

CHAPTER 2

Literature survey

2.1 INTRODUCTION

The literature survey for this dissertation focuses on aspects such as the learning community, pedagogy and technology. This chapter commences with a literature review of individual components of a computer-integrated Theme Day. Numerous sources were consulted in search of appropriate material. Printed material in the form of journal articles and books, electronic journal articles, electronic database such as www.iearn.com, ITFORUM and the World Wide Web were consulted in the literature search. Resources were also retrieved from an ERIC database. The learning community will be described in the following section.

2.2 LEARNING COMMUNITY

“Today’s kids bring a new culture to the family landscape. Children understand computers because they can control them. They love them because they can make their own windows of interest. Remember sitting in class? If what the teacher said was too simple, you lost interest. And oh how tiny that window was.” (Negroponte in the foreword to Seymour Papert’s *The Connected Family*, 1998 IN: Lemke & Coughlin).

The learning community, as illustrated in Figure 1.2, are the learners, educators and the Connected Learning Community at St Alban's College. The learning community of St Alban's College belongs to the net generation. This community are working in cooperative groups, using digital technology to its utmost potential during computer-integrated Theme Days. In this section, the learners of the *Net Generation*, *Net Generation* learning, the *digital child* and new generation educators will be described.

2.2.1 Learner characteristics of the Net Generation

Digital technology is not intimidating for the children of today, and according to Tapscott (1998b:1), a new generation has emerged. This new generation is known as the Net Generation. These learners differ from their predecessors because they grow up surrounded by digital media. Cellular phones, computers and digital technologies, such as digital cameras, are commonplace to the Net Generation or in short the *N-Gen*. They work with all these technologies at school and at home. These new technologies are increasingly connected to the Internet and an expanding web of networks, which are attracting many new users monthly. The N-Gen children are constantly surrounded by technology and are accustomed to its strong presence in their lives. The N-Gen is the new generation, who, in profound and fundamental ways learn, work, play, communicate and create communities very different from that of their parents (Tapscott, 1999:1; Miller, 2003: 22-24).

The age of N-Geners is between 2 and 20 years. This new generation is exceptionally curious, smart, focused, high in self-esteem and has a global orientation (Tapscott (b) 1; De Villiers, 2001:41). The generation category of the three generations before the "arrival" of the N-Gen is tabulated in Table 2.1:

Table 2.1 Generation category

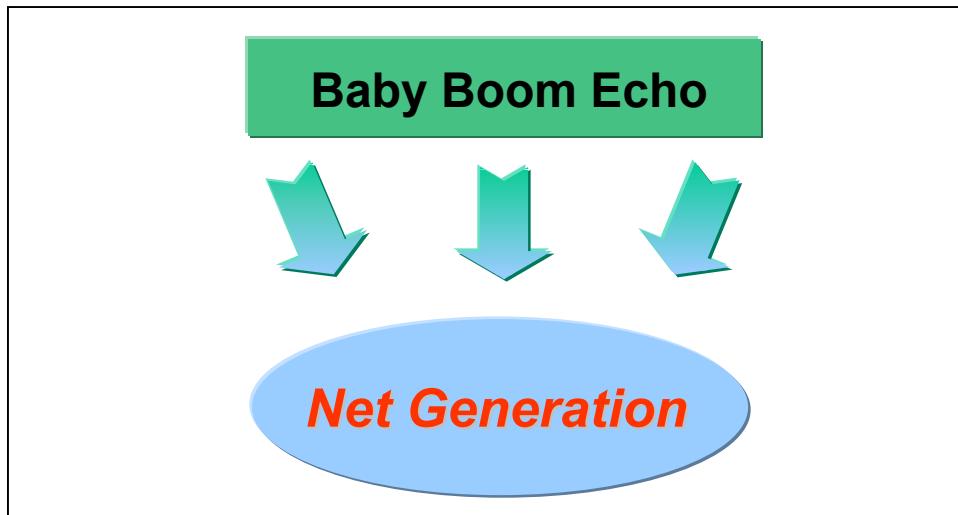
Generation category	Description
The Baby Boom	People born between 1946 and 1964.
The Baby Bust	People born between 1965 and 1976.
Baby Boom Echo	People born between 1977 and 1997. The Baby Boom Echo eventually gave way to a new generation, i.e. the <i>Net Generation</i> . This generation is influenced by intensive Internet usage.

(Tapscott 1998a:15-22; De Villiers, 2001:41-42; Miller, 2003: 22-24)

In the period following the Second World War, the so-called baby boom occurred, i.e. babies born between 1946 and 1964. Between 1977 and 1997 a great number of babies were born. The children of the baby boomers are known as the baby bust,

i.e. babies born in 1965 to 1977 (De Villiers, 2001:41). The Internet penetrated US households almost as fast as the television did in the 1950s. In 2000, almost 40 percent of American households were connected to the Internet and new technologies appeared on the market such as Web browsers and e-mail (Tapscott, 1999:4). The Baby Boom Echo generation tried to prolong their youth. This wave of youth coincides with the digital revolution, which is transforming society. Together, these two factors are producing a new generation where the Baby Boom Echo eventually became the *Net Generation* (Tapscott, 1998a:20-22; De Villiers, 2001:41). The Baby Boom Echo becoming the *Net Generation* can be visualised by making use of Figure 2.1.

Figure 2.1 Baby Boom Echo becomes the *Net Generation*



Therefore, this study inquires into the appropriateness of the Theme Day concept for the Net Generation learner. This new generation and the media they use will be described in the following section.

2.2.2 New Generation and the media

The cornerstone of the New Generation is the shift from broadcast to interactive media. The learners want to be users of media, not just its viewers or listeners. Research in the USA detected a decline in television viewing from 1995 to 2000. Nielsen Media Research projects that the population between the ages of 2 and 17 year view 100 hours television less a year (Tapscott, 1998:2).

The penetration of the new media into the American households meant less hours in front of the television but an increasing number of hours spent at the computer surfing the Internet. The new generation finds the new media increasingly more popular because it is interactive. The learners have to search for information on the Internet, rather than simply looking at the information on a television screen or reading text in a textbook. The learners of the Net Generation developed into critical thinkers – they have to decide which web sites are worth visiting and which ones are not (Tapscott [a], 1998:29 & Tapscott [b], 1998:4; De Villiers: 2001:43).

The learner characteristics of the *digital child* will be described in the section to follow.

2.2.3 Learner characteristics of the *digital child*

Although Tapscott refers to a whole new generation of children i.e. the *Net Generation*, it is important to provide a description of the '*digital child*'. Table 2.2 tabulates a summary of the *digital child*, how they use technology and the learning styles of these children.

Table 2:2 Characteristics of the *digital child*

Who is the <i>digital child</i>?	<ul style="list-style-type: none">▪ The <i>digital child</i> is a boy or a girl who lived his or her entire life in a digital world.▪ The <i>digital child</i> is the offspring of parents who were not born in a digital world but grew up during the transformation from an analogue world to the digital one.▪ The <i>digital child</i> was born in the latter half of the 20th century.▪ For the <i>digital child</i>, life is a balance between working, learning and playing.
Relationships	<ul style="list-style-type: none">▪ Relationships with other human beings are the most important aspect of life.▪ Family relations, community relations, learning and working relationships form the fabric of the <i>digital child</i>.
Learning style	<ul style="list-style-type: none">▪ <i>Digital learners</i> do not learn in isolation.▪ They learn in groups even if the group members live in other countries.▪ Learning is collaborative and social, not solitary and competitive.▪ <i>Digital learners</i> want recognition for real accomplishments.

Table 2:2 (Continue)

Digital curriculum	<ul style="list-style-type: none">▪ <i>Digital children</i> must learn to read critically, write effectively and speak fluently.▪ The <i>digital learners</i> must be prepared for life in their own time, i.e. to cope in the digital world.▪ The digital curriculum must produce citizens who are extremely discerning. The <i>digital child</i> must be able to distinguish between the useful information and the hype, or the truth from the propaganda.▪ Excellent education is the key to thriving in a digital world.
Use of technology	<ul style="list-style-type: none">▪ The <i>digital child</i> is comfortable with new technologies and makes the most of these new technologies in his/her professional life, confidently awaiting the next new technological breakthrough.

(Vail, 2001)

The impact of the computer on the learner in a digital environment will be described in the following section.

2.2.4 The impact of the computer on the learner in a digital environment

The impact of the computer on the learner in a digital environment will be described in this section. Computers do not necessarily have only positive effects on learners in the digital environment. Computers can have a negative influence on learners and this leads to behavioural and/or health problems. Research in the United States of America has revealed that the American youth between the ages of 2 and 17 are viewing 100 hours a year less television but this has resulted in the increasing number of hours the children have spent surfing the Internet or chatting with their "cyber friends" (Tapscott, 1998:2). Literature revealed that aspects such as the ergonomic risks, communication skills of learners and computer anxiety might have an impact on the new generation learners. These aspects are summarised in Table 2.3.

Table 2.3 Communication skills, social problems, ergonomic risks and computer anxiety in a digital environment

Communication skills	<ul style="list-style-type: none">▪ Learners prefer to communicate by means of e-mail even if they are sitting in the same classroom.▪ Computer and the use of e-mail resulted in poor communication skills with other learners sitting in the same classroom.
Social and related problems	<ul style="list-style-type: none">▪ Children spending too much time in front of the computer have the tendency to be:<ul style="list-style-type: none">○ overweight,○ displaying poor life skills,○ experiencing reading and writing problems,○ have a declining interest in reading books,○ experiencing visual and perceptual problems,○ are less creative because the computer has many graphic software packages available and they can just cut and paste images.▪ The potential danger of children viewing pornography on the Internet exists.▪ An emotional dependency on the computer develops.
Ergonomic risks	<ul style="list-style-type: none">▪ Poor posture, inadequate furniture and lack of frequent breaks can cause injuries.▪ Furniture in schools is not always adjusted to suit the school's computer centre. Warning signs are younger learners whose feet don't touch the floor and learners who tilt their heads and necks because the computer screens are too high.▪ Research by a neurologist of the Centre for Occupational and Environmental Neurology in Baltimore shows that teenagers and young adults are showing repetitive-stress injuries, which once were seen only in adults. The neurologist believes that these injuries are preventable if the necessary preventative measures are implemented at school computer centres. Table 2.4 suggests some preventative solutions.

Table 2.3 (Continue)

Computer anxiety	<ul style="list-style-type: none">▪ Frustration and irritation leads to panic attacks.▪ Fear of embarrassment, failure and disappointment in front of other learners in the classroom.▪ Physical symptoms of anxiety are:<ul style="list-style-type: none">○ becoming cold and sweaty,○ getting clammy hands,○ feeling like crying, and○ increased heart rate.▪ Time causes anxiety when educators place an emphasis on the speed in which assignments have to be completed.
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(Vail, 2001; Monk IN: Vail, Fajou, S).

A lack in communication skills, social and related problems, computer anxiety and ergonomic risks can be addressed, and possible solutions are tabulated in Table 2.4.

The *Reader's Digest Oxford Complete Wordfinder* (1996:409) defines 'ergonomics' as 'the study of the efficiency of persons in their working environment'. The impact of the computer and its usage in the digital environment resulted in learners, who lack proper communication skills, as learners prefer the computer as a medium of communication, using e-mail and chat rooms to communicate. Learners are thus isolating themselves in the process. Educators and parents play an increasingly important role in the digital environment, as they should monitor learners and the time they spend in front of the computer (Vail, 2001:5). Literature reveals that educators and parents can implement measures to assist learners to acquire proper communication skills, how to curb computer anxiety and reduce ergonomic risks.

These aspects are summarised in Table 2.4.

Table 2.4 Possible solutions to communication skills, social problems, ergonomics risks and computer anxiety in a digital environment

Communication skills	<ul style="list-style-type: none"> ▪ Motivate learners to discuss a topic in class instead of using the computer to search for solutions.
Social and related problems	<ul style="list-style-type: none"> ▪ Educators should be trained properly to utilise computers appropriately in their classrooms. ▪ Computers are becoming increasingly a part of life, and children who don't use them, will be disadvantaged! ▪ A balance between the time spent in front of the computer and time on the sports grounds is important. ▪ The moderate use of computers is of the utmost importance. ▪ Install software packages that will prohibit children from accessing pornographic web sites on the Internet.
Ergonomic risks	<ul style="list-style-type: none"> ▪ Schools need to pay attention to ergonomic risks of all their learners, especially the junior learners, who are acquiring work habits at the computers that will last into adulthood.
Computer anxiety	<ul style="list-style-type: none"> ▪ Educators can curb learners' computer anxiety by providing appropriate feedback to the learners. Feedback is important as it provides the learners with an indication how they are progressing and which sections of the work need more attention. It is often the case that the learners who need more feedback receive less than the more competent learners who may have fewer problems. ▪ Educators' motivation can help learners to overcome anxiety. Computer games can help learners feel more relaxed about computers in general and thus help them overcome any computer anxiety they may experience.

(Vail, 2001; Fajou, S; Truter, 2003 IN: Sarie; Bouwer, 2003 IN: Sarie)

New-generation learners growing up in a digital world need new-generation educators. The new-generation educators and the role they fulfil in the life of new-generation learners in a digital world will be described in the following section.

2.2.5 New-generation educators

The new-generation learners require new-generation educators. The role of the educator has now become that of a facilitator. Since the new media is drastically

changing the learning milieu, the educators have to change their roles and become better adapted to their new system of learning. The changing role of the educator will be described in the following section.

2.2.5.1 *From educator-centred to learner-centred education*

New media has shifted the centre of the learning experience to the individual rather than the transmitter (the educator). The shift from educator-centred education to learner- centred education does not imply that the educator has a less important role to fulfil. The educator is equally critical in learner-centred education, and still plays an essential role in creating and structuring the learning experience. The new media provides a vehicle to focus the centre of the learning process on the learner and no longer just on the educator. Unfortunately, education in the past tended to focus on the educator and not so much on the learner. Many of the classroom activities used to entail that the educator was talking and the learners listening (Tapscott, 1998a:144-145; Tapscott, 1998b:5).

Learner-centred education begins with an evaluation of the abilities, learning style, social context and other important factors of the student that affect learning. Learners would use software programs extensively, which can structure and tailor the learning experience for the learner. The learning experience would therefore become an activity, with learners discussing, debating researching and collaborating on their projects facilitated by a new generation of educators (Tapscott, 1998:5-6 & Tapscott, 1999:6).

2.2.5.2 *From the educator as transmitter to the educator as facilitator*

A new-generation educator facilitates learning. Educators are no longer the transmitters or sole providers of knowledge. Instead, where learning is facilitated, learners construct their own knowledge. These changes are also visible in the South African education system, as the role of the educator as well as that of the learners has changed with the implementation of the outcomes-based education. The new generation of educators need to learn new tools, new approaches and new skills to

educate the new generation of learners. This means that educators should go for further training or attend workshops to keep up to date with the new trends in education (Tapscott, 1998a:148-149; Olivier, 1998:34-35).

Learners should be prepared to live, learn and work successfully in the digital age. According to Lemke & Coughlin (1988:16), in order to prepare these learners for survival in a digital age, their education requires:

- high academic standards,
- technological fluency,
- communication skills,
- information literacy,
- independent in learning,
- critical thinking abilities, and
- economic viability . . . within the context of a digital communication age.

Educators at St Alban's College do fulfil the role of facilitators and they are well adapted to these new roles. The importance of new technology and the integration of computers are not neglected. Furthermore, these educators are no longer the sole providers of knowledge. They provide the St Alban's learners with learning experiences where they can construct their own meaning. This opportunity becomes a reality by means of the computer-integrated Theme Day concept. A detailed description of the role of the Connected Learning Community (CLC) in this study is provided in Chapter 3: Project description. So, this study investigates the new role of the educator of the Net Generation learner and the role the educator would play in a computer-integrated Theme Day environment.

2.3 PEDAGOGY

The new-generation learning from instruction to construction and discovery will be described in the following section.

2.3.1 New-generation learning

Tapscott (1998:5) is of the opinion that there is a shift away from pedagogy – the art, science and profession of teaching – to the creation of learning partnerships and learning cultures. A school can become a place to learn rather than a place to teach. Learners don't want pre-designed information, they want to learn by doing where they synthesise their own understanding, which is usually based on trying things out. Educators describe this approach as the constructivist approach to education. Learners are not assimilating knowledge by being instructed by educators, rather, the learner constructs knowledge anew. Constructivism argues that people learn best by *doing* rather than simply being told what to do. Constructivism is the opposite of instructionism. The evidence for constructivism is persuasive, but it shouldn't be too surprising. The enthusiasm that young learners have for a fact or concept 'discovered' on their own is much more likely to be meaningful and retained than the same fact simply written out on the classrooms blackboard by the educator (Tapscott, 1998:143-145, Hein, 1991:1-2).

Cooperative learning, a historical perspective thereof and the essential elements of cooperative learning will be described in the following section.

2.3.2 What is cooperative learning?

A short historical perspective of cooperative learning is followed by a definition of the terms cooperate and cooperative learning. Montagu (1965) is quoted as follows in Johnson & Johnson (b):

"Without the cooperation of its members society cannot survive, and the society of man has survived because the cooperativeness of its members made survival possible ... It was not an advantageous individual here and there who did so, but the group. In human societies the individuals who are most likely to survive are those who are best enabled to do so by their group."

2.3.3 Cooperative learning: a historical perspective

Cooperative learning is an old idea and as early as the first century, Quintilian argued that learners could benefit from one another. In the last three decades of the nineteenth century, Francis Parker was one of the most successful advocates of cooperative learning. Parker believed that learners would fully develop their capacities only if shared learning was encouraged and competition was eliminated as the main motive in school tasks. Following in Parker's lead, John Dewey promoted the use of cooperative learning groups as part of his method in instruction. Dewey argued that if humans are to learn to live cooperatively, they have to experience the living process of cooperation in schools (Johnson & Johnson, 1991:17-20).

More recently, Johnson & Johnson published the first edition of *Learning Together and Alone* in 1975. Literature has revealed that the two American brothers, David W Johnson and Roger T Johnson, did extensive research on cooperative learning practices and published widely in numerous books and journals. A number of researchers began to develop cooperative learning procedures to be used in classrooms. David de Vries, Robert Slavin, Spencer Kagan, Shlomo Sharan and Elliot Aronson, to mention but a few, have also contributed to cooperative learning practices (Johnson & Johnson, 1991:18-20).

2.3.4 Defining cooperative learning

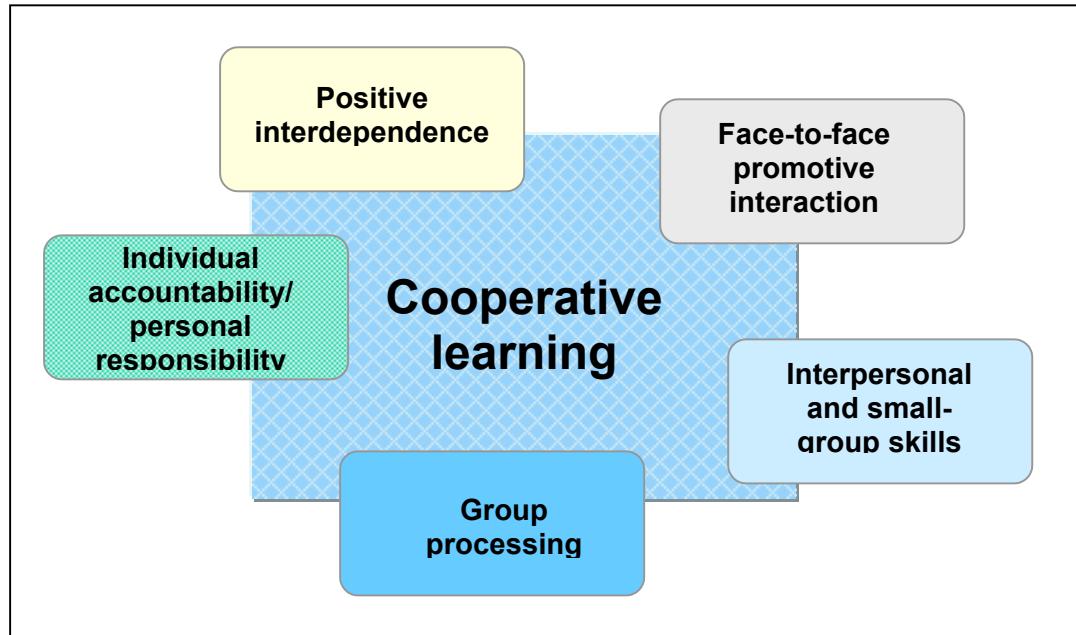
Cooperation and cooperative learning can be defined as follows. **Cooperation** is working together to accomplish shared goals. According to Johnson & Johnson ([a] 1) **cooperative learning** is the instructional use of small groups of learners. These learners work together to maximise their own and each other's learning. Cooperative efforts result in participants striving for mutual benefit so that all the group members gain from each other's efforts. All the group members share a common fate, i.e. 'we all sink or swim together here'.

A heart transplant or brain surgery are examples of major operations, and the success of these operations cannot depend on the work of a single surgeon who operates alone. The success and outcome of the operation depends on the surgeon's skills and knowledge as well as the entire medical team who cooperates with the surgeon operating on the patient. Cooperation is an inescapable fact of life. From cradle to grave, humans cooperate with others. The five essential components of cooperative learning will be described in the following section.

2.3.5 Essential elements/components of cooperative learning

It is only under certain conditions that cooperative efforts may be expected to be more productive than competitive and individualist efforts. Figure 2.2 illustrates the five essential components of cooperative learning.

Figure 2.2 The essential components of cooperative learning (adapted from Johnson, Johnson & Holubec, 1994:10)



The five basic elements of cooperative learning must be included for small-group learning to be truly cooperative. These essential elements are discussed in the following section.

2.3.5.1 *Positive interdependence*

"All for one and one for all."

Alexandre Dumas (IN: Johnson & Johnson, 1991:55)

The first and the most important element of cooperative learning is *positive interdependence*. The educator should provide clear task and group goals so that the learners would know that they will 'sink or swim together'. Group members have to realise that every learner's efforts will not only benefit that of the individual alone but the group as a whole. Positive interdependence exists when learners coordinate their efforts with the efforts of their fellow group members to complete a task (Johnson & Johnson, 1991:55-56; Kennedy, 1993:17).

2.3.5.2 *Face-to-face promotive interaction*

The second element of cooperative learning is *face-to-face promotive interaction* among the members of the group (Johnson, Johnson & Holubec, 1994:9). Promotive interaction is characterised by individuals providing each other with efficient and effective help and assistance, exchanging needed resources, such as information and materials, and providing each other with feedback in order to improve their subsequent performance. To obtain meaningful face-to-face interaction, groups should be small – the number of learners in a group should range between two and six. According to Johnson & Johnson (1991:57), the perception does exist where each learner's contribution and efforts increases as the number of learners in the group decreases. Whereas the larger the groups become, the more pressure peers can place on unmotivated learners (Kennedy, 1993:18).

2.3.5.3 *Individual accountability and personal responsibility*

The third element of cooperative learning is *individual accountability*. The group must be accountable for achieving its goals, and each member has to be accountable for contributing to a fair share of the work. A lazy or uncooperative learner cannot 'hitchhike' on the work of the others and in the process receive

recognition for it. The purpose of cooperative learning groups is to make each member of the group a stronger individual in his or her own right. Individual accountability is the key to ensuring that learning cooperatively strengthens all group members (Johnson, Johnson & Holubec, 1994:10-11; Johnson & Johnson, 1991:57; Kennedy, 1993:18).

To ensure that each learner is individually accountable for his or her fair share of the group's work, educators need to assess how much effort each member is contributing to the group's work. Johnson & Johnson ((a) 4) suggested the following ways to structure individual accountability:

- i. Keep the size of the groups small.
- ii. Randomly examining learners orally by calling on one learner to present the group's work to the educator or the entire class.
- iii. Assign one learner in each group the role of checker (leader). The checker asks other group members to explain the reasoning and rationale underlying group answers.
- iv. Observing each group and recording the frequency with which each member contributes to the group's work.

2.3.5.4 *Interpersonal and small-group skills*

The fourth element of cooperative learning is teaching learners some essential *interpersonal and small-group skills*. By placing socially unskilled individuals in the same group and telling them to cooperate is no guarantee that they will work effectively together. The group members must know how to provide effective leadership, get to know each other, to manage conflict and to communicate with other group members. Learners must be taught interpersonal and social skills. If learners are to work together in cooperative groups, they must be equipped with the appropriate skills (Johnson & Johnson, 1991:57; Johnson, Johnson & Holubec, 1994:10-11; Kennedy, 1993:17).

2.3.5.5 *Group processing*

"Take care of each other. Share your energies with the group. No one must feel alone, cut off, for that is when you do not make it." (Willi Unsoeld, renowned mountain climber, IN: Johnson & Johnson, (b) 5).

The fifth element of cooperative learning is *group processing*. According to Johnson, Johnson & Holubec (1994:11), group processing exists when group members discuss how well they are achieving their goals and how well they maintain effective working relationships. In order to ensure that small-group processing takes place, educators allocate some time at the end of each class session for each cooperative group to process how effectively members worked together. Groups need to describe what member actions were helpful and not helpful in completing the groups tasks. An important aspect of small-group processing is group or class celebrations. It is the feeling of being successful, appreciated and respected that builds commitment to learning and the enthusiasm about working together in cooperative learning groups, and a sense of self-efficacy in terms of subject-matter mastery and working together with classmates (Johnson & Johnson, (b) 5; Kennedy, 1993:17-19).

2.3.6 Cooperative learning groups

A group of learners sitting at the same table doing their own work, but being free to talk with each other as they work, is not structured to be a cooperative group, as there is no positive interdependence. Study groups, project groups or reading groups are not necessarily cooperative. Placing learners in the same room and calling them a cooperative learning group does not make them one (Johnson & Johnson, 1991:55; Johnson, Johnson & Holubec, 1994:6). Before the cooperative learning event, the educator makes two pre-instructional decisions, i.e. the size of the group and the assignment of learners to a group.

2.3.7 Size of the groups

According to Johnson, Johnson & Holubec (1994:24) there is no ideal size for a cooperative learning group. The appropriate size depends on the outcomes of individual lesson, the learners' ages, materials and/or equipment available and the time limits for the learning event. The size of cooperative learning groups ranges between two and four learners per group, but smaller groups are advisable (Kennedy, 1993:34).

According to Geistert and Futrell (2000: 245) small groups of four to five learners can use a computer station at the same time. The number of users per computer are best utilised within some cooperative learning format with individuals being given specific responsibilities and with a clear designation of one learner with the role as the computer operator (Kennedy, 1993:42). The educator should consider the tasks and the time frame wherein learners should complete their assignments. Each group is assigned a set time to work on a specific task. According to Geisert & Futrell (2000:243-244) educators should be cautious with the use of time to complete assignments on computers. Although it appears to be the fairest method of allocating the computer's time, it hides the fact that the quicker learners will learn more than the slower learners in the same group.

Chapter 2 of this study investigates the concept of cooperative learning, the utilisation of cooperative learning groups and the size of cooperative learning groups for learners of the net generation. Computer-integrated Theme Days at St Alban's College implemented cooperative learning, and learners worked in cooperative groups. This concept is described in Chapter 3 of this study.

Cross-curriculum will be described in the following section.

2.3.8 Cross-curriculum

According to Morrison (1994:1), the responsibility rests upon schools to prepare the learners to cope with change. Furthermore, there is at present a need for learners to

be adaptable and flexible as never before. The school also has the task to prepare learners for life outside and beyond the school. In this sense, cross-curriculum plays an important role (Siraj-Blatschford, 1995:2, 27).

According to Morgan (2001:23), the computer is a technological tool that adds to the hidden curriculum by structuring thinking and, in so doing, prescribes how individuals process information. Furthermore, as an educational tool, the computer communicates value as the significance of knowledge, the importance of the individuals as problem solvers, and the supremacy of logic.

The learners of St Alban's College are in a fortunate position to benefit from the hidden curriculum, as it is not part of the College's prescribed curriculum. The benefit lies in 'experiencing and participating' in computer-integrated Theme Days. It was not only the learners as part of the CLC team who benefited, but also the learners as the participants. The learners of form CLC team gained managerial skills and conflict resolutions skills by being involved in the planning and execution of a Theme Day. The participating learners, on the other hand, learned how to work in cooperative teams, sharing knowledge and assisting fellow group members where necessary. A detailed discussion of the learners and the leaders who were members of the CLC team is provided in Chapter 3, i.e. the Project description.

The digital divide where the 'haves' have access to computers versus the 'have-nots' as those who do not have access to computers, as well as the initiatives to bridge the digital divide in South Africa, will be described in the following section of this study.

2.4 TECHNOLOGY

Technology does have benefits and limitations, which includes the accessibility or non-accessibility to technology, schools with computer centres and those without it. Resources, be they human resources, i.e. well-trained educators or financial resources, will always be a contributing factor. There are examples of schools that have computers, but the educators do not know how to utilise them, or are not willing

to use them. Technology and the universal problem, which is the digital divide, will be described in the following section of this study.

The aim of this dissertation is not to provide an in-depth and detailed description of technology and its use during Theme Days. The technological aspects do have an influence and without it, a computer-integrated Theme Day will not be possible. Technology and a universal problem, which is the digital divide, will be described in the following section of this study.

2.4.1 The digital divide

The aspects of the digital divide were described in the introductory chapter, section 1.2.1. As information technology becomes more important for economic success and societal wellbeing, the possibility of 'information apartheid' as Tapscott (1998:11) refers to the term 'digital divide' in a different manner, becomes increasingly real. The most widely feared prediction surrounding the digital divide is that it will splinter society into a race of information 'haves' and 'have-nots', 'doers' and 'do-nots' – a digital divide (Tapscott, 1998:255; Tapscott, 1999:2; Morgan, 2001:22).

Research for this study focuses on literature relevant to computer-integrated Theme Days. The case study under discussion is about a computer-integrated Theme Day at school that can be classified as being part of groups who are the 'haves'. Research relevant for this study is 'about the haves' and how technology is implemented and utilised by the learning community belonging to those 'haves'.

Although the scenario sketched is that of a school with a richly equipped computer centre, the opposite scenario does exist in many South African schools. Many disadvantaged schools have not yet integrated computers into their teaching and learning process. Even if these schools had computers, they would not use them or give little thought to the idea of how to utilise computers in their school system, or the computers donated to the school were stolen. Cossa (2002:19-21) referred to the example of Katlehong High School. The principal and educators had no idea what to do with the computers that were donated to the school. They did not even plan to use them.

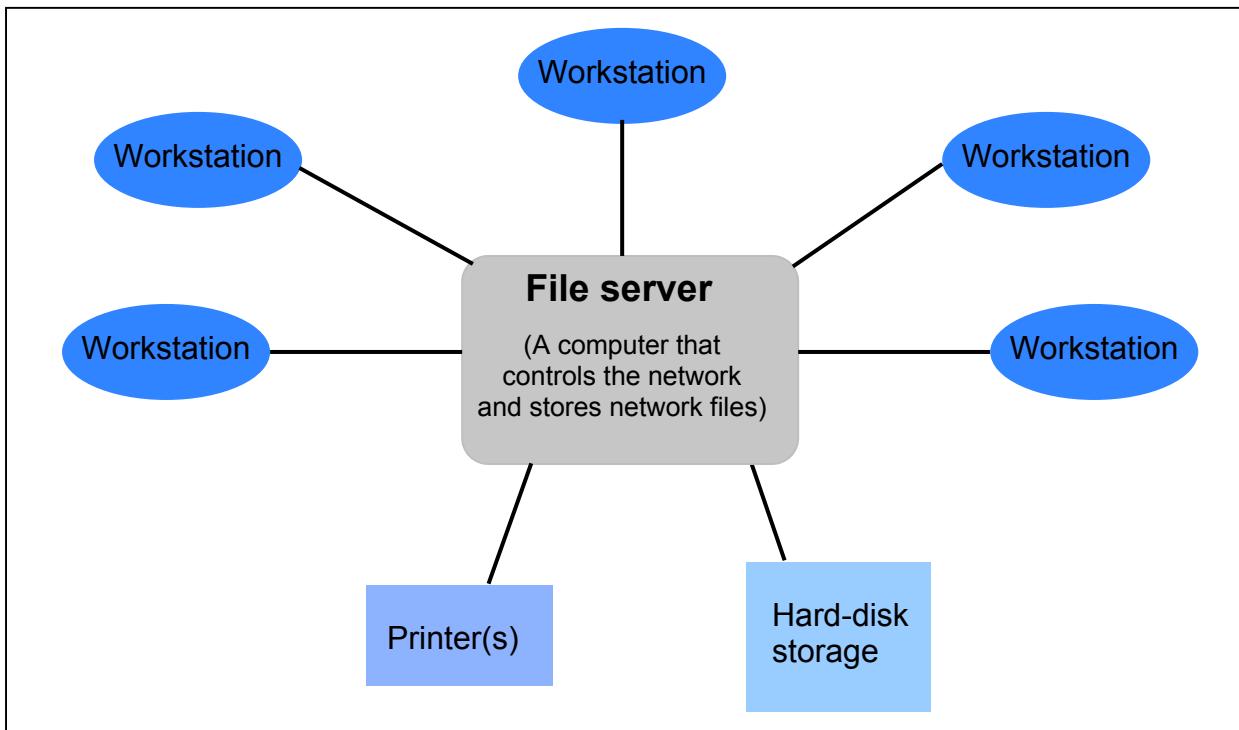
2.4.2 Technology today

Four components of technology, which is the local area network, the intranet, the Internet and bandwidth, will be described in the following section. These components are important factors contributing to the education of new-generation learners growing up in a digital environment. E-mail and the Internet are an integral part of the lives of these learners. Specific technological aspects at school make it possible for the new-generation learners go about their daily activities at school. These four aspects will be described in short, and the complicated technical detail of a computer centre will not be described as it is not part of the research for this study.

2.4.2.1 *The school's local area network (LAN)*

A local area network (LAN) connects computers within a limited area. A LAN distributed throughout a school's facilities offers a connection between learners, educators, administrative staff members and school-wide resources. Educators leave assignments on one computer and learners can access it from another computer, or the school principal can send messages to all computers with the click of a button. Figure 2.3 illustrates the layout of a LAN for a computer centre.

Figure 2.3 A local area network (LAN) for a computer centre (Adopted from Heinich, et al. 2002: 276)



A LAN alone does not provide educators or learners access to the Internet. The technological infrastructure of a school allows learners, educators and parents to be connected via an Internet Service Provider (ISP) or have access via a dial-up facility to the Information Hub housed on an Intranet (Beyers (c), 1998: 6). The aforementioned means of access provide the essential connections to facilitate the process of allowing the educator to

- publish learners' work at any time of the day,
- check e-mail for responses from learners,
- respond to e-mail requests from parents,
- search the Internet for information on the next section of work,
- publish test results on a database, and
- restructure and publish lesson plans directly onto the intranet.

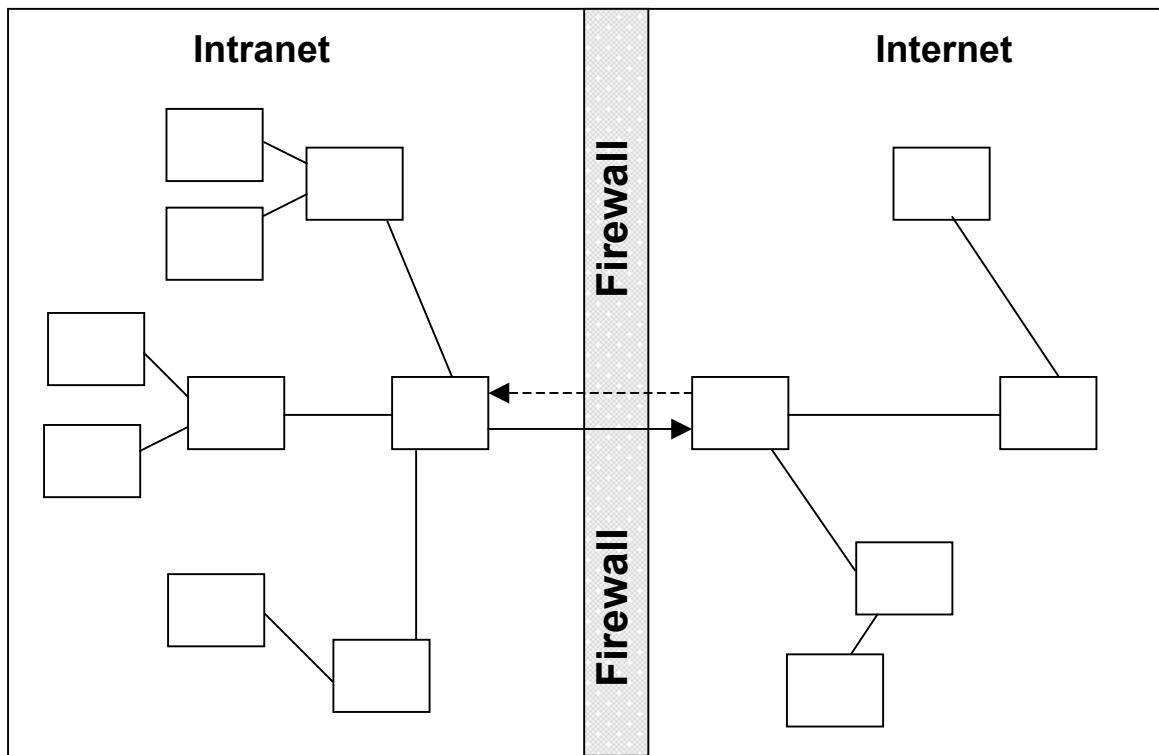
2.4.2.2 *The Intranet*

Intranets are internal networks for schools, and are a way of increasing communication, collaboration and information dissemination within schools. Users can access the intranet directly without a password or user name. The intranet is connected to a larger network, e.g. the Internet. A software package called a firewall prevents external users from accessing the internal network, while allowing internal users to access external networks. Refer to figure 2.4 for an illustration of an intranet, the Internet and a firewall.

According to Heinich et al. (2002:274), the development of an intranet is not a one-person project. When using the intranet, it is important that it is coupled with the structure of the computer centre, the instructional designers and information technology of the school. Instructional designers will work in cooperation with the managers of the computer centres, staff members of the school and curriculum specialists.

Parents might find intranets useful. They can, for instance, access the intranet to review their child's work or to correspond with educators. Parents without computers at home can log on to a school's network to gain access to the learners' work from the computer centre or the school's library. The intranet can easily be updated with the latest information. Figure 2.4 illustrates the intranet and a firewall of a computer centre.

Figure 2.4 An intranet and firewall of a computer centre (Adopted from Heinich, et al. 2002:274)



2.4.2.3 *The internet*

Computer networks come in many sizes and are used for many types of applications. The Internet is the most widely used network (Heinich, et al. 2002:262-263). To gain access to the Internet, a user has to maintain an account with an Internet Service Provider (ISP). Examples of ISP's in South Africa are www.mweb.co.za, www.icon.co.za or www.iafrica.com. Figure 3.4 illustrates the Internet as a collection of computer networks.

The Internet forms the foundation of the information superhighway. According to Heinich, et al. (2002:263) the Internet is an expanding network of cables, fibres and telephone lines that forms the physical structure of the electronic 'universe' known as cyberspace. The Internet delivers vast amounts of information directly to individuals at school, tertiary institutions or work. The Internet connects millions of computer networks across the globe and it provides several services such as (Heinich, et al., 2002:263):

- Electronic mail (e-mail), which makes person-to-person communication possible.
- Information search capabilities for accessing libraries or databases of information throughout the world.
- Live communication, allowing individuals on the Internet to 'chat' or 'talk' to each other in real time.

2.4.2.4 *The bandwidth*

Technology advances at a startling rate, and new facilities are available, e.g. the use of optical fibres instead of cables. The use of cables limits what can be transferred from one computer to another. Phone lines are too slow and operate on a too narrow bandwidth to handle multimedia applications such as video, sound and animation (Heinich, et al. 2002:296-297). Wireless networks promise to prove easier and better transmission of multimedia materials.

The history of the StaTech centre at St Alban's College will be described in the following section.

2.4.3 The history of the StaTech centre at St Alban's College

A brief historical description on the creation and establishment of StaTech Centre at St Alban's College is as follows. Lippert (1993:127) refers in her research in the early 1990s to the StaTech Centre at St Alban's College as "... a role model for the nineties". In 1988, the management council of St Alban's College decided to conduct a feasibility study regarding technology in education. Simultaneously, a staff member conducted research abroad in the United Kingdom (UK) and in the United States of America (USA) to review the use of computers in twenty-four high schools. The aforementioned actions gave "birth" to a project that is presently known as StaTech – an acronym for the St Alban's Technology Centre (Vieyra, 1993:9-10, 38). St Alban's had to overcome the problem of learners going to technology as opposed to turning to technology to solve the problem. The construction of the StaTech complex meant that the learners had to leave their traditional classes and move towards technology

(Beyers (b) 1999:6). The StaTech centre served as a model for the nineties and with the implementation of the computer-integrated Theme Days in 1999, the centre surely serves as a model for 2003 and the future.

According to Lippert (1993:128-129) the mission of StaTech became to research and deliver cost-effective courses, products and services for the key customers of St Alban's College, the wider community and organisations committed to innovative people development strategies. The StaTech centre was designed to use computers as a fully integrated educational delivery centre. St Alban's College has an ethos of concern and introduced outreach programmes, which makes the College facilities available to disadvantaged township communities such as communities in Mamelodi and Hammanskraal (St Alban's brochure, 5 July 2002). Mamelodi is a black township next to Pretoria and Hammanskraal is situated approximately 50 km north of Pretoria.

The technological purpose of this research is to consider the role of technology in assisting learners and educators in a cooperative learning community in the context of a Theme Day.

2.5 SUMMARY

Chapter 2 provided the literature survey for this dissertation. The literature review of the four aspects investigated for this dissertation, namely learners, educators, pedagogical and technological aspects are described in this chapter. The arrival of the New Generation, New Generation learning and the use of cooperative learning to educate these new-generation learners was described. Literature focused on learners growing up in a digital world; the impact of the use of computers and related problems were highlighted. The relevant literature that has an influence on a computer-integrated Theme Day was described in detail in each of the aspects under discussion. Chapter 3 is the project description of this study, which is the *Earthly Aliens Theme Day* of 31 May 2001.