findings in these words: "Man is a wanting animal, and rarely reaches a state of complete satisfaction except for a short time." According to Maslow, these needs are not acquired but are innate in every human being. When one need is satisfied, another comes into the foreground. In relation to motivation, it must be noted that these needs are such that a lower level need must be completely satisfied before a higher level need is explored. If a learner is worried about basic needs such as food and shelter, it is likely that learning will not be a priority. Maslow believed that most people will not go beyond esteem, the forth step, in their psychological development. As most people require all their energies on satisfying their security, affection and recognition needs, they hardly have the opportunity to excel to the next level, fulfilling themselves—self-actualization. At this stage, once one has satisfied all lower-order needs, it is possible for one to begin self-actualization and emerge as a major motivator.

Based on this school of thought, human beings behave in order to receive an outcome that is pleasing to them. In a way there are similarities between Freud and Adler, in that, in all cases, one is driven by some inner force that brings about some level of satisfaction. Freud felt that this is the sex impulse. Adler believed it is the desire to bring about control and superiority. One gets the

feeling that each one of these experts has looked at motivation from their own life experience and that each has contributed partially to the solution of the puzzle.

If one were to examine UL's educational technological environment from a behaviourist perspective, one would look for selected discriminative stimuli and differential reinforcements in the educational environment that have caused the students to become interested in learning through technology. What is relevant to this study, in terms of behaviour, is the concept of reinforcement—social, symbolic, tangible, intermittent, internal, imitative, etc.—which will have bearing in this study.

In summary, humanists believe that human beings, by their very nature, are endowed with tremendous potential for growth. While we have personal and environmental limitations, we do not get close to our full potential. Bahá'u'lláh (1817–1892) the founder of Bahá'í Faith puts it beautifully with these words: "Regard man as a mine rich in gems of inestimable value. Education can, alone, cause it to reveal its treasures, and enable mankind to benefit there from" (Bahá'u'lláh, 1983, p. 260).

Maslow's contribution and relevance to this study is significant because of the special and unique circumstances in which this study has taken place. In circumstances when basic security, privacy and the physical arrangement of the educational facilities are less than ideal, according to Maslow, the likelihood is minimal that students will, of their own accord, become interested in their studies or become intrinsically motivated. Chapter 4, will examine the extent to which these variables are an issue in UL's service-delivery systems.

### 2.3.4 Motivation – the Basic concepts

In the search for an answer to the question of the source of motivation for a student's desire to use technology, I document in this section, the literature

findings in term of the basics of what is covered in contemporary literature on the subject.

D. C. McClelland is regarded by some as the father of the contemporary studies of motivation (Niles, 1995; Maehr and Meyer,1997, p. 379). He introduced the concept of achievement motivation and is reported by a number of researchers (Beard and Senior, 1980, p. 5; Niles, 1995, Maehr, 2008, p. 917) to attribute it to religion or philosophy that the individual comes from. He was not in favour of regarding motives as "deficit" in need of reaching a state of equilibrium as was believed by many of his predecessors (McClelland, Atkinson, Clark and Lowell 1976, p. 8). Thus, according to this point of view, the source of motivation for students' use of technology and learning is the desire to achieve their goals in life and see an opportunity to achieve these goals through the use of technology. Students with a high level of need for achievement are relatively independent of adults; are less likely to conform to the opinion of their peers in social situations; are better able to work under delayed, reinforcement conditions and prefer moderately difficult tasks to easy or very hard ones (Beard and Senior 1980, p. 6). Such students engage in energetic, innovative activity; and work hard only when there is some challenge in a situation. UL students do show some of the attributes described above. It would be interesting to see if there is correlation between these orientations and ICT use or academic performance. An added dimension to this definition which is relevant to this study comes from Wang, Slaney and Rice (2007, p. 1281) who believe that Chinese social-oriented achievement motivation includes a desire to fulfil the expectations of groups such as family, clan, or society.

Everyone has the need for achievement in some area or another, but this need is stronger and deeper in some people than in others (Kolesnik, 1978, p. 123). Kollesnik further explains that unless this need for achievement is aroused and encouraged it may become or remain dormant. In another study, McClelland, Atkinson, Clark and Lowell (1976, p. 275) addressed the origin of achievement

motivation: "all motivations are learned" and "they develop out of repeated affective experiences connected with certain types of situations and types of behaviour". A helpful summary and definition comes from Covington (1998, p.12) who feels that there are two broadly different approaches to achievement motivation. "One perspective views motivation as a ***drive***, that is an internal state or need that impels individuals towards action. This motives-as-drive approach typically views motivation as an enabling factor—a means to an end…. The second perspective considers motivation in terms of ***goals*** or ***incentive*** that draw, not drive, individuals toward action".

This brings us to the next section where I will be documenting my findings on the motivation goal theory.

### 2.3.5 Motivation Goals Theory

Over the past fifteen years, there has been an increased research interest in motivation in learning contexts. Research in the field has been lead by those working with the **motivational goal theory**, which emphasises the reasons students engage in achievement-related behaviour and takes into account both environmental and individual influences on student motivation (Mansfield, 2007, p. 2). Rather than focusing on the content of what people are attempting to achieve (i.e., objectives, specific standards), goal orientations define *why* and *how* people are trying to achieve various objectives (Anderman and Maehr, 1994, p. 294, Kaplan, Maehr, 2007, p. 142) and refer to overarching purposes of achievement behaviour (Kaplan and Maehr, 2007, p. 142; Mansfield 2007, p. 2). In this school of thought, a difference in behaviour is attributed to a complex set of goals that a learner pursues (Mansfield, 2007, p. 2). An element that is gaining prominence is the social (cultural) aspects of a student's life that play an important role in defining these motivational goals (Dowson and McInerney, 2001) or more generally the environmental characteristics that foster these motivational orientations (Kaplan, Maehr, 2007, p. 142).

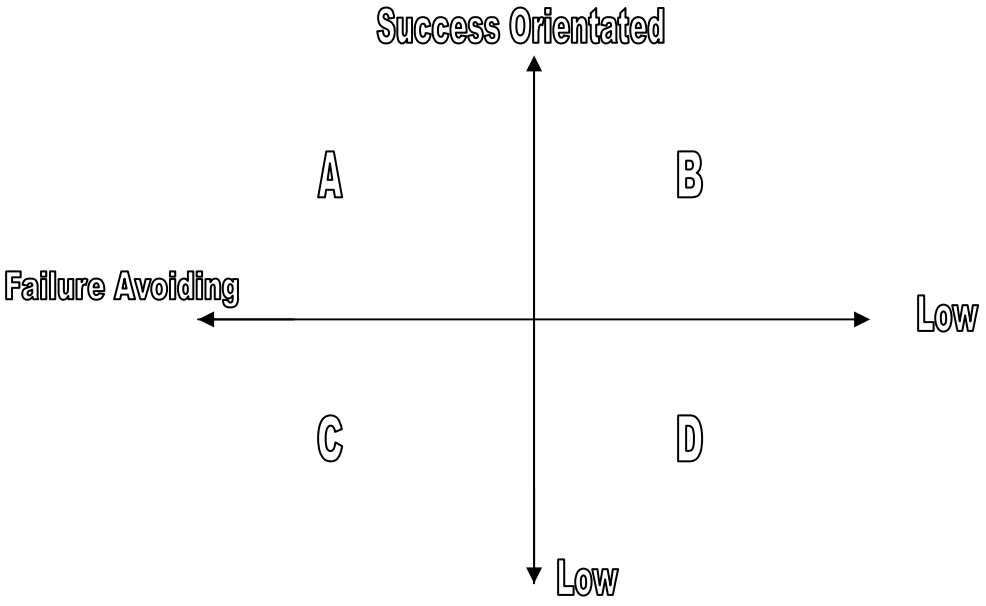
Research on achievement motivation has long emphasized the cognitive base of behaviour, but the recent literature has advanced an achievement goal framework that integrates cognitive and affective components of goal-directed behaviour (Ames, 1992, p. 261). Thus, another angle is provided to look at the question that is of interest in this study. To understand why and how students are interested in technology and learning, one must look at the complex set of goals that drives motivation.

Contemporary conceptions of student motivation define goals as the purposes or intentions driving academic engagements (McInerney, Hinkley, and Dowson, 1998, p. 621; Ames, 1992, p. 261). More precisely, goals are defined as integrated patterns of belief attributions that produce the intentions of behaviour. Understanding the goals of others allows an understanding of their intentions, and to anticipate how, when, and where these others may act on the basis of these intentions (Dik and Aarts, 2007, p. 727). Two contrasting achievement goal constructs have received the most attention. These are mastery and performance goals (Ames,1992, p. 261; McInerney, Hinkley, and Dowson, 1998, p. 621). It should be noted that this dichotomous view of goals with mastery and performance orientation sitting on opposite sides is moderated to a position of a multiple goal perspective being accommodated with various degrees in an individual (Harackiewicz, Pintrich, Barron, Thrash and Elliot, 2002, p. 638). In addition, social goals have been added to the equation in recent years and are gaining in popularity.

Purposefulness, also seems to be a unique quality of human thought and human behaviour (Feldman and Csikszentmihalyi, 1994). This implies that human behaviour is directed towards a goal. These goals emanate from various needs such as: psychological, affiliation, affection, approval, self-esteem, independence and new experiences. A behaviour that aims at satisfying more than one need is multi-motivated. Others have defined goals in an academic perspective as simply “the purposes or intentions driving academic engagement”.

The main drive behind goals and incentives are the hope for success and avoidance of failure with its possible implications of humiliation and shame, "according to Atkinson, all individuals can be characterized by two learned drives, a motive to approach success and motive to avoid failure" (Covington, 1984, p. 33). This implies that there are two opposing orientations with respect to success with one being optimistic and the other less so. However, Covington believes that this provides an "endless variety of motivational patterns." Figure 2.4, below, illustrates this concept. It depicts four general groups of students. Group A represents individuals who posses two strong conflicting orientations. They need to succeed and avoid failure. These are referred to as ***over-striders***. Group B consists of individuals who aspire for success but are not particularly concerned with failure. These are ***success-orientated*** students. Group C, which is found on the opposite side of the previous group, consists of those students that are highly concerned with failure but are not concerned necessarily with success. These are referred to ***failure-avoiders.*** Finally, Group D, consists of individuals who are moved neither by success nor failure. These are ***failure acceptors***. In this school of thought, the motive behind a drive could be emotion or cognition. Atkinson was the main advocator for emotion being the main driver in achievement motivation. He defined the motive to approach success as "a capacity to experience pride in accomplishment". Weiner's version of this concept, from the cognitive school of thought, is "a capacity for perceiving success as caused by internal factors, particularly effort" (Covington, 1998, p. 56).

Figure 2.3 - Quadripolar model of need achievement. Source: Covington(1998)




### 2.3.5.1 Mastery Goal

In this class of motivational goal the learner aims at developing his/her competency. "Mastery-oriented students focus on learning, understanding, developing skills, and mastering information" (Kaplan and Maehr, 2007. p.142). A very similar definition is provided by Meece, Anderman and Anderman (2006, p. 490) where mastery goal orientation is defined in terms of a focus on developing one's abilities, mastering a new skill, trying to accomplish something challenging, and trying to understand learning materials. Success is evaluated in terms of self improvement, and students derive satisfaction from the inherent qualities of the task, such as its interest and challenge. Mastery goals have a positive impact on students' metacognitive knowledge, strategy usage and academic effort (Ames, 1992, p. 262) and have been positively associated with deep processing, persistence and effort (Mansfield, 2007, p. 3). A mastery student is able to find meaning in the work (Seifert, 2004, p. 147). In terms of affective outcomes, mastery goals seem to lead students to feel proud and

satisfied when they are successful and guilty when they are not successful (Ames, 1992, p. 262). Mastery goals increase the amount of time children (or learners) spend on learning tasks and their persistence in the face of difficulty and, more importantly, the quality of their engagement in learning (Ames, 1992, p. 262).

#### 2.3.5.2 Performance Goals

Conversely, performance goals refer to the desire to show competencies by trying to obtain positive judgments (Darnon, Butera and Harackiewicz, 2007, p. 61). Performance goals orient learners to focus on their ability and self-worth, to determine their own ability by outperforming competitors, surpassing others in achievements or grades and receiving public recognition for their superior performance (Ames, 1992, p. 262). Meece, Anderman and Anderman (2006, p. 490) believe that a performance goal orientation represents a focus on demonstrating high ability relative to others, striving to be better than others, and using social comparison standards to make judgments of ability and performance. A sense of accomplishment is derived from doing better than others and surpassing normative performance standards. Mastery and performance goals have traditionally been conceptualized as oppositional, but more recent work on approach and avoidance variants suggests that a more nuanced and multidimensional perspective is needed (Pintrich, 2000). Students who perceive their classrooms as places that stress learning, as opposed to performance goals report, more positive attitudes towards the subject, more intrinsic motivation and more cognitive engagement or thoughtfulness (Blumenfeld and Mefgendoller,1992, p208).

#### 2.3.5.3 Social Goals

It is suggested that students may also hold social goal orientations that influence their academic achievement (McInerney, Hinkley and Dowson, 1998, p. 622). This is particularly relevant in this study since the initial observations that led to it

showed the signs of a clear relationship between cultural (social) influences and motivation. As a consequence, academic achievement may be influenced by a complex array of motivational determinants related not only to students' mastery and performance goal orientation but also to their social goal orientation. In fact, a combination of mastery and social goal orientation might be more productive than mastery alone because feelings of belonging and social responsibility engendered by social goals may provide added impetus for academic efforts (McInerney, Hinkley and Dowson, 1998, p. 622). Darnon, Butera and Harackiewicz (2007, p. 67) examined achievement goals in social interactions and compared learning with mastery vs. performance goals. Their conclusion indicated that when a partner disagreed, the induction of mastery goals led to significantly better learning than did the induction of performance goals. Again this has an implication in this study since the collective approach and ability to arrive at solution could mean enhancement for better collective and individual performance.

Hwang and Kim (2007) found that knowledge sharing by email is a fundamental driver of TML (Technology Mediated Learning) and KM (Knowledge Management) success. Their research establishes an empirical link among affective commitment, collectivist culture, social influence, and attitude toward sharing knowledge by email in a technology-mediated learning environment. In a similar conclusion Hwang and Kim (2007), Alavi, Kayworth and Leidner(2006), regard knowledge sharing as an important variable in the technology mediated learning (TML and knowledge management (KM) literature incorporating social and cultural factors).

### 2.3.6 Intrinsic vs. Extrinsic Motivation

> *I have become convinced that an essential ingredient for sustaining creative effort is intrinsic motivation, or the ability to derive rewards from*

*the creativity itself rather from external incentives like power, money or fame.*

Feldman and Csikszentmihalyi (1994)

The similar orientation between mastery goal and intrinsic motivation should be noted. They both emanate from the same type of character, while, performance orientation behaviour and extrinsic motivation have similar origins. Most achievement goal and intrinsic motivation theorists contend that mastery goals are facilitative of intrinsic motivation and its constituent processes, whereas performance goals are posited to have negative effects. That is, mastery goals are said to promote intrinsic motivation by fostering perceptions of challenge, encouraging task involvement, generating excitement and supporting self-determination, whereas performance goals are portrayed as undermining intrinsic motivation by instilling perceptions of threat, disrupting task involvement and eliciting anxiety and evaluative pressure (Elliot and Harackiewicz, 1996, p. 462). Intrinsic motivation is based on wanting to learn because the student is interested or curious about a task itself (Biggs and Telfer, 1987, p. 96), or adopting goals that are more aimed towards deeper learning strategies (Pintrich, 2004, p. 388). Being intrinsically motivated in an academic task indicates that the student's participation in the task is an end in itself. An intrinsically motivated student is likely to display autonomy and employ self-initiated exploratory strategies (Bye, Pushkar and Conway (2007, p.144).

Extrinsic motivation, on the other hand, refers to doing something because it leads to a separable outcome (Ryan and Deci, 2000, p. 55) or to adopting goals that are more inclined towards surface learning strategies (Pintrich, 2004, p. 388). Bread and Senior (1980, p. 3) feel that learning is an intrinsic motive which finds both its source and reward in its own exercise. They further point out that the lack of motivation is likely to become a problem only when learning is imposed on the learner. Bread and Senior (1980, p. 4) summarize the behaviourist point of view that speaks more of providing motivation through

incentives and rewards with a view to establishing behaviour which may in themselves become their own reward. It is expected that students with a high level of intrinsic motivation will also have a high sense of self-directedness (de Bruin, 2007). McCauley and McClelland (2004, p. 34) found higher levels of self-directedness in postgraduate students than undergraduates, which they attributed to the nature of the work, maturation, changes in expectations and methods of instruction. By contrast, extrinsic-motivation orientation is mostly disfavored by the literature. Pintrich, for example, says that self-regulated learning can be facilitated by the adoption of mastery and relative ability goals and hindered by the adoption of extrinsic goals (Pintrich, 1999, p. 459). However, this position is by no means universal. Ryan and Deci (2000, p. 60) feel that most of people's activities are not, strictly speaking, intrinsically motivated. This is especially the case after early childhood, as the freedom to be intrinsically motivated becomes increasingly curtailed by social demands and roles that require individuals to assume responsibility for non-intrinsically interesting tasks. In schools, for example, it appears that intrinsic motivation becomes weaker with each advancing grade (Ryan and Deci, 2000, p. 60). Playing is an example of intrinsic motivation since children rarely need encouragement to play a game of their choice. Can computers be organized in such a way that education becomes like a game for the learner?

Intrinsically motivated students find learning as an end in itself, just as looking at beautiful scenery is enjoyable and does not require other external motivation. The question is: Does technology provide the necessary incentive to assist education? Is there something technology can do to facilitate enjoyable learning? Is this the explanation for the high number of students that circle the computer labs in search of learning?

Interest has been defined as the most basic and ubiquitous of universal motivating emotions for humans. High levels of interest are necessary to trigger and maintain a strong intrinsic motivation for learning (Bye, Pushkar and Conway (2007, p.145).

A well respected scholar of these ideas is Jean Piaget, whose views, while he "has not dealt with motivation extensively ... have been given strong support to the concept of intrinsic motivation. He believes that human beings by their very nature have an intrinsic tendency to assimilate and accommodate and thus to grow intellectually" (Kolesnik, 1978, p. 137).

Pintrich and De Groot (1990, p. 37) found intrinsic values to have a strong relationship with the use of cognitive strategies and self-regulation, i.e., students who were motivated to learn the material (not just for grades) and believed that their schoolwork was interesting and important were more cognitively engaged in trying to learn and comprehend the material.

Reigeluth (1999, p. 6) takes this idea further and finds a place for intrinsic and extrinsic motivation in his definition for instructional design theory. In other words instructions should include "activities that are amply rewarded, either because they are interesting and engaging in themselves or because they feed into other achievements and concern the learner."

Having established the ideals of intrinsic motivation and the practical realities of extrinsic motivation, the question that emerges is how does one provide ICT services in such a way that students become intrinsically motivated while they pursue their learning career? This is a question that Chapter 4 of this study will cover.

### 2.3.7 Self-Efficacy

The origin of self-efficacy goes back to the concept of expectancy that has a rich history in psychology (Schunk,1991, p. 207). It is referred to beliefs in one's capabilities to organize and execute the courses of action required to manage respective situations (Bandura, 1997, p. 2; Schunk, 1991, p. 207) and one's personal judgments about his or her performance capabilities in a given domain

or activity (Bates and Khasawneh, 2007, p. 178). Self-efficacy makes a difference in how people feel, think, and act (Schwarzer, 1992, p. ix). Students who have more positive self-efficacy beliefs (i.e., they believe they can do the task) are more likely to work harder, persist and eventually achieve at higher levels (Linnenbrink and Pintrich, 2002, p. 3). Evidence has also been reviewed suggesting that self-efficacy promotes adaptive strategy use, such as self-regulation, suggesting that students with high self-efficacy beliefs will also be likely to use adaptive and appropriate study skills. In particular, self-efficacy has been associated with increased persistence relating to engagement. Evidence has also been reviewed suggesting that self-efficacy promotes adaptive strategy use such as self-regulation suggesting that students with high self-efficacy beliefs will also be likely to use adaptive and appropriate study skills (Linnenbrink and Pintrich, 2002, p. 3). Self-efficacy predicts such diverse outcomes as those of academic achievements, social skills, smoking cessation, pain tolerance, athletic performance, career choices, assertiveness, coping with feared events, recovery from heart attack and sales performance (Schunk, 1991, p.207).

In the search for the sources of self-efficacy in human beings, I turned to Albert Bundura, a Professor of Social Sciences at Stanford University whose work is much respected and repeated in literature. He identifies four sources that contribute towards the formation of peoples' belief about their efficacy (Bandura, 1997, p. 3–5). First, they are the most effective through their mastery experiences. Success builds robust belief in one's personal efficacy. This could explain why technology is so welcomed by so many students. The reason could be the fact that it provides differing levels of solutions depending on one's level of sophistication and intelligence. In UL even the cleaning ladies show an interest in learning ICT tools, since they see themselves as being able to use and complete tasks that appeared impossible at one point. When disadvantaged students who have until that point only heard about technology see it in action and realize that it is easy to use, they become productive. Their sense of self-efficacy is awakened, and this results in their becoming motivated to carry on.

Going back to Bundura's four sources that contribute to self-efficacy, the second influential way of creating and strengthening efficacy belief, he says, is through the vicarious experiences provided by social models. Seeing those similar to themselves succeed by perseverant effort raises the observer's beliefs that they too possess the capabilities to perform comparable activities (Bandura, 1997, p. 3). This observation is particularly relevant to UL's environment where students take a collective approach and often learn from each other. Most of the basic ICT tools are learnt from one another in the student computer laboratories. Social persuasion is the third way of strengthening people's beliefs that they have what it takes to succeed. Technology-assisted learning involves growing social relationships and allows students to find their voice in these relationships (Lankshear, Peters and Knobel, 2000, p. 20; Greyling and Wentzel 2007, p. 655). Because mandatory involvement requirements may not intrinsically motivate learners to achieve high-quality learning, social factors under commitment are especially important determinants of TML (Technology Mediated Learning) success (Hwang and Kim, 2007, p. 232).

The fourth source of self-efficacy in people, according to Bandura, is the physiological and emotional states in judging their capabilities, i.e., the interpretation of stress reaction and tension as a sign of vulnerability to poor performance. One of the most powerful influences on a person's behaviour is another person. We do things because it is important to us that we appear favourably in the eyes of significant others, whether those others be peers, peer groups, neighbourhoods, employers, one's spouse, authorities, etc. (Biggs and Telfer, 1987, p. 106).

Yi and Hwang (2003) in their research linked self-efficacy with technology. They make reference to a concept called general computer self-efficacy (CSE) which is defined as an individual judgment of efficacy across multiple computer domains and application-specific self-efficacy is defined as an individual perception of efficacy in using a specific application or system within the domain

of general computing (p. 434). In their research they talk about application-specific self-efficacy that exerts a significant effect on system use (p. 443). Moos and Azevedo (2009, p. 591) in relation to Computer Based Learning Environments (CBLEs) found that self-efficacy is a particularly important construct. However, they point out several salient issues. First, the relationship between computer self-efficacy and learning with different CBLEs may vary (p. 593). It is critical to measure computer self-efficacy with a variety of different CBLEs because the cognitive and metacognitive demands vary between distinct CBLEs. Some CBLEs, such as hypermedia, place high levels of cognitive and metacognitive demands on learners (p. 593). They further point out that (p. 592) self-efficacy research has treated this construct as one dimensional. These measurements have typically examined the strength of an individual's computer self-efficacy, whereas the other two dimensions of level and generality have rarely been included in these measurements. In a similar line of thinking Bates and Khasawneh (2007, p. 188) bring an interesting point that has some significance in this study. In their research they found that previous success with online learning systems may be a critical factor in the development of self-efficacy and attitudes about online learning system use. In this study where most students do not have previous exposure to ICTs, it would be interesting to see how the results from this study compares.

What then is the practical implication of self-efficacy? In other words, once one becomes aware of one's capabilities, such awareness leads to the delivery or the execution process. Again, Bandura (1997, p. 5) identifies that four processes are involved. Two of these, cognitive and motivational processes, are, within the scope of this study as they explain, in my opinion, our student's behaviour.
The effects of efficacy belief on cognitive processes take a variety of forms. Much human behaviour, being purposive, is regulated by forethought embodying valued goals (Bandura, 1997). When students get the feeling that they can use a PC and obtain critical information, this feeling of being effective leads to the cognitive awareness that he/she can accomplish an academic task and therefore

sets goals to be achieved. People with high self-efficacy are more likely to set high goals or to accept difficult, assigned goals; to commit themselves to difficult goals; to respond with renewed efforts to setbacks and to discover successful task strategies (Locke, 1996). A major function of thought is to enable people to predict events and to develop ways to control those that affect their lives. Such problem-solving skills require effective cognitive processing of information that contains many complexities, ambiguities and uncertainties (Bandura, 1997, p. 6). Motivational processes are followed. Most human motivation is cognitively generated. When I am confronted with a difficult task, I try to motivate myself by thinking about pleasant and positive aspects of the things that might be associated with the task. Here the cognitive and motivational forces join hands to accomplish a deliverable result. An interesting observation is made by Pintrich and De Groot (1990, p. 33) that knowledgement of cognitive and metacognitive strategies is usually not enough to promote student achievement. Students must also be motivated to use the strategies as well as to regulate their cognition and effort. That is why students with remarkable intelligence often may not necessarily perform adequately academically. A similar view is expressed by Seifert (2004). While it may seem sensible enough to say that students who perceive themselves incapable will not be motivated to learn, it is not necessarily the case that students who are not motivated to learn see themselves as incapable. This point is evidenced by the bright but bored underachieving student who does the minimum amount of work necessary to achieve some minimal acceptable standard (p. 144).

### 2.3.8 Self-Regulated Learning

In this section of the literature review, basic concepts and a definition for self-regulated or self-directed learning are provided. There are a number of reasons for interest in and the relevance of this topic in this case study. Firstly, because it stresses a balance between motivational and cognitive elements, it serves as a befitting link between the previous section, motivation, and the next section, which is technology. Secondly, one of the characteristics of the student

population in this study is that students demonstrate strong interest for learning by themselves (self-directed learning) once given ICT tools. The concept of self-regulated learning, therefore, first has to be understood and then the phenomenon tested for this case study.

There are a variety of definitions for self-regulated learning. I have chosen the definition from Pintrich and van de Groot (1990, p. 33). First, self-regulated learning includes students' metacognitive strategies for planning, monitoring, and modifying their cognition. Second is students' management and control of their effort. A third important aspect of self-regulated learning that some researchers have included in their conceptualization is the actual cognitive strategies that students use to learn, remember, and understand material. Self-regulated learning refers to our ability to understand and control our learning environments (Schraw, Crippen, and Hartley, 2006, p. 113).

"Metacognitive" refers to what one knows about the learning process and about oneself as a learner (Brown, 1988, p. 312)—in other words, any form of learning in which the individual is primarily responsible for the planning, implementation and evaluation of learning (de Bruin, 2007, p. 231; Knowles, 1975, p. 18). Academic self-regulation is not a mental ability, such as intelligence, or an academic skill, such as reading proficiency; rather it is the self-directed process through which learners transform their mental abilities into academic skills (Zimmerman, 1998, p. 1, Zimmerman, 2008, p.166). The key to self-regulation among learners is intentionality (Jonassen 1996, p. 259). The term "intention" has also been used to refer to goal or motivation (Locke, 1996, p. 117). Thus an explanation is provided for how self-directed learning, motivation and cognition join hands to assist in learning. Students first become motivated to learn, and, since they get satisfaction in using ICTs as tools, they become encouraged to continue and control and manage their self-directed learning environment. The two elements of motivation and cognition work hand in hand in this process. An interesting extension of self-regulated learning is given by Simons (1993, p. 291),

who looks at constructive learning with attributes that include: active, constructive, cumulative and goal orientated. He then extended this idea by finding a relationship between constructive learning and self-directed learning. Similar studies showed a correlation between self-regulated learners and academic performance, students' giftedness, self-efficacy and strategy use (Zimmerman and Martinez-Pons, 1990, p. 51).

It is not just the individual's cultural, demographic or personality characteristics that influence motivation and achievement directly, but rather the individual's active regulation of his or her motivation, thinking and behaviour that mediates the relationships between the person, context and eventual achievement (Linnenbrink and Pintrich, 2002. p. 2). Wang and Newlin (2002, p. 160) verified the relationship between self-efficacy and academic performance. They further found that students who chose to do a Web-based course had higher levels of self-efficacy, indicating that students who embrace new technology might benefit from higher levels of self-efficacy.

Zimmerman (1990, p. 6) feels that students' self-directed learning involves three features: a) - Student use of self-regulated learning strategies, b) – Student responsiveness to self-oriented feedback about learning effectiveness, and c) - interdependent motivational processes. Yukselturk and Bulut (2007) in a study that included 16 related variables concluded that self-regulation to have the strongest correlation to academic success.
One of the by-products of self-efficacy is self-regulation. Pintrich and van de Groot (1990, p. 38) found a close relationship between the two.

## 2.4 Technology and the Learning Environment

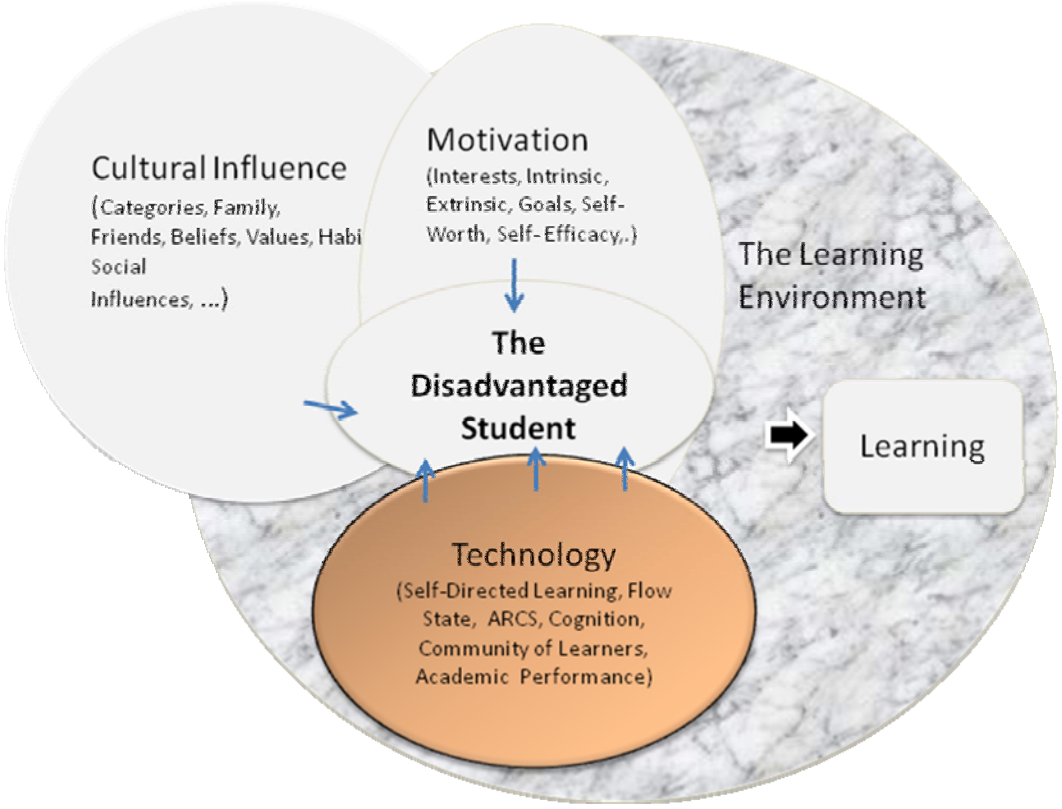
In the literature survey so far, I first examined whether students' cultural background has been found to have an influence the learning process. It was

suggested that it plays a key role and is a main contributor in influencing and forming motivational forces that shape the aspirations and behaviour of a human being. I then looked at various aspects of human motivation and found that learning essentially relies on motivation and that it is the practical expression of various motivational forces within us.

In this section, I explore the third key variable of this study, **technology**, and its role in the learning environment. First, I examine whether technology's presence in education is inevitable or if there is an option not to embrace it. Second, I look for answers to the question that has been the driving motivation in this study and look for the reasons why students are keen to use technology. In this endeavour, topics such as the state of flow and tailoring technology to suit learning will be discussed. Here, some of the well-known scholars that have won respect in this field are documented as examples of how ICT tools can be used to advance learning. Third, I examine what literature has to say about the correlation between ICT use and academic performance.

Figure 2.5, below, illustrates this concept. It shows that technology is a variable in the educational environment. The response it gets from students depends to some extent on students' cultural and motivational backgrounds and the way that it is presented in the educational environment.

Figure 2.5 – Depicts the influence of technology on student's learning process




## 2.4.1 Inevitability of Technology in Education

> *It is difficult and maybe even impossible to imagine future learning environments that are not supported, in one way or another, by Information and Communication Technologies (Punie, Zinnbauer and Cabrera, 2006, p. 5).*

In the previous section I documented how learning begins and ends with motivation. Perhaps it is technology's ability to fascinate and therefore motivate that has given it its penetrative power in education. But, to what extent has technology's influence been pervasive in the world of education and the learning process? For colleges and universities trying to stay in this competition, the

main question these days does not seem to be whether they should adopt ICT in their study programs, nor the many consequences this might have for higher education, but rather how fast they can realise in practice the opportunities the new technology is offering (Stensaker, Maassen, Borgan, Ofterbo and Karseth (2007, p.418).

Spencer (1999) likens the advent of the new technology in education to the developments of language, writing and print. He says "some technologies, such as writing and printing, have been so successfully embedded in education that we are hardly aware of them: These are the ubiquitous technologies that have formed the very foundations of education for centuries". In other words, in the past, technology was concerned with fitting people's bodies; today it must fit people's minds (Norman, 1993, p. 9).

Others have used similar, befitting examples to demonstrate the pervasive and all-encompassing influence of technology in education. The term "ecology of education" is used in the sense of the totality of interactions between an organism and its environment or, in the case of humans, the complex interactions between mind, action and environment. Just as an ecosystem can be understood through its interacting subsystems, so an ecology of education would subsume ecologies of learning, knowledge, ideas and so on. Such ecologies may provide a means of establishing how "the weaving together of mind and action, individual and group, macro- and micro-contexts and historical framings [allow] us to see how individuals are positioned within the possibilities of the actions available to them and what they make of those opportunities" (Dillon, 2004, p. 148). However, Spencer warns us that progressive change in education requires that emphasis be placed upon the technology *of* education rather than the provision of technology *in* education (Conlon and Simpson, 2003, p. 149). However, the rapid speed of the expansion of technology has, at times, been interpreted more in the economical interest of a few rather that based on sound pedagogical principles (Dillon, 2004, p. 138). On a similar theme, Conlon and

Simpson (2003) document cases where the introduction of technology has not had any “clear and substantial evidence of students increasing their academic achievement as a result of using IT”. A closer examination of the study, however, suggests that the absence of a number of key essential support mechanisms in the process may have occasioned the slow progress. It reminds us that the successful implementation and use of technology is associated with the stage of the development of a society and the availability of the necessary support structures that must be in place. As an example, in the above study, it was found that the academic community had multiple competing priorities, inadequate computer infrastructure and lack of ICT skills, all of which are critical for successful implementation of technology-based initiatives.

Another well known debate that needs to be mentioned in relation to the role technology in learning is Clark’s statement that “Media is not significant” (Clark and Sugrue, 1990, Clark, 1991). Here the value of media is minimized if not dismissed and emphasis is put on the content, method (Clark 1991, p. 35) or economic (and not psychological) advantages. Media are “mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition” (Clark, 1991, p. 35). Clarks views have been “reframed” by Kozma (1994) who demonstrated that in certain applications, there is clear evidence of the capabilities of a particular medium to make a difference in the learning process. In other words media and method both influence learning (Kozma, 1991, p. 11). In terms of the disadvantaged students the case is even clearer. Although a stove or a pot in the kitchen are mere tools in the cooking process without them the chef will have great difficulty producing good results. In the disadvantaged student setting, access to technology, clearly makes the learning environment more accessible, available, diversified and practical.

Like any tool, ICT makes life a lot easier for the student. In the case of the disadvantage students, with their particular cultural and motivation background,

there is an additional motivational aspect that technology appears to make a greater impact. Not only does technology makes the information easily and readily accessible, in addition, it uses its multi-dimensional capability to communicate more effectively since there is possibly a greater receptively towards technology use in the disadvantaged students.

As with the advent of language, writing and printing, technology's penetrating influence is inevitable. It is clear that the new technology and the Internet in particular, are having profound effect on education across the world (Standish, 1999, p. 417). Advances in information and communications technologies have brought about exciting opportunities for fundamental changes in education. Instructors increasingly leverage available technologies to enhance their students' learning experiences, such as by creating vivid, playful, interactive learning environments that support multimedia presentations, adaptive online exercises, and virtual discussions with greater student control of learning and pacing (Hui, Hu, Clark, Tam and Milton, 2008, p. 245). The digital age is throwing many of our educational practices and emphases and their underlying epistemological assumptions, beliefs, concepts and substantive theories into doubt (Lankshear, Peters and Knobel, 2000).

Keller and Suzuki remind us that there are many things that can be done effectively with computers that would be difficult with any other media (1988, p. 410). A good example is computer games where a combination of clever graphics with relevant information that can be revealed to solve a mystery and which manages to motivate the participants to solve the mystery. In an instructional setting, learners can be led toward the final answer by working through a succession of problem-solving activities combined with the partial release of facts. With graphics and animation, the learner can "move" through a series of scenes and situations (Keller and Suzuki, 1988, p. 410), making it more exciting and interactive than mere text-based learning.

### 2.4.2 Self-Regulated Learning with Technology

The early beginning of self-directed learning and ICTs' practical experiment must be attributed to Professor S. Mitra who in an Educational Computing Conference in 1982, together with a colleague, R.S. Pawar offered a methodology for the teaching of computer languages as a learning tool (Mitra and Rana, 2001). Later in 1988, Professor Mitra conducted two experiments and concluded that unsupervised use of computers can lead to accelerated learning of skills in children. Specifically, he saw a difference between children and adults' response to technology. In 1995, the first experiment in rural area was conducted. Here, a few computers were placed in a school and children were allowed to use them after minimal instruction (Mitra and Rana, 2001). This was followed by a second and much larger experiment, which took four years and involved 150,000 computers, called "learning through exploration, discovery and adventure". In 2001, there was already a clear evidential support for his initial ideas. "Urban children all over the world seem to acquire computing skills without adult intervention" (Mitra and Rana 2001).

In a series of studies pioneered by Professor Mitra the phenomenon of ICT as an instrument for self-directed learning was repeatedly confirmed (Mitra and Rana, 2001; Inamdar, 2004; Van Cappelle, 2004; Dangwal, Jha and Kapur, 2006; Cronje and Burger, 2006; Gush, Cambridge and Smith, 2004).

The common denominator in these studies was a combination of children of young age—between 6 and 18—coming from poor (disadvantaged) communities, with little or no prior experience with ICT, being given an opportunity to have access to ICT tools. The outcome has provided a clear evidence that "technology offers children unique intellectual experiences and opportunities" (Dangwal, Jha, Chtterjee and Mitra, 2006, p.42). Appropriate use of computers can "provide children with new possibilities for learning, thinking, and growing emotionally as well as cognitively" (Papert, 1980, p. 17). In this

study, I follow up the same principles and test them against an environment in higher education with a student population that is predominantly from a disadvantaged background.

Wang and Newlin (2002, p. 160) demonstrated the correlation that exists between self-efficacy for technology use and academic performance, i.e., students that showed confidence in their abilities to use technology also did well in their exams. Learner perceptions of personal efficacy, therefore, have a reciprocal relationship with the self-regulatory processes that affect motivation and performance (Lynch and Dembo, 2004). This evidence is by no means universal and there have been exceptions. For example, in relation to online learning Eom and Wen(2006) used self-efficacy to measure self-motivation and found no relationship between self-motivation and perceived learning outcomes.

### 2.4.3 *Possible Explanation for Students' interest in ICTs*

A general theme throughout this research study has been the search for an explanation for students' interest in technology, i.e.,

**Why are students interested in technology?**

#### 2.4.3.1 The Flow State

In section 2.4, above, I examined, from an educational psychology point of view, why students might be motivated to use technology for learning. In this section of the literature survey, I look for an alternative explanation, referred to as "state of flow", for students' interest in technology.

It is commonly accepted that computers are engrossing to young and old alike. A wife that complains about her husband being in front of the computer all the

time and, parents that are concerned about their children constantly playing and chatting are all scenes that we are well familiar with. One puzzle for the researcher has always been this phenomenon in students and their response to technology at UL. This is not by any means universal and is not applicable to every student. There are those that look at technology (PCs) with indifference. The questions are why and how and from where this motivation and phenomenon come from. One explanation is given by Csikszentmihalyi (1992, p. 71).

We have seen how people describe the common characteristics of optimal experience: a sense that one's skills are adequate to cope with the challenges at hand, in a goal directed, rule bound action system that provides clear values as to how well one is performing. Concentration is so intense that there is no attention left to thinking about anything irrelevant or to worry about problems. Csikszentmihalyi refers to this state as "flow". When a person's skill is just right to cope with the demands of a situation—and when compared to the entirety of everyday life the demands are above average—the quality of experience improves noticeably (Csikszentmihalyi and Csikszentmihalyi, 1988, p. 32). This also explains why every individual that associates with computers has his/her own special approach. This could also explain why in a teamwork exercise everyone can contribute towards the solution in their own way. Technology, with its many paths for solutions, allows individuals with different capacities to feel accomplished since they all, in some way, feel they have achieved something. It is said that through technology students can think better and more clearly; they have access to accurate information; they can work effectively with others, whether together in the same place or separated by space or time (Norman, 1993, p. 3).

Now that the phenomenon of interest in technology is explained in psychological terms, the challenge for an educational technologist must surely be to facilitate a learning environment that is conducive to reaching a state of optimal flow while

learning. This phenomenon is readily attributed to the use of technology in education. One is inclined to ask, should it not be recognized by educators as such, particularly in areas with disadvantaged students, and be used more extensively as a means to leapfrog students' learning development?
This provides an explanation for student's interest in technology. In this school of thought, technology acts as an effective catalyst that, owing to its ability to attract students, is able to facilitate learning.

### 2.4.3.2 Tailoring Technology to Suit Learning

Features such as the flow state with its ability to motivate, together with many other positive ICT features, ideally, could become through a systematic plan, integrated into the daily educational environment of a student's life.
Linnenbrink and Pintrich (2002, p. 1) remind us that instructional efforts and the design of classrooms and schools can make a difference in motivating students for academic achievement. The implication of this fact is that technology, with its natural motivational power, can, provided it is used appropriately, enhance motivation and therefore accelerate learning. For example, the ability of computers to withhold access to information until the student has qualified for it allows the designer to build inquiry and mystery into lessons (Keller and Suzuki, 1988). This makes computers a natural tool to create curiosity which is a motivator. The audio and visual capabilities of the computer can be particularly effective in capturing attention. Animation, inverse, flash and sound are all effective ways to capture a student's attention (Keller and Suzuki, 1988, p. 409).
However, it should be noted that students do not learn from computers but rather that students learn from thinking in meaningful ways (Jonassen, 1996, p. 3).
Decisive direction and planning are needed to progress in the correct direction. Unless the introduction of technology is as part of a holistic management plan that takes into consideration all aspects related to the overall culture, stage of development and environmental circumstances that surround teaching and learning, such as content and pedagogy, the benefits will be negatively affected

(Reynolds, Treharne and Tripp, 2003, pp. 152-155). The same study points out that in some examples of exceptional performance there was an ICT expert who drove the process.

### 2.4.4 Motivation from John Keller's Point of View

In this section of the literature review, examples where technology is used as a motivational tool to improve learning are presented. In addition, elements of instructional design that are recommended to enhance motivation, and therefore learning, are also provided. In an earlier section of the literature review, basic components of how and why students are motivated were discussed. In this section, we see how those attributes could be used to enhance learning. One such example is provided by Keller in his ARCS (Attention, Relevance, Competency and Satisfaction) model. John M. Keller is a professor of instructional systems and educational psychology at Florida State University. The basis for his model is founded on two motivational characteristics of state and trait. Keller and Litchfield (2002, p. 87) differentiate between these two motivational characteristics in an individual: "State is a condition brought on by situational stimulus or process, whereas a trait is a stable psychological need or drive." While trait is believed to be fairly static and does not easily change in an individual, state can be changed by appropriate motivational strategies. It is in this area that Keller introduces his model. The goal of an instructional designer in an ARCS-based learning environment, therefore, will be two-fold. On one hand, a designer must accommodate factors that are associated with elements of **trait** that are likely to be motivational and, on the other hand, be conscious of those elements that are **state** and therefore could easily be used to motivate learners. The focus of the ARCS model is thus to create a learning environment that takes into consideration the motivational side of the learner.

"The theory was derived from a synthesis of many areas of research that pertain to human motivation and its purpose is to help answer questions about how to

design motivational strategies into instructions that will stimulate or sustain students' motivation to learn" (Keller and Suzuki, 1988). Hodges (2004, p. 4) summarizes Keller's ARCS model as a "method for systematically designing motivation strategies into instructional material". He further elaborates that the model consists of three components. The **first** component is related to motivation. The emphasis in on creation and sustenance of four distinct motivational attributes: attention, relevance, confidence and satisfaction in offering a lesson. The **second** component is a set of strategies for enhancing motivation in instruction and the **third** component is a design model for motivational design. In a study where he played a key role, Keller adds an interesting dimension to his model. "The ARCS model is based on a synthesis of motivational concepts and a problem-solving approach to design, rather than the application of specific motivational solutions that are advocated without regard for the specific characteristics of a given situation" (Keller and Zuzuki, 2004, p. 1) . This makes the model a dynamic solution that can be applied in different situations and can provide the appropriate remedy relevant to the given situation. Keller's recommended strategy includes "varying the delivery of format of the instruction using humour, participation and facts that contradict a learner's intuition to sustain attention" (Hodges, 2004, p. 4).

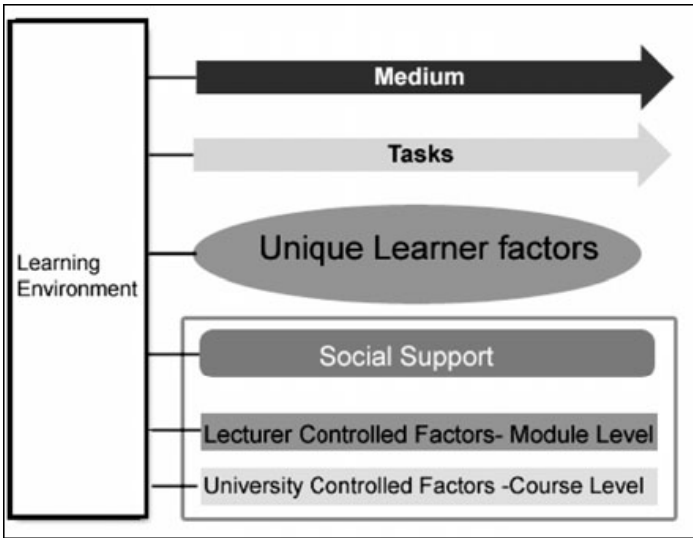
Hodges (2004, p. 5) tells us that the ARCS model includes a design process. Like a typical system-development cycle, it consists of four phases: definition, design, development and evaluation. Once an instructional problem has been identified to be that of motivation, it is stated formally and clearly. Based on the stated problem, motivational strategies are employed to design and develop the required material. The final stage is an evaluation process where the methods and strategies used are evaluated.

Keller's ARCS model has been the subject of subsequent research with varying results. Means, Jonassen and Dwyer (1997, p. 1) found inconsistent results on motivation levels and learning outcomes in different groups. In their study they

examined a number of ARCS-based research projects and found strong evidence for “relevance” as a major motivational factor. One area that is silent in Keller’s work is the role of the lecturer, his/her level of enthusiasm, for example. In research conducted by Concannon, Flynn and Campbell (2005, p. 509) the lecturer’s level of enthusiasm was reported to be an “important initial motivator”. Similar arguments from Seifert ( 2004, p.148) and Seifert and O’Keefe (2001, p. 90) show how other relevant attributes if displayed by the teacher will have an influence on the level of motivation of the students. Teachers who are perceived as being nurturing, supportive and helpful will be developing in students a sense of confidence and self-determination which will be translated into the learning-oriented behaviours of the intrinsically motivated student (Seifert, 2004, p.148, Seifert and O’Keefe, 2001, p. 90). It might be argued that the level of enthusiasm generated by the lecturer and generally his/her role is vital and outside the scope of this study. It should be noted, however, that success or otherwise of many of these technological interventions assume an appropriate and befitting role for the lecturer that cannot possibly be the case under all conditions.

Figure 2.6, below, illustrates how various factors, such as institutional and lecturer controlled factors together with social support and learner factors combine with tasks and medium and are all interrelated in an educational environment. Medium or technology, thus, is just one of these factors. If, for example, in an educational environment with the best technology, there is no passion from the educators and the institutional leadership, as often is reported to be the case in many of our rural schools, the effectiveness of technology will be limited.

Figure - 2. 6 – Graphical illustration of the factors influencing the learning experience ICT tasks (Concannon, Flynn and Campbell, 2005, p. 506)




This confirms what has been mentioned earlier about the educational environment. The students' response to technology, therefore, depends on many influences. These include students' social, cultural background and motivational orientation. To these areas of influence, other institutional factors, such as the role of the lecturer, the department and the faculty are added. In fact, the list is long, and what is being mentioned is but a few of the major players in the educational environment.

I now turn my attention to each of the four motivational components in the ARCS model. What follows is a prescription for the design of e-learning material that is motivational and therefore assists in providing a sustained learning environment.

#### 2.4.4.1 Attention

"First, a lesson must gain and sustain the learner's attention" (Keller and Suzuki, 2004, p. 4). Here a variety of tactics are used to gain a learner's attention. These could include graphics, animation or "any kind of event that introduces

incongruity or conflict" (Keller and Suzuki, 2004). In the earlier study of motivation, it was mentioned that "a stimulus can hold or attract our attention driven by our sense of curiosity" (Kolesnik, 1978, p. 203). Teachers often complain about students' lack of attention. Actually there is attention but not in the areas of interest to the teacher. The course design offered in its collective form takes into consideration elements that would be attractive to the learner, with regard for culture and other variables related to the student it is intended for. "Berlyne has identified three kinds of factors that are most likely to attract our attention: psychophysical, ecological or collative" (Kolesnik, 1978, p. 203). Psychophysical factors refer to factors such as colour and sound adjustments. Ecological factors are those that are biological and emotional, such as a threat. Collative factors refer to elements that give rise to tension, surprise or intellectual conflict etc. In a study by Keller and Suzuki (2004, p. 4), the concept of curiosity in relation to the ARCS model is further expanded: "A second level of curiosity is aroused by using mystery, unresolved problems and other techniques to stimulate a sense of inquiry in the learner." Another concept that is recommended in the model is *variability*. "No matter how interesting a given tactic is people will adapt to it and lose interest in it over time" (Keller and Suzuki, 2004, p. 4). Hodges (2004, p. 4), as mentioned earlier, summarizes Keller's strategy for attracting attention by employing humour, participation and facts in the delivery of instruction.

Under this heading three specific strategies are suggested by Keller and Kopp (1987):

- Perceptual arousal: Gain and maintain student's attention by the use of novel, surprising, incongruous or uncertain events during instruction.
- Inquiry arousal – Simulate information-seeking behaviours by posing or having the learner generate questions or a problem to solve.
- Variability – Maintain the student's interest by varying the elements of instruction.

In summary, Keller, in his ARCS model, recognized the value of curiosity as a motivational sense and used it to attract attention and thereby provide a tool in a learning environment.

Indeed, in a disadvantaged student setting, this could be a prime motivator for initial attraction to technology. A student that comes to the University, even though he has heard a lot about ICTs but has never used them, is curious to experience them. This is not the same with other students who have used PCs extensively prior to coming to university. Provided the attention is sustained, ICTs become a new way of life and an essential tool for learning.

#### 2.4.4.2 Relevance

Once a learner's sense of curiosity is stimulated, Keller feels that the material must be relevant to the students' needs for the initial attention to continue to be sustained. The educational environment needs to offer services that are compatible with student goals and connected with their past experience. "In general, it is more difficult to establish the relevancy of the instructions than to generate attention" (Keller and Kopp, 1997, p. 293). Here the designer of the educational material ensures that the student is presented with relevant information. Technology, with its power of offering different levels of interactive responses (menus), is well suited to accommodate the desired level of flexibility. A simple option chosen from a menu can focus on the type of material that the student is precisely looking for. Keller and Kopp (1987, p. 293) recommend three strategies to accommodate relevance.

- Familiarity - Use concrete language, examples and concepts that are related to the learner's experience and values.
- Goal Orientated - Provide statements or examples that present the objectives and utility of the instructions, and either show their accomplishments or have the learner define them.

- Motive Matching- Use teaching strategies that match the motive profiles of the students.

This is of particular significance in this study since often the elements of familiarity and motive matching are ignored in our educational settings. It is not often that a student's background, culture and preferences are taken into account when designing academic courses offered.

In Hodges' s(2004, p. 4) interpretation of Keller's ARCS model for relevance, I came across the following: "relevance is addressed by incorporating a choice in method of accomplishing course goals into the instruction, or stating how instruction relates to the learners at the present time, or how it will help them meet future goals." He further recommends that the use of enthusiastic guest lecturers who had themselves completed the course, relating how the course had helped them, would make the material more relevant.

In the study conducted by Bonk (2002, p. 11), 88% of the respondents found relevance to be the highest motivational factor for using Web-based material. This agrees with Hodges' (2004, p. 5) statement that "Relevance is by far the most reported successful motivator." Means, Jonassen and Dwyer (1997, p.1) conducted research with a particular emphasis on relevance. They concluded that "both intrinsic and extrinsic strategies enhanced the motivation of the college learners. Embedded relevance-enhancing strategies resulted in greater motivation and performance gains than did intrinsic relevance."

Thus, the relevance of technology to the disadvantaged students' needs becomes another factor that encourages students continue to use it. They first became attracted to it because of the curiosity as discussed in the previous section. Once attracted, interest is maintained, provided it is relevant to overall student goals, objectives and culture.

#### 2.4.4.3 Confidence

There needs to be confidence in one's ability to complete the objectives of a course reasonably successfully, otherwise the motivation to continue with the

course could diminish. "A positive expectancy for success is the third requirement for motivating learners. The risk level needs to be adjusted according to the confidence levels of the learners and the type of learning objectives" (Keller and Kopp, 1987, p. 293). Keller and Kopp recommend three strategies to accommodate confidence:

- Expectancy for Success – Make learners aware of performance requirements and evaluative criteria. "When learners know what to expect, they are more likely to be confident in their estimate of success than when a high degree of ambiguity surrounds the testing and evaluation processes" (Keller and Suzuki, 1988, p. 415).

- Challenge Setting – Provide multiple achievement levels that allow learners to set personal standards of accomplishment and performance opportunities that allow them to experience success. Provide challenge levels that allow meaningful success experience under both learning and performance conditions (Keller and Suzuki, 1988, p. 415).

- Attribution Moulding - Provide feedback that supports student ability and efforts as the determinants of success. Motivation to learn is more likely to be enhanced by providing learner control over access to different parts of the courseware, and over the difficulty level. A menu-driven structure is the ideal way to provide this feature. Provide challenge levels that allow meaningful success experience under both learning and performance conditions (Keller and Suzuki, 1988, p. 417).

Alessi and Trollip (2001, p. 27) feel that three practices increase confidence:

- Making expectations clear to the learner,

- Providing reasonable opportunities to be successful in the lesson, and

- Giving the learner personal control; provided success is achieved without luck and the perception of being easy.

Hodges' (2004, p. 5) interpretation of the ARCS model with respect to confidence is that "clearly stating learning goals, organizing materials in order of increasing difficulty, helping students set realistic goals, attributing success to effort, and allowing students to become independent learners are all strategies for instilling confidence in the learners."

A general feature that has been attributed to computers is their ability to provide multiple paths with varying degrees of sophistication to solve a problem. That is why so many people from different backgrounds, young and old, rich or poor, clever and not so clever find them attractive. The implication for the disadvantaged student is that, having become attracted to the new tool and finding it relevant, he/she continues using it in an ever-increasing manner, since his/her sense of self-confidence is increased as he/she faces challenging but not overly difficult problems to address. Culturally, in a disadvantaged student setting, the main source of acquiring knowledge and support are other students and friends. Technology facilitates this. This sense of gaining confidence is accelerated, which is the reason why technology plays a critical role in the life of a disadvantaged student.

#### 2.4.4.4 Satisfaction

Here, elements of design take into consideration factors that ensure the student's satisfaction with his/her educational experience, once initiated. Keller and Kopp (1987, p. 293) provide us with some examples where motivation could die out.

- If the evaluation and grading system seems subjective and arbitrary,
- If an intrinsically motivated person is locked into an externally controlled contingency system, or
- If the experience of the instruction simply isn't what was expected.

Alessi and Trollip (2001) provide other suggestions to ensure the continued and positive motivation of the learner: positive consequences following progress, encouragement during times of difficulty and fairness on the part of the lecturer.

According to Hodges (2004, p. 5), “satisfaction strategies include verbal reinforcement, rewards, personal attention, feedback, and deliberate avoidance of negative influences. Negative influences include threats, external performance evaluations, and overt surveillance.”
Keller and Kopp (1987, p. 294) recommend three strategies to accommodate satisfaction.

- Natural Consequence – Provide opportunities to use newly acquired knowledge or skills in a real or simulated setting.
- Positive Consequence – Provide feedback and reinforcements that will sustain the desired behaviour.
- Equity – Maintain consistent standards and consequences for task accomplishment.

### 2.4.5 Motivation from Malone’s Point of View

Another example of an instructional designer who uses technology to motivate learners in a learning environment is Malone. This section summarizes his contributions. The importance of such developments for this study emanates from the fact that, in a way, they demonstrate examples for the noblest fruits that the marriage of motivation and technology has produced. Here psychological principles are identified and technology is used to server students’ learning environment.
“The successful use of microcomputers in education depends critically on the cognitive and motivational processes in learning and the social structure of the educational setting” (Malone and Levin, 1983, p. 1).
As can be seen from the comments from Malone and Levin, they recognize the fact that technology has the remedial power to provide educational solutions to the needs of divers groups of social structures.
Malone suggested three elements that contribute to motivation in the design of educational material. These are challenge, curiosity and fantasy. He later added learner control.

#### 2.4.5.1 Challenge

This is individually based and aims at making the content neither beyond the capacity of the learner nor too easy. This principle is further maintained through educational experience.

In order for an activity to be challenging, it should present a *goal* for which the *outcome is uncertain.* This can be achieved for a wide range of players by (a) having variable difficulty levels (either chosen by the player or determined automatically) and (b) having a number of goals at different levels all embedded in a single environment. These multiple-level goals can often be encouraged by score-keeping or speeded responses (Malone and Levin, 1983, p. 8). This is a practical manifestation of many of the ideas mentioned above. For example, Bandura (1997, pp. 3–5) in his work on self-efficacy, reminded us how success builds robust belief in one's personal efficacy, which in turn is a predictor of academic performance.

#### 2.4.5.2 Curiosity

Malone identifies that cognitive curiosity is aroused by information that conflicts with the learner's existing knowledge or expectations, is contradictory, or is in some way incomplete (Allesi and Trollip, 2001, p. 25).

Educational activities can evoke *sensory curiosity* by including audio and visual effects, such as music and graphics. They can evoke *cognitive curiosity* by leading learners into situations in which they are surprised. To be educational, the surprising situations should include information that helps the learners understand the misconceptions that led them to be surprised in the first place (Malone and Levin, 1983, p. 8).

Closely linked ideas are interest, creativity, curiosity and attention. Interest is a personal attribute and differs from one person to another depending on sex, age,

levels of maturity and personal tastes. The idea is that, based on what one is interested in, one could be motivated to move in a particular direction. Human beings have a natural inclination to explore their environment, i.e., we have a sense of curiosity. "We want to satisfy our curiosity and find out more about the world around us" (Kolesnik, 1978, p, 199).

"Curiosity is more likely to develop in an emotionally comfortable, nonthreatening, relaxed atmosphere in which the individual student feels secure and free to investigate the kinds of things he wants to investigate. Thus, a classroom atmosphere conducive to intrinsic motivation is one in which the student feels free to make mistakes as he ventures into new areas of his own, knowing that he will not be ridiculed or rejected for making the effort" (Kolesnik, 1978, p. 201).

#### 2.4.5.3 Control

According to Alessi and Trollip (2001, p.25), in Malone's motivation theory there are three rules relevant to control: contingency, choice and power. The contingency rule implies that a lesson sets out to achieve, in the expected manner, what it is expected to. There are no surprises or disappointments. Choice provides flexibility and maneuver capability based on menus and branching capability. The notion of power implies the experience is overwhelming and thus motivating.

#### 2.4.5.4 Fantasy

Fantasy facilitates the provision of an imaginary state of what a learner could experience once the course or lesson is completed. It acts as a motivating stimulus. "Fantasy situations encourage learners to imagine themselves in imaginary contests or events using vivid realistic images" (Alessi and Trollip, 2001, p.25).

Fantasies in instructional activities can make the activities emotionally appealing. They can also provide practical examples and vivid images for the use of the skill being learned (Malone and Lenin, 1983, p. 8).

This concludes my literature findings on technology and the learning environment. I started by recording how in a state referred to as the "*flow state"* it is possible for an individual student to become so immersed in the feature of technology that he/she can easily spend long periods in search of information. I then offered the suggestion that the advent of technology is similar to other milestones in the developmental stages of humanity such as the invention of language and printing and therefore to a large extent is inevitable and indispensable. I then presented contributions from literature that offered suggestions that technology, through its unique and special motivational power, is capable of arousing a sense of curiosity, attracting attention, providing suitable challenges and is therefore able to satisfy and capture students' attention in the learning environment. Two examples of Keller and Malone were forwarded with each case emphasizing different types of various motivational variables that could be used in an instructional-design setting.

Now that the student is motivated, the cognitive elements must be processed before learning can happen which is the focus in the next section.

### 2.4.6 Technology and Cognition

An essential element that needs to be mentioned in this study is the cognitive side of learning. It was mentioned earlier how a student is motivated through his/her cultural and social background and how technology can provide motivational tools. However, in the final analysis, unless this process is combined with cognition, or the thinking process, learning will not take place. Norman (1993, p. 15) tells us that there are many modes of cognition, many different ways by which thinking takes place. The two modes particularly relevant are called experiential cognition and reflective cognition. Experiential

thought is reactive, automatic thought, driven by the patterns of information arriving at our senses but dependent upon a large reservoir of experience (Norman, 1993, p. 23). The reflective mode is that of comparison and contrast, of thought, and of decision making; this is the mode that leads to new ideas and novel responses. Modern technology has the power to enhance reflection, to make it even more powerful than before (Norman, 1993, p. 16). Technology is not always used optimally. The manner in which the television is used in most instances is a case in point. A typical viewer sits passively and watches scenes that are not necessarily reflective. Our educational system is more and more trapped in the experiential mode: the brilliant, inspired lecture; the prevalence of pre-packaged films and videos to engage the student and the textbook that follows a predetermined sequence (Norman, 1993, p. 17). The use of computers for education, in most cases, if designed properly, will fall into the reflective category, provided it is challenging but solvable, able to attract attention and cause excitement. When learners actively construct knowledge, it is more meaningful, applicable and memorable (Jonassen, 1996, p. 13). Learning from computers or about computers should be replaced with learning with computers (Jonassen, 1996, p. 17).

### 2.4.7 Computers and the Community of Learners

Literature also mentions social elements that technology facilitates to motivate learning. Meaningful technology-assisted educational experience is embedded in what is called the “Community of Inquiry”. This model is based on the assumption that learning occurs through the interaction of three essential elements: cognition, teaching and social interactions. The last, i.e., the social presence, supports both cognition and teaching by its ability to spark, sustain and support interaction (Garrison, Anderson and Archer, 2000; Greyling and Wentzel, 2007, p. 656). This confirms our understanding that learning is a complex interaction between cognitive, motivational, affective and social processes which culminates in the development state where students assume responsibility for their own learning (Greyling and Wentzel, 2007, p. 657). The social

phenomenon of technology-based learning is of particular interest in this study since there seems to be a group and collective approach amongst students in this study when seeking for a solution to a problem.

The literature does provide us with a word of warning. It is acknowledged that technology offers many innovative features that can be used to make instruction more appealing to the learners. However, many of these features are interesting only because they are novel and may lose their appeal as learners become accustomed to them (Keller and Suzuki, 2004, p. 1). A second voice of concern is expressed in the literature regarding the number of drop-outs in an online delivery setting, which is said to be higher in online learning and distance education when compared with face-to-face delivery (Keller and Suzuki, 2004, p. 3). While this is not directly related to this study—since the delivery mode under consideration is that of a blended approach—it is important to note some of the limitations of e-learning.

## 2.5 ICT Use and Academic Performance

Having established that ICTs are inevitable and indispensable, I now look into the question of their effectiveness as a teaching and learning tool. One of the critical questions that this research needs to answer is whether ICTs assist with improvement in academic performance. Weaver (2000) provides us with an example of a longitudinal study which spanned a number of years and examined the role of the use of technology in teaching science and mathematics. He concluded that improvements in academic results could be positively correlated to the amount and type of computer use in science and math classes. Keengwe, Onchwari and Wachira (2008, p. 80), in analysing the benefits of technology in education, report conflicting outcomes with cases with no significant difference in students' academic achievements. Another example of an apparently negative

connotation to the use of ICT in education is found in a study by Bradbrook, Alvi, Fisher and Lloyd, (2008, p. 49).

It says:
An analysis of student data collected in 2,000 schools across 31 countries concluded that once other resources, institutional characteristics and the socio-economic composition of the classroom are taken into account, no statistically significant difference in pupils' performance could be found between schools 'strongly lacking' computers and those without such a shortage (Fuchs and Woessmann 2004, p. 17).

A deeper examination of the research reveals the facts. In the same document, Fuchs and Woessmann (2004, p. 17) mention: "By contrast, student performance is positively related to the use of computers at home for accessing emails and web pages and to the availability of educational software at home". This once again confirms that it is not merely the availability of a computer that improves academic performance but it is the manner in which it is used. An issue that needs to be emphasized in relation to providing a solution to the disadvantaged students is that the mere presence of technology is not likely to make much difference. Kirkwood and Price make this point very clear in their study. Although ICTs can *enable* new forms of teaching and learning to take place, they cannot *ensure* that effective and appropriate learning outcomes are achieved (Kirkwood and Price, 2005, p. 257). Alexander and McKenzie provide more details in their study. First, they say that:

The use of a particular information technology did not, in itself, result in improved quality of learning or productivity of learning. Rather, a range of factors were identified which are necessary for a successful project outcome, the most critical being the design of the students' learning experiences (Alexander and McKenzie, 1998, p. 3).

They then elaborate on the factors that contribute towards a successful learning outcome. I have shortened substantially the originally extensive list but included what I believe is relevant to the UL project at this point in time:

- The way the project is integrated into the learning experience is well thought through and implemented, and the support needs of students and staff are identified and planned for,
- The project team has adequate access to technical support and educational software development expertise,
- Individual members of the project team are committed to the project and have adequate time to carry out their roles and responsibilities in the project (e.g., through release from teaching),
- Students have adequate access to the hardware and software required for implementing the project,
- Where required, sufficient funding for implementation of the project is available,
- The head of department/School and the dean are supportive of the project, recognize the value of the project to the department or faculty, and they are committed to its implementation,
- The institution's promotion and tenure policies recognize teaching developments as a significant contribution to the university.

As can be seen from the above, the successful implementation of technology in the academic program is a complex and involved process that necessitates a well-planned integration at all management levels. The 2006 Council for Higher Education thus summarizes the changes facing the universities in South Africa: There has been a shift in the use of ICT in higher education institutions, from the initial emphasis since the late 1980s/early 1990s on the administrative

environment, to an expansion into the academic environment, accompanied by e-learning policies, structures, and new academic related practices.
This confirms the literature findings that a holistic and comprehensive plan needs to be in place before ICT implementation can have a visible impact on the academic performance of students.

Blackmore, Hardcastle, Bamblett and Owens (2003, p. iv), in their ICT report with focus on disadvantaged students in Australia, summarized their findings based on the literature as follows.
Case studies and larger systemic reviews of the literature (Meredyth, Russell, Blackwood, Thomas and Wise, 1999, p. xxxiii; Wenglinsky, 1999) suggest that teachers and parents agreed that ICT did the following when underpinned by innovative teaching:

- Motivated and stimulated learners,
- Solved some problems of students' 'motivation' for academic work and competence with literacy,
- Encouraged problem solving, analytical and creative thinking,
- Improved students' understandings, assimilation and creation of new knowledge,
- Provided new modes of communication to network locally and globally,
- Provided access to data bases, Web-sites and discussions that were previously unavailable,
- Assisted in the development of independent learning and research skills.

It is interesting to note that every one of these points were also raised, in one form or another, by the questionnaire that was used in this study and serves therefore as a verification of the findings stated above.

In terms of specific tools within ICTs, email has been subject to some studies with some findings that relates to both motivation and academic performance. In a recent research on motivational aspects of the interaction with email between students and their lectures Kim and Keller (2008, p.45) found a positive effect especially when the emails are personalized.
Next, I turn to the disadvantaged student with his/her particular background, needs and attributes and document the salient points that literature has offered in this regard.

### 2.5.1 ICTs and the Disadvantaged Student

> *"There is a considerable risk that already disadvantaged groups and marginalized people will not be able to benefit fully from the new opportunities offered by ICT."*
>
> (Punie, Zinnbauer and Cabrera, 2006, p. 15)

Aspects related to the culture, technology and motivation associated with students and their learning patterns were documented in earlier sections of this chapter. Although these aspects were approached, mostly, from a general student perspective, the underlying motive was to examine the effect of these variables against disadvantaged students. In this way, it was shown how a disadvantaged student who often comes from a particular cultural background is influenced by it and how this in turn has a bearing on motivation and response to technology. In this section, I document what literature contains, in general, about disadvantaged students.

Before any further discussion on the topic, I should explain what I mean by a disadvantaged student in this study. The term "disadvantaged student does not imply some deficiency on the part of individual students or groups of students. Rather, it understands disadvantage as a complex set of factors that prevent some students from equitable access to, and participation in, worthwhile

educational experiences" (Blackmore, Hardcastle, Bamblett and Owens, 2003, p. 7). Educational disadvantage is: "the impediments to education arising from social or economic disadvantage which prevent students from deriving appropriate benefit from education in schools" (Madden-Hallett and Ho, 2008, p.1).

One of the common features in the literature regarding ICTs and the disadvantaged is the almost universal acceptance that its existence is synonymous with the improvement of learning patterns. Its degree of success, however, is documented to be different and depends on the way that it is implemented.

For example, in his work with disadvantaged students, Carr (2001) found that, overall, the results obtained by students using a web-based delivery system were slightly better than that of students on the equivalent paper-based course. However, students from disadvantaged backgrounds fared marginally ***worse*** than those on the paper-based course (Carr, 2001, p. ii). There are two points that catch the attention in Carr's - statement. First, all students that used the web-based delivery method did better than those that were doing it face-to-face, and second, the disadvantaged students, overall, did worse than those on the paper-based course.

At face value, the statement says that those who used the Web-based method and were also disadvantaged did worse in their academic results. On a closer look at the research, it becomes clear why there was a difference. Later on, Carr in his research document states: "It should, however, be noted that allowing students to work off campus would favour the advantaged students. The disadvantaged students would still only be able to access their course material from computer laboratories on campus" (Carr, 2001, p. 97). It becomes clear, therefore, that students that were being compared did not have access to the same level of resources outside the campus and therefore cannot be expected to

produce the same level of performance. This addresses another critical point with respect to the institutional role that needs to be played when dealing mostly with disadvantaged students. A critical finding from a study by Blackmore, Hardcastle, Bamblett and Owens illustrates this point: home computer use significantly impacts the capacity of ICT to improve the learning outcomes for all students. Home access is a key element in whether and how students integrate ICT into their learning in school (2004, p. ix). This puts extra responsibility on the institutions to compensate for this deficiency if their disadvantaged students must compete nationally with other students from other educational institutions with access to computers at home. It is this dimension of ICT that concern Muller, Hernandez, Giro and Bosco (2007, p.1177) that rather than providing a reliable relief from injustice it tends to reinforce existing social structures and inequalities. In a study done by Bradbrook, Alvi, Fisher and Lloyd (2008, p. 47), which has a special focus on disadvantaged students, the implication of ignoring this resource imbalance is highlighted.

*Without intervention, resource-rich families are the most likely to adopt technology. Resource-rich families develop ICT skills as - crucial cultural capital for the current and emerging digital age. ICT is used as a tool to increase and strengthen both social and cultural capital, through - tools to support and extend social networks and by easy access to information. ICT can also increase financial capital by giving access to cheaper goods and services.*

The other factor to bear in mind is that one needs to take into consideration the quality of work and dedication that might go into course preparation. Just as it is possible to have a pen that does not write well, it is possible to deliver an online lecture that is not attractive to students. What is certain, based on what is documented in the literature, is that ICT is a powerful tool for effective communication, but its success in teaching and learning still depends on the quality of teaching skills used in the delivery. Further evidence in Carr's research that the delivery might have been a problem is shown further in the research -:

"The majority of the students were against web-delivery of course material" (Carr, 2001, p. 98). This statement, and the fact that the majority of students did not favour the particular Web-based course, indicates that there must have been fundamental problems with the way the course was presented and not with the mode of delivery. In other words "learning seems to be affected more by what is delivered than by the delivery system" (Kirkwook and Price, 2005, p. 259). Therefore, technology does matter to academic achievement, with the important caveat that whether it matters depends upon how it is used (Wendlinsky, 1999, p. 34). Bradbrook, Alvi, Fisher and Lloyd (2008, p. 50), following the detailed analysis of a series of research papers that had positive and negative comments about ICT, conclude that the crucial component in the use of ICT within education is the teacher and his or her pedagogical approaches. In other words, if the coordination and the preparation of the material to be presented is carefully considered and the necessary dedication and care is used in preparing for the presentation for the lecture, the outcome will be positive; otherwise, even with the best tools, i.e. technology, will not make much of a difference.

Having explored various studies on the effect of ICTs on disadvantaged students, I am reminded of one of the best examples of success in this area of study that needs to be mentioned as this section of the literature review comes to an end. For this, I turn to the research Professor of Psychology Hartley who reminds us of the well known "hole- in- the-wall" study, which in some ways has some practical implications for this research study. Often, a student with no prior experience with technology walks into our computer laboratories with some friends. A few days later he/she is already hooked on the new way of learning. This is owing to the informal communication that takes place amongst students. Following a similar experience for developing countries, Hartley concludes: "Such a picture of the potential use of new technology in developing countries is perhaps an idyllic one" (Hartley, 2007, p. 55). He then summarized the experience, which I feel is what happens in the University of Limpopo's computer laboratories on an ongoing basis.

Typically, learning proceeds as follows:

1. One learner explores randomly and others watch until an accidental discovery is made (e.g., if you press this button, the following happens).

2. Several learners repeat the discovery for themselves by requesting that the first learner let them do so.

3. While in Step 2, one or more learners make additional accidental or incidental discoveries.

4. All of the learners repeat the discoveries made and, in the process, make more discoveries and start to create a vocabulary to describe their experiences.

5. The vocabulary encourages them to perceive generalizations (e.g., when you do this, then that happens).

6. They memorize entire procedures for doing things (for example, how to open a painting programme and retrieve a saved picture). They teach each other shorter procedures for doing the same thing whenever one of them finds a new, shorter, procedure.

7. The group divides itself into the ‘knows’ and the ‘know nots’ much as they did into ‘haves’ and ‘have nots’ in the past. A learner that ‘knows’ will share that knowledge in return for friendship and exchange.

8. A stage is reached when no further discoveries are made and the children occupy themselves with practicing what they have already learned. At this point, adult intervention is required to introduce new discoveries.

A number of references are made in the literature that recommend knowing the environment as the first step before an effective solution can be offered in a disadvantaged setting. “Empowerment can only occur when it is clear who the learners are that require this empowerment. Each institution providing open and

distance education should have a clear picture of the profile of their students" (Beneke, 1999, p.1). While this recommendation is specifically addressed to a distance-learning environment, I feel there is no reason why it could not equally be applicable in a blended-mode approach.

Ackerman (2004, p. 251) goes further and feels that a study should be conducted into the role that culture plays in learning. Hence, a learners' background will be one of the variables that will be taken into consideration.
Lazenby (2003, p. 297), in her suggestion for further research, points to the need to investigate whether strategies are used at other higher education institutions in terms of innovation and perhaps find a correlation between the strategies used and the culture of particular universities. She further identifies an area that requires considerable research: the needs of South African learners and lecturers in the flexible environment—especially Web-supported learning. Another research field pertains to the question of whether a Web-supported learning environment fosters students who are academically more mature. The common feature that underlines all these suggestions is that, before educationalists can prescribe a remedy that meets the needs of the students, they must study the environment. This means understanding the culture, motives, habits, family background, likes and dislikes of the students. It is only in such informed settings that educational solutions can be effectively offered. It is indeed to this end that the cultural, motivational and technological tendencies of the students were surveyed in this study so that, based on an informed situation, recommendations could be made for a solution.

In conclusion to this section, I feel the findings from BECTA (British Educational Communication and Technology Agency) are a befitting ending. **Education is a way to overcome disadvantage, though this is complex to achieve** (Bradbrook, Alvi, Fisher and Lloyd (2008, p. 89).

In the next section, Chapter 3, I will be documenting the research plan and the methodology that I used to solve my research questions.