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Towards a social software technology ecology for computer-supported collaborative learning

by

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I declare that

Towards a social software technology ecology for computer-supported collaborative learning

is my own work and that all sources that I have used or quoted have been indicated and acknowledged by means of complete references.

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Sumarie Roodt

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Abstract

Towards a social software technology ecology for computer-supported collaborative learning

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The objective of this study was to determine whether social software can be used to support Computer-Supported Collaborative Learning (CSCL) for the Net Generation of students in a higher education context. The use of social software combined with a CSCL environment is proposed as a tool that can improve teaching and learning endeavours around the world. In attempting to justify this proposal, a Participatory Action Research project was conducted at the University of Pretoria which involved conducting social software interventions over the course of three years, 2009 to 2011, on a 1st year under-graduate course run in the Faculty of Economic and Management Sciences.

Three key themes were explored extensively, being the Net Generation, CSCL and Social Software. The study sought to find commonalities between these three concepts, as well as identifying existing research, which would make them influential in supporting collaborative learning endeavours for the Net Generation in higher education. The use of Social Software in higher education, as well as the use of Social Software for CSCL in higher education, was explored to determine whether, how and the extent to which Social Software is being used to support CSCL for the Net Generation in higher education. Most of the research done in

this regard is limited to the actual social software tool(s) that is used, with little focus on providing input as to how Social Software can be used for CSCL for the Net Generation in higher education.

An existing CSCL Theoretical framework was used as a basis to develop an enhanced framework, called the Social Software Socio-Economic-Cultural-Technical (SECT) framework for CSCL. The SECT framework was developed incorporating relevant concepts from Bloom's Revised Taxonomy, Experiential Learning Theory, CSCL and Participatory Action Research, as well as the application of the relevant findings from each iteration of the project.

The positive results obtained from this study concerning the use of social software for CSCL and the subsequent social software SECT framework for CSCL, will enable lecturers to understand and design successful CSCL environments using social software for the Net Generation of students in higher education.

CONTENTS

DETAILED CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

INTRODUCTION

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

The pervasiveness of the internet has changed and continues to change the way in which students engage with their learning environments. Much of this change can be attributed to the introduction of the personal computer and the internet during the latter part of the 20th century and now enjoys relatively high levels of adoption globally (Thompson, 2007). The internet as we know it today, commonly known as Web 2.0, has become ubiquitous with people's daily lives and has brought about new opportunities to create educational uses with it (Lambropoulos & Romero, 2009). This development has led to the application of Web-based software, Web 2.0 (also known as social media), to support student learning via group interaction, known as educational social software (Lambropoulos & Romero, 2009). For the purpose of this thesis I will be using the term '*social software'* to refer to the application of Web 2.0 for student learning throughout this thesis. Not only has the advent of social software itself influenced the way in which educators' interact with students, but so too has it influenced the learning preferences of today's students (Oblinger & Oblinger, 2005). This generation of learners, known as the Net Generation or Digital Natives, have unique learning preferences which present challenges to traditional learning environments which need to be addressed by educators (Thompson, 2007). For the purpose of this thesis I will be using the term '*Net Generation'* to refer to these students throughout this thesis.

For this Net Generation of learners, learning has become a collaborative social endeavour. These students want learning environments that are active, social and learner-centered (Oblinger & Oblinger, 2005). Collaborative social learning, commonly known as collaborative learning, includes the creation of understanding through group interaction, with a focus on social learning. Social learning focuses on the '*how*' rather than the '*what*' of education and (Prensky, 2001) argues too that '*how people learn'* is as important as '*what people learn*'. For the purpose of this thesis I will be using the term 'collaborative learning' to refer to the concept of collaborative social learning. Collaborative learning emphasizes the ability of students to participate in study groups and transfer knowledge (Johnson & Johnson, 1986). There are clear benefits to a collaborative learning environment that cannot go unnoticed, for example that students can clarify uncertainties while taking hold of the material more easily by asking questions and acquiring different views from fellow students, as well as the fact that students are able to enter into comfortable and non-threatening

'*peer learning environments'* (Brown & Adler, 2008). In order to create this type of collaborative learning environment, there is mounting evidence that social software is one type of tool that can be used to enhance the collaborative learning process (Roodt, De Villiers, Joubert, & Oelofse, 2009). Research on the use of social software for the Net Generation suggests that social software can be integrated into the learning processes in order to enhance the learning experience (Green, Facer, Rudd, Dillon, & Humphreys, 2005).

One reason for this is that Web 2.0 technologies, and more specifically social software, share many characteristics with the learning preferences of the Net Generation of learners and exhibit characteristics that are particularly well aligned to the use of these technologies in an educational context (Oblinger & Oblinger, 2005). These similarities stem from the fact that using social software is by nature done in a social context and is centered on the principle of social interaction. To this end, the Net Generation gravitate towards group activity as well as having a need for social interaction not only in their personal lives but also in their education environments (Oblinger & Oblinger, 2005). As such, both social software and the Net Generation of learners share the characteristic of being social by nature amongst others. So whilst social software is used for social interactions amongst the Net Generation, it is also used to support their learning activities (Li, Ingram-El Helou, & Gillet, 2012). Other similarities will be discussed in the literature review which follows in Chapter 3 of this thesis.

According to Li et al. (2012), "*…many efforts have been made to incorporate social media into students' overall learning ecology…*". Much research is currently taking place about what constitutes an active, social and learner-centered learning environment, as well as what technologies can be used to enable the realization of such environments (Roodt, 2010). Even-though there is much research taking place regarding this development, the use of social software to enhance learning environments is still in its early phase and needs to be explored further (Li et al., 2012). As Clark, Logan, Luckin, Mee & Oliver (2009:56) state, "*More needs to be understood about the transferability of Web 2.0 skill sets and ways in which these can be used to support formal learning*." Therefore, this research endeavor aims to further contribute theoretically and practically to the body of knowledge about the use of social software for collaborative learning for the Net Generation in higher education. I attempt to do this by exploring the use of social software to support collaborative learning for the Net Generation in higher education by conducting a participatory action research project at the University of Pretoria. This participatory action research project involves conducting social software interventions over the course of three years, 2009 to 2011, on a 1st year under-

graduate course run in the Faculty of Economic and Management Sciences, called 'Business Driven Technology'. This course, known as INF112, has traditionally been viewed by students and lecturers alike as being of little or no value, as well as having low class attendance and limited engagement (INF112 Course Evaluation, 2008). I selected this course because the students enrolled for it are part of the Net Generation of students and because of the average class size being 1500 students, it provides a representative sample for this study. For this research, a number of social software were selected over the course of three years, including Facebook©, pbWiki© (which has been rebranded to pbWorks© subsequent to my thesis), Google Groups©, Google Sites© and YouTube©. In view of the fact that this is the first time that the University of Pretoria is applying this innovative and technologically advanced teaching and learning method, the research is important to establish if it will be feasible to continue with the teaching method in the future as well as determining to what extent social software can be used to support collaborative learning for the Net Generation in higher education. Additionally I endeavour to develop a revised CSCL framework for the use of social software in higher education for the Net Generation, based on the outcome of the findings from the social software interventions on the INF112 course.

1.2 MOTIVATION FOR THIS STUDY

The main inspiration for this thesis is to determine whether INF112 course can be improved by using social software for collaborative learning for the Net Generation of students enrolled for this course. I believe that this research will make a meaningful contribution to the body of knowledge regarding the use of social software for education.

As mentioned during the introduction, the research being conducted about the use of social software for education is relatively new and more research is needed to validate the findings (Li et al., 2012). Furthermore, many of these studies focus on the use of one type of social software only, such as wikis, and do not include the use of multiple types of social software in the same study. At the time of writing this thesis, there is limited evidence of research being conducted to develop a social software technology ecology for collaborative learning for the Net Generation in higher education. I intend to develop a social software technology ecology that can be used by higher education institutions for collaborative learning for the Net Generation.

Additionally, there is limited literature available on the use of social software for collaborative learning for the Net Generation in higher education and as such I endeavour to build on that body of knowledge both from a theoretical and practical perspective. The intended outcome is not only to

determine whether and to what extent social software can be used to support collaborative learning for the Net Generation in higher education but also to make the learning experience interactive and enjoyable for the students enrolled for the course.

1.3 ASSUMPTIONS AND LIMITATIONS

This study is limited to the context of 1st year commerce students at the University of Pretoria enrolled for the INF112 course and does not extend to other higher education institutions. The resulting assumption is that there is no difference between the learning preferences of the Net Generation of students at other higher education institutions globally. Also, another resulting assumption is that there is no difference between the Net Generation of students in other faculties at universities, such as Medical Science or Engineering.

This study is limited to using social software for learning in the collaborative context and does not include using social software for individual learning. The results of this study will therefore be limited to collaborative learning only and will not address learning in the individual context. Additionally, this study is limited to three participatory action research iterations, spanning from 2009 to 2011. The resulting assumption is that the three iterations are sufficient to address all of the research questions adequately. It also then assumes that the research findings are also representative and can be applied to the future.

This study focuses on using only web-based social software and does not include studying the use of any off-line and/or standalone social software. The resulting assumption is that there is no difference between the extent to which on-line and off-line can be used to support collaborative learning for the Net Generation in higher education. It must also be noted that the data that is used to generate the findings is based on students' perceptions only.

Lastly, this study is limited to exploring the research questions within the context of higher education and does not include primary, secondary and/or adult education environments. The resulting assumption is therefore that the findings apply to all levels of education, from primary, secondary, adult and higher education.

1.4 THEORETICAL UNDERPINNINGS

Kirriemuir & McFarlane (2003) argue that in order to understand what the potential benefits of social software in the educational context are, it is important to first understand the concept of learning and what the underlying theories thereof are. Table 1 below (adapted from Kirriemuir & McFarlane, 2003) identifies three contemporary learning theories being Behaviourist, Cognitivist and Constructivist, and summarises these learning theories and their corresponding aspects.

	Behaviourist	**Cognitivist**	**Constructivist**
Knowledge is:	Passive, largely automatic responses to external factors in the environment	Abstract symbolic representations in the mind of individuals	A constructed entity made by each individual through the learning process
Learning is:	A relative permanent change in behaviour	A change in a learner's understanding	Discovery and construction of meaning
Focus of learning is on:	Association, operant behaviour, conditioning	Increased meaning and improved memorisation	Problem-solving and construction of meaning
Key learning concept:	Reinforcement and programmed learning	Elaboration	Intrinsic motivation
Centered on:	Teacher	Learner	Learner

Table 1: Contemporary Learning Theories

A new emergent contemporary learning theory, called 'Connectivist Learning', was developed by George Siemens during 2005. This learning theory was developed by Siemens because his view is that the behaviousist, cognitivist and contructivist learning theories were developed when learning was not impacted by technology (Siemens, 2005). He argues that because of the paramount impact that technology has had on people's lives over the past three decades, our learning theories should be reflective of our underlying social environments (Siemens, 2005). According to Siemens (2005:4), "*Connectivism is the integration of principles explored by chaos, network, and complexity and self-organization theories. Learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual. Learning (defined as actionable knowledge) can reside outside of ourselves (within an organization or a database), is focused on connecting specialized information sets, and the connections that enable us to learn more are more*

important than our current state of knowing." However, Siemens's connectivist theory has not received wide acceptance and there is a broad range of critique surrounding his theory (Verhagen, 2006) . Verhagen's view is that connectivist theory is a '*pedagogical view'* and not a learning theory. In view of this, I have chosen to not select connectivism as the learning theory for this thesis and have instead selected constructivism as the dominant learning theory.

The pioneer of the constructivist learning theory was Bartlett who developed the theory in 1932 (Good & Brophy, 1990). According to Jonasson (1991:6), "*What someone knows is grounded in perception of the physical and social experiences which are comprehended by the mind*." (Jonassen, 1991). This therefore implies that reality is created through a process of social and experiential negotiation. The influences of constructivist learning includes the research of Bruner, Ulrick, Neiser, Goodman, Kant, Kuhn, Dewey and Habermas (Jonassen, 1991), with the primary influence being the work of Jean Piaget which was further developed by von Glasserfield (Smorgansbord, 1997), as well as the work of Vygotsky in 1978. Vygotsky suggested that the appropriation of knowledge by individuals happen after that knowledge is first constructed in a social context (Eggen & Kauchak, 2004). Greeno, Collins, & Resnick (1996) argue that learners would not be able to construct knowledge on their own to the extent that they would be able to if they were constructing it together with other learners (Greeno et al., 1996). Because of the social context and nature of the research conducted in this thesis, the constructivist learning theory is best-suited to this study.

Within the constructivist learning theory realm, theories of learning and knowledge include Revan's Action Learning Theory, Kolb's Experiential Learning Theory, Kelly's Personal Construct Theory and Lewin's Action Research Theory (Dunn, 2002). For the purpose of this research study, Kolb's Experiential Learning Theory, Bloom's revised Taxonomy and Lewin's Action Research Theory have been selected as the main theoretical underpinnings. I have selected David Kolb's Experiential Learning theory and Kurt Lewin's Action Research theory because of their underpinnings in constructivist learning, the fact that Experiential Learning Theory includes a large degree of social interactions, and the fact that Action Research is based on the practical application of theory, which is best suited to this research context. The over-arching pedagogy which I have selected for this research study is Bloom's revised Taxonomy. Action Research will be discussed in more detail in the Research Methodology section in Chapter 2 of this thesis. Experiential Learning theory will be discussed in detail in the Literature Review in Chapter 3. Each of these theories is discussed briefly below.

1.4.1 Participatory Action Research

According to Zuber-Skerritt, Action Research can be defined as: *"…a cyclical iterative process of action and reflection on and in action. Through reflection we conceptualise and generalise what happened (action). We can then investigate in new situations whether our conceptions were right; that is, we try to find confirming or disconfirming evidence.'"* (Zuber-Skerritt, 1996:20).

Key characteristics of action research include (Baskerville & Wood-Harper, 1996):

- A practical focus;
- The educator-researcher's own practices;
- Collaboration;
- Dynamic process;
- Plan of action;
- Sharing research.

Action Research theory was developed by Kurt Lewin and published for the first time in 1946 (Zuber-Skerritt, 1996). The original action research process consisted of four phases, planning, acting, observing/collecting and reflecting. This process is depicted in Figure 1 below.

Figure 1: Action Research Process

The planning (plan) phase consists of (Baskerville & Wood-Harper, 1996):

- Developing a detailed plan of action;
- Deciding on the time frame;
- Selecting the resources you will need
- Devising strategies to carry out your plan.

The action (action) phase consists of (Baskerville & Wood-Harper, 1996):

- Implementing your plan;
- Noting any deviations from your plan (with reasons).

The observing/collecting (observation/collection) phase consists of (Baskerville & Wood-Harper, 1996):

- Using different observation techniques(e.g. research journals, student feedback, videos, recordings, questionnaires, peer observations);
- Collecting and analysing the data.

The reflecting (reflection) phase consists of (Baskerville & Wood-Harper, 1996):

- Reflecting critically on what has happened:
  - Challenges encountered;
  - Points to learn from;
  - Celebrate and affirm positives;
- Sharing your findings and reflections;
- Thinking about how you can make further improvements.

As can be seen from Figure 1 above, action research is a reflective, collaborative and cyclic practice of action-based inquiry (Baskerville & Wood-Harper, 1996). Because of its cyclical and iterative nature, these phases can be repeated after each iteration has taken place, creating a spiral effect as can be seen below in Figure 2 below (Jr. & Nereu, 1997).

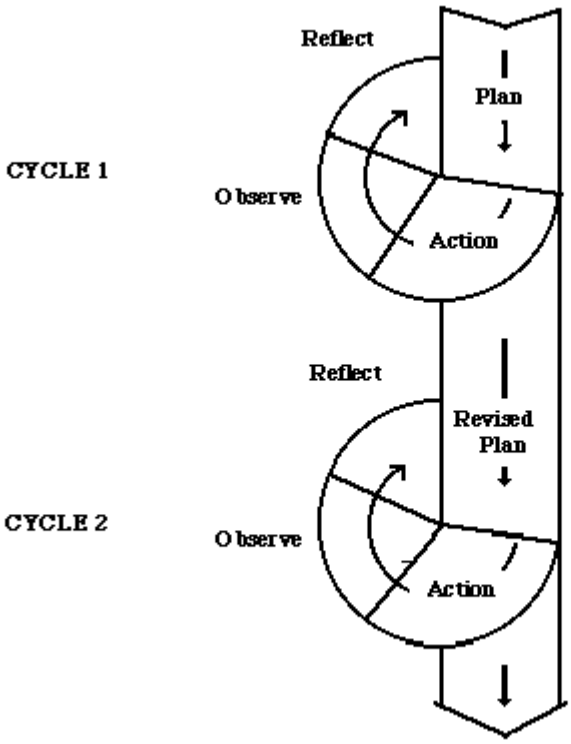

Figure 2: Spiral Action Research Process

If one looks at Figure 2 above, it can be seen that an action research project consists of practitioners (researchers) who cycle through a spiral of steps, continuously monitoring the activity of each step in order to adjust as needed (Kemmis & McTaggart, 1982). Because of the cyclical nature of action research, it allows for the action plans to be flexible and responsive to the environment in which the action research is taking place (Dickens & Watkins, 1999).

A number of types of action research exist, one of them being Participatory Action Research (PAR) (McIntyre, 2008). A number of definitions exist for PAR, one of them being: "*Participatory action research is a form of action research in which professional social researchers operate as full collaborators with members of organizations in studying and transforming those organizations. It is an on-going organizational learning process, a research approach that emphasizes co-learning, participation and organizational transformation.*" (Greenwood, Whyte, & Harkavy, 1993:177). PAR uses a variety of methods, including (McIntyre, 2008):

- Surveys;
- Participant observation;
- Interviewing;

- Mapping;
- Diagramming;
- Group work and discussions.

The PAR methods which I have selected are surveys and group work. I have selected PAR as my approach to conduct social software interventions on the INF112 course by using iterative cycles of action and reflection. I have selected PAR as my research approach because I, as the researcher, will actively participate in the research intervention. Additionally, one intervention of social software on the INF112 course is not sufficient to answer all of my research questions. Additionally PAR involves an iterative and cyclical approach which is well aligned to my chose theoretical framework, being Experiential Learning. PAR will be discussed in more detail in Chapter 2.

1.4.2 Blooms revised Taxonomy

The pedagogy for this research study is based on Bloom's revised Taxonomy. Benjamin Samuel Bloom, born in Pennsylvania in 1913, was an American educationalist who extensively contemplated the nature of thinking, authoring or co-authoring 18 books (Anderson & Krathwohl, 2001).
Bloom's Taxonomy is a multi-tiered model of classifying thinking according to six cognitive levels of complexity (Eisner, 2002). This model, and its subsequent revision, is depicted in Figure 3 below (Eisner, 2002):

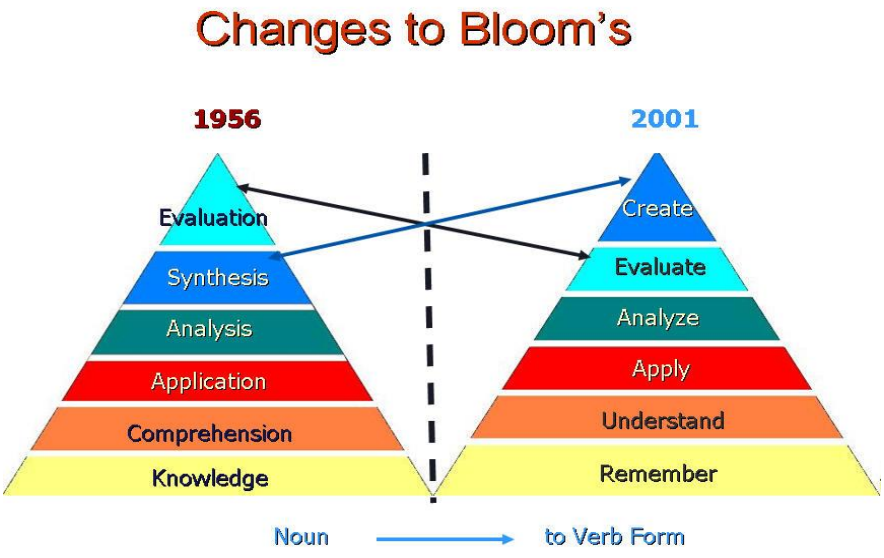

Figure 3: Bloom's Original & Revised Taxonomy

A brief description of each of these levels follows in Table 2 below (Krathwohl, 2002):

Competency	Skills
Knowledge	Learner can recall information.
Comprehension	Learner can explain and predict.
Application	Learner can solve problems and use information.
Analysis	Learner can see patterns or concepts and organizational structure may be understood.
Synthesis (original)	Learner can build a structure, put parts together to form a whole, with emphasis on creating a new meaning or structure.
Evaluation	Learner can compare and make judgements about the value of ideas or materials.
Create (replaces 'synthesis')	Learner can generate new ideas, products, or ways of viewing things

Table 2: Description of the Levels of Bloom's Taxonomy

Bloom's Taxonomy was revised by one of his former students, Lorin Anderson, during the 1990's, with the intention of adding relevance to the model for 21st century students and educators (Anderson & Krathwohl, 2001). The model was revised to consist of six levels in the form of verbs according to which a learner's skill can be organized, with the sixth level being to '*create*'.

I have decided to use Bloom's revised Taxonomy to guide the pedagogical influence on this research study due not only to the widespread acceptance and adoption of Bloom's Taxonomy in terms of education (Anderson & Krathwohl, 2001), but also because Bloom's Taxonomy is being used to guide curriculum development and student assessment at the University of Pretoria. Also, with the addition of the 'create' level to the model (and removal of 'synthesis'), it makes the application of the model to my research study a good fit as the focus of my research study is hinged on experiential learning during which students '*create*' artifacts as part of the learning process.

1.4.3 Experiential Learning Theory

Kolb's experiential learning theory includes a four-stage cyclical theory that combines experience, perception, cognition, and behaviour (Kolb, 1984). Building upon earlier work by John Dewey and Kurt Levin, Kolb states that "*learning is the process whereby knowledge is created through the transformation of experience*" (Kolb, 1984:38). The theory presents a cyclical model of learning, consisting of four stages shown below in Figure 4. One may begin at any stage, but must follow each other in the sequence (Kolb, 1984).

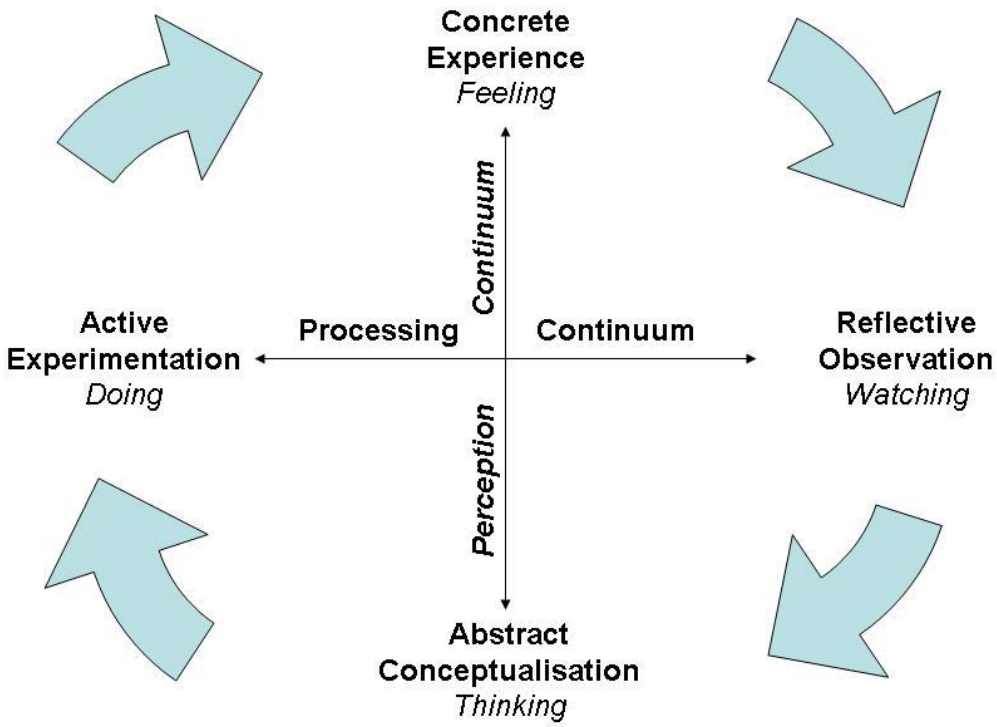

Figure 4: Kolb's Experiential Learning Cycle

The model depicted above consists of four stages (Healey & Jenkins, 2000):

- Concrete experience (or 'DO');
- Reflective observation (or 'OBSERVE');
- Abstract conceptualization (or 'THINK');
- Active experimentation (or 'PLAN') – after Kurt Lewin.

Each of these four stages is described in Table 3 below (Levy, 2011):

Stage	Description
Concrete experience	Where the learner is actively experiencing an activity. Eg: A laboratory session
Reflective observation	Where the learner is consciously reflecting back on that experience.
Abstract conceptualization	Where the learner is being presented with/or trying to conceptualise a theory/model of what is (to be) observed.
Active experimentation	Learning in this stage takes an active form - experimenting with, influencing or changing situations.

Table 3: Description of the Four Stage of Kolb's Experiential Learning Model

According to Kolb and Fry (1975), the learning cycle can commence at any of the four stages and that the model can be viewed as a continuous spiral, similar to Lewin's Action Research Process, and the learning process often begins with a person carrying out a particular action (Tennant, 1997). Kolb and Fry further developed this model to include a learning style inventory according to which people could be placed in terms of their learning style preferences (Tennant, 1997). As a result of this Kolb and Fry identified four basic learning styles, being (Kolb & Kolb, 2001):

- **Divergers** - grasp experience through concrete modes and transform their experience through reflective observation. They are good at generating ideas, tend to be more 'people oriented', and are usually more emotional. They are strong in imaginative ability, good at seeing things from different perspectives, and are believed to have broad cultural interests.
- **Assimilators** - grasp experience through abstract conceptualization and transform their experience through reflective observation. They tend to be less interested in people and more interested in concepts. They are strong at creating theoretical models and excels in inductive reasoning.
- **Convergers** - grasp experience through abstract conceptualization and transform their experience through experimentation. The convergers prefer dealing with objects, rather than people, and are often considered unemotional. They are strong in practical application of ideas, can focus on hypo-deductive reasoning on specific problems, and are believed to have narrow interests.
- **Accommodators** - grasp experience through concrete experience and transform their experience through active experimentation. They are intuitive and often become impatient when a problem does not conform to their ideas. Their greatest strength is

doing things, they are more of a risk taker and they perform well when required to react to immediate circumstances.

Due to the focus of my research study being on the Net Generation of students, I can assume that these students are generally **Accommodators** as they have a preference for experiential learning (Oblinger & Oblinger, 2005). Their learning style should then be between **concrete experience** and **active experimentation** as they like to learn by doing, gravitate towards group activity (collaborative learning) and actively experimenting (Oblinger & Oblinger, 2005). Figure 5 below depicts the stages of the model combined with the learning style inventory – the Net Generation learning style is highlighted in yellow (Kolb, 1984):

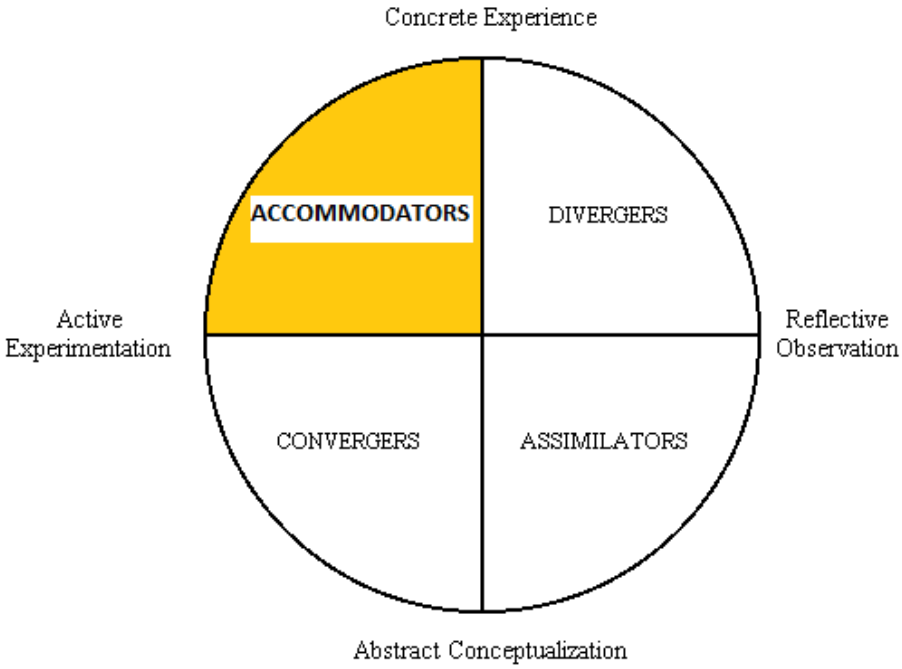

Figure 5: Kolb's Learning Styles combined with the Experiential Learning Model

It is important to note the role that experience plays in learning in Kolb's model, is similar to the models and theories developed by Dewey, Lewin and Piaget (Coleman, 1976).

1.4.4 Computer-Supported Collaborative Learning

The term '**computer-supported collaborative learning**' was coined by O'Malley and Scanlon in 1989 (Marshall, 1995). It has increasingly been regarded as an important focus area by researchers with the emergence of technology in the past two decades (Hakkinen, Arvaja, & Makitalo, 2003). A material amount of recent research on the use of technology in education is exploring technology's

possibilities to facilitate social interaction between educators and students, and among students (Hakkinen, et al., 2003).

In order to understand the term CSCL, it is important to define its two components, computer-supported (CS) and collaborative learning (CL) individually first. Collaborative learning is best described (Hilke, 1990:12) as "…***an organizational structure in which a group of students pursue academic goals through collaborative efforts. Students work together in small groups, draw on each other's strengths and assist each other in completing the task***."

Collaborative learning has five basic elements (Gabbert, Johnson, & Johnson, 1986):

1. Positive goal interdependence which occurs when learners undertake a group task believing that they cannot succeed unless everyone in the group succeeds.
2. Face-to-face promotive interaction which occurs when a verbal interchange takes place. With technology today this need not be face-to-face or verbal, but can be using electronic communication.
3. Individual accountability which means taking responsibility for learning material by giving individual tests, presentations, etc.
4. Social skills which involves knowing how to communicate effectively and how to develop respect and trust within a group.
5. Group processing to reflect on how well the group is working and to analyse the members' effectiveness and how it may be improved.

Collaborative learning is also referred to as group work in education or small group learning, although not all group work can be called collaborative learning. There is a consensus among researchers, that collaboration involves the construction of meaning through interaction with others and can be characterised by a joint commitment to a shared goal (Häkkinen et al, 2003). Collaborative learning is often defined in a way that necessitates participants to be engaged in a co-ordinated effort to solve a problem or perform a task together (Littleton & Hakkinen, 1999). This coordinated, synchronous activity is the result of a continued attempt to construct and maintain a shared conception of a problem (Roschelle & Teasley, 1995). For a learning process to be considered collaborative two or more people (students) must learn something together and the learning objective can only be achieved if the group works in collaboration (Gros, 2001). In a collaborative learning situation, group members need to decide how they will go about achieving the task, with communication and negotiation being essential to the learning process (Gros, 2001). Dillenbourg

simplifies the matter by stating that "*a situation is termed 'collaborative' if peers are (1) more or less at the same level and can perform the same action, (2) have a common goal, and (3) work together.*'' (Dillenbourg, 1999:9).

The full-term, CSCL, is a learning approach wherein learning takes place via social interaction using a computer or through the Internet (Dillenbourg, 2002). In the case of my thesis, CSCL will be taking place using certain types of social software over the course of three iterations in the learning context of collaborative learning via group work.

1.5 RESEARCH OBJECTIVE(S)

Feedback received from numerous INF 112 students is that they dislike the subject as they do not understand what it is about nor do they see the point in taking it (INF112 Course Evaluation, 2008). Lecturing staff that have been involved with the subject would generally prefer not to be involved with it anymore and it is viewed in the department negatively. The purpose of my research study is to improve the learning experience for these students by implementing a number of social software interventions for the collaborative learning component of the course.

These social software interventions will aim to prove / disprove whether social software can be used to support collaborative learning for the Net Generation in higher education. Additionally, this research study will aim to determine which types of social software are more conducive than others in supporting collaborative learning for the Net Generation in higher education. Once the objectives mentioned above have been achieved, I will develop a social software technology ecology in the form of a framework that can be used to understand and/or design collaborative learning interventions for the Net Generation in higher education using social software. Ultimately this will allow me to contribute to the body of knowledge on the use of social software for the Net Generation in higher education.

1.6 PROBLEM STATEMENT

There is limited research evidence that conclusively proves firstly social software can be used for collaborative learning for the Net Generation in higher education and secondly the extent to which social software can be used to support collaborative learning for the Net Generation in higher education. As such, this research endeavour strives to be a comprehensive research project involving the use of a range of social software for collaborative learning for the Net Generation in higher education.

As mentioned in the introduction to this chapter, research on the use of social software for the Net Generation suggests that social software can be integrated into the learning processes in order to enhance the learning experience (Green et al., 2005). Even-though there is much research taking place regarding this development, the use of social software to enhance learning environments is still in its early phase and needs to be explored further (Li et al., 2012). As such my research project primarily aims to determine whether and the extent to which social software can be used to support collaborative learning for the Net Generation in higher education.

1.7 RESEARCH QUESTIONS

1.7.1 Main Question

My main research question is: ***Can social software be used to support Computer-Supported Collaborative Learning for the Net Generation in higher education?***

1.7.2 Sub-questions

I have two research sub-questions. They are:

- ***Are certain types of social software more conducive to providing support for Computer-Supported Collaborative Learning for the Net Generation in higher education?***
- ***Can a CSCL framework be developed that can be used to design collaborative learning activities using social software for the Net Generation in higher education?***

All of the research questions mentioned above will be answered during the data analysis and findings sections of this thesis.

1.8 RESEARCH METHODOLOGY

I, as the researcher, have selected an Interpretivist Participatory Action Research approach which will make use of iterative cycles to explore whether social software can be used to support collaborative learning for the Net Generation in higher education. The dominant paradigm that will be used for the purposes of this research is that of an interpretive, mainly qualitative paradigm of inquiry operating on the principles of social constructivism (Orlikowski & Baroudi, 1991). Ontologically (i.e.: the nature of being), interpretivism operates from a dual stand-point being (Nandhakumar & Matthews, 1997:1):

1. Internal realism: reality is an inter-subjective construction shared between individuals;
2. Subjective idealism: reality is a personal construction of each individual.

I recognize that my research study is intimately intertwined with the social context and as such interpretivism is an appropriate ontology. Epistemologically, interpretivism also operates from dual stand-points being (Nandhakumar & Matthews, 1997):

1. Anti-positivism: recognition that facts and values cannot be separated;
2. Normativism: recognition that scientific knowledge is idealogical and serves the interests of particular social groups.

I, as the researcher, will be actively involved with the social setting of the topic as my research takes place at the University of Pretoria and I am cognizant of the fact that there could be a recursive relationship between the two. I have selected this paradigm because of the following contributing factors (Baskerville & Wood-Harper, 1998):

- The multi-variate social setting in which the research will occur;
- Intervention by the researcher, will take place;
- The researcher will be a participant observer;
- And the research involves the study of change within a social setting.

Another reason for me selecting an interpretive approach is because it provides different dimensions for the research investigation (Chen & Hirschheim, 2004) and my research topic has a number of different dimensions which need to be considered.

Participatory action research, which was discussed in the **Theoretical Underpinnings** section of this chapter, is well suited to this topic because it can be used to solve a real-world challenge which is being experienced by educators at all levels of education, and that is whether social software can be used to support collaborative learning for the Net Generation of learners in higher education. I intend to follow the steps in the participatory action research process and will amend them as necessary in order to cater for the iterative nature of the research. I will be making use of on-line questionnaires as my data gathering technique, and will include both quantitative and qualitative data.

The social setting within the University of Pretoria is multi-variate and the introduction of social software in the INF112 course will involve a change in the social setting and as such I as the researcher believes that participatory action research will be most appropriate. I will also be a

participant observer and will be intervening in the process. A number of other lecturers are involved in this research process as teachers on the INF112 course, and as such are involved in influencing the change within the organisation (UP). The process itself will involve implementing a number of social software across the INF112 curriculum over the course of three years. Hence an iterative process will be undertaken during which the type of social software is refined after each iteration. Ultimately I aim to introduce organisational change in the form of implementing social software at the University of Pretoria in the INF112 course whilst at the same time studying the process in order to develop and/or refine a framework. I, as the researcher, have the support of the University of Pretoria in this endeavour which will contribute to my ability to conduct the necessary research. The research approach will be further elaborated on in Chapter 2.

1.9 EXPECTED CONTRIBUTION TO KNOWLEDGE

I intend to make a meaningful contribution to the body of knowledge regarding the use of social software for collaborative learning for the Net Generation in higher education. This contribution will be both theoretical and practical, given the fact that this research project involves making change in a real-world setting, being the INF112 course at the University of Pretoria.

At the time of writing this thesis, I have seen limited evidence of research being conducted to develop a framework that can be used in higher education for the integration of social software into course curricula for collaborative learning for the Net Generation of students. As such, I intend to use the findings from my research activities in order to develop such a framework.

1.10 PROPOSED CHAPTER PLAN

Chapter 1 provides an introduction to the thesis. It provides an overview of the nature of this research project as well as describing the key concepts and components involved in the study.
Chapter 2 documents the Research Methodology. In this chapter I will explain all aspects of the research approach including the research paradigm, a theoretical framework review, the research design, the research methodology, the research tools as well as the data gathering and analysis techniques.
Chapter 3 details the findings of the literature review which was conducted, covering the key themes of the study. This includes Computer-Supported Collaborative Learning, Social Software and the Net Generation.
Chapter 4 documents the social software research intervention as well as the analysis and findings from Iteration 1 for 2009.

Chapter 5 documents the social software research intervention as well as the analysis and findings from Iteration 2 for 2010.

Chapter 6 documents the social software research intervention as well as the analysis and findings from Iteration 3 for 2011.

Chapter 7 consolidates the findings from Iteration 1, 2 and 3 and conducts a comparative analysis. Additionally, it strives to answer the main research question as well as the sub-questions.

Chapter 8 presents the proposed CSCL framework which can be used to design social software interventions for the Net Generation in higher education.

Chapter 9 provides a conclusion to the research study.

1.11 CONCLUSION

The purpose of this introductory chapter was to provide an overall introduction to the research study at hand. It provides background to the research problem as well as explaining why I have chosen this particular research problem. Additionally, it explains the delimitation of my study. The theoretical underpinnings of my study are introduced, being: Participatory Action Research, Blooms' revised Taxonomy, Experiential Learning and Computer-Supported Collaborative Learning. The motivation for selecting these underpinnings is explained, as well as how they will be used to influence my study. The research objectives, problem statement and research questions are documented so that the audience has the context within which my study is being conducted, as well as understanding what the main thrust of this study is. The expected contribution to knowledge is explained so that the audience and I, as the researcher, will be able to determine whether my study does indeed make the intended contribution. Lastly, a summary of the chapter plan is provided in order to guide the audience through this thesis.

CHAPTER 2

RESEARCH METHODOLOGY

CHAPTER 2: RESEARCH METHODOLOGY

2.1 INTRODUCTION

This chapter explains, in detail, the research methodology which I have selected for this research project. The topics that are covered during this chapter include an introduction, a theoretical framework review, the research questions, the research method, the research approach, ethical considerations and a conclusion. Included in this chapter are the justifications for the selections that I have made.

A completed research project should consist of the following 5 steps (Myers, 2009:22):

1. A set of **philosophical assumptions** about the world;
2. A **research method**;
3. One or more **data collection** (gathering) techniques;
4. One or more approaches to **data analysis**;
5. A written record of the **findings**.

In this chapter, I describe steps 1 to 4 for my research project. As such, I will be following a model of research design depicted in Figure 6 below:

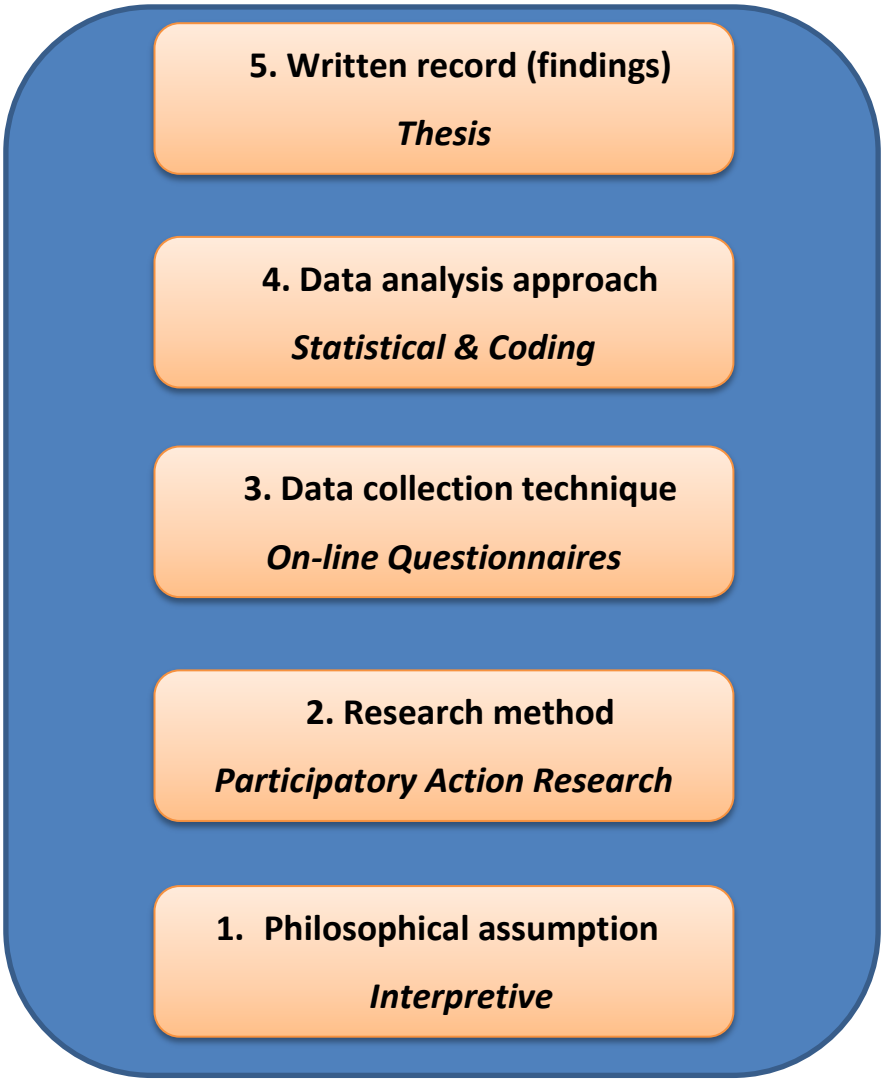

Figure 6: My chosen model for the research design
(Myers, 2009)

As can be seen from Figure 6 above, I have selected ***interpretivism*** as the philosophical assumption, ***participatory action research*** as the research method, ***on-line questionnaires*** as the data collection technique and ***statistical analysis and coding*** as the data analysis approach.
Each of these steps that I have selected will be discussed during this chapter.

2.1.1 Context of the Research

The emergence of the internet has resulted in a new generation of technically literate students called the Net Generation (Prensky, 2001). As mentioned during the introduction in chapter 1, the learning style preferences of these learners differ from previous generations (Prensky, 2001). The use of social software in education has been suggested as a teaching and learning tool for the Net

Generation students (Duffy, 2008). The use of social software in education is a relatively new field of study and there is a limited amount of literature and practical studies that have been published regarding the subject (Snelson, 2011). According to Harris (2011), these tools have the ability to enrich course content and improve student engagement (Harris, 2011). This reality sets the context for the research which I conduct in this thesis as it deals with the use of social software for collaborative learning for the Net Generation in higher education.

The research conducted for this thesis is based on a single course, INF112, commonly known as *'Business Driven Technology'*, which is being taught at the University of Pretoria to all first-year under-graduate students in the Faculty of Economic and Management Sciences during the first semester. The course lays the basic foundations of Information Systems. The course consists of a theoretical component as well as a practical component in the form of group work (collaborative learning projects).

The implementation of social software tools is a new aspect to teaching and learning in this course and as such my research study involves assessing whether and to what extent social software can be used to support collaborative learning for the Net Generation in higher education.

2.1.2 Purpose of the Research

The primary purpose of my research is to ascertain whether and to what degree social software can be used to support collaborative learning for the Net Generation in higher education. Social software interventions will be conducted during each semester, covering three iterations (2009 – 2011).Towards the end of the semester, students enrolled in the course will be given an on-line questionnaire asking them if and to what effect the use of the social software had on the collaborative learning process in the course. By conducting a comparative analysis across these iterations, this research aims to discover whether and to what extent social software can be used to support collaborative learning for the Net Generation in higher education. The results gathered will aid in determining the feasibility of continuing with this innovative learning method on the INF112 course as well as whether these innovative learning tools should be rolled out to other courses within the University of Pretoria.

2.1.3 Objectives of the Research

The use of social software tools such as blogs, wikis and YouTube inside and outside the classroom to increase student engagement, learning and motivation for the Net Generation has been suggested by several authors (Agazio & Buckley, 2009; Berk, 2009a; Berk, 2009b; Churchill, 2009;

Duffy, 2008; Harris & Rea, 2010; Roodt & De Villiers, 2011). As discussed in section 1.5 in Chapter 1, the research objectives are as follows:

- To determine if and to what extent social software can be used to support collaborative learning for the Net Generation in higher education;
- To determine whether certain types of social software are more conducive to providing support for collaborative learning for the Net Generation in higher education;
- To develop a framework that can be used to design collaborative learning activities using social software for the Net Generation in higher education.

2.2 THEORETICAL FRAMEWORK REVIEW – EXPERIENTIAL LEARNING

2.2.1 Background

The primary theoretical framework which I have selected for this research project is Kolb's ***Experiential Learning*** theory which will be discussed in more detail below. As mentioned during Chapter 1, the contemporary learning theory which is applicable to this thesis is social constructivism. Social constructivism is well aligned with experiential learning as both theories support the view that learners construct meaning from their experiences (Doolittle & Camp, 1999). Experiential learning embraces the fact that some students learn differently from other students and as such creates a mix of strategies, pedagogic and curricular, that can be used to create varied learning environments to cater for these learning differences (Penny, Frankel, & Mothersill, 2012). Experiential learning can be defined as *"the involvement of learners in concrete activities that enable them to 'experience' what they are learning and the opportunity to reflect on those activities"* (Silberman, 2007:8). Experiential learning's primary objective is to create educational environments that satisfy students' needs to advance (Penny, et al., 2012):

- Knowledge acquisition and critical judgement;
- Thinking and acting;
- Reflection and engagement;
- Career development and informed citizenship;
- Growth as an individual and
- Greater connectivity with the larger community.

The goal of an experiential learning intervention is to assist students in achieving the needs listed above in a sensitive approach that respects the individuality of students learning preferences (Silberman, 2007).

As mentioned during Chapter 1 of this thesis, educators are faced with a challenge today of a new generation of learners who require unique, customized learning environments. One of the ways in which these environments can be created is by making use of experiential learning strategies as noted by Kolb (1984): *"In the field of higher education, there is a growing group of educators – faculty, administrators, and interested outsiders – who see experiential education as a way to revitalize the university curriculum and to cope with many of the changes facing higher education today"* (Kolb, 1984:4). Experiential learning has the following guiding principles (Wurdinger & Carlson, 2010:8):

- Promoting hands-on learning;
- Using a problem solving process;
- Addressing real-world problems;
- Encouraging student interaction with each other and the content;
- Engaging in direct experience, and
- Using multiple subjects to enhance inter-disciplinary learning.

The social software interventions that I conduct for the purposes of this thesis use the guiding principles mentioned above as students are assigned group work for which they must use social software to create an artefact(s) which is directly related to the course content. They must achieve this by learning to use the social software tools themselves and using their own initiative and creativity to complete the task whilst being guided by their group members and the group work brief.

The four components of experiential learning are (Woolfe, 1992:2-3):

1. The student is aware of the processes which are taking place, and which are enabling learning to occur;
2. The student is involved in a reflective experience which enables him/ her to relate current learning to past, present and future, even if these relationships are felt rather than thought;
3. The experience and content are personally significant: what is being learned and how it is being learned have a special importance for the person, and
4. There is an involvement of the whole self: body, thoughts, feelings and actions, not just of the mind; in other words, the student is engaged as a whole person.

When looking at the social software interventions which I conduct for the purposes of this thesis, the four components of experiential learning listed above are taken into account for the collaborative learning aspect of the course work involving the students.

Whilst experiential education may take a number of forms, all of the forms involve students in activities that are different from traditional classroom-based methods (Moore, 2011). As mentioned during Chapter 1, the experiential learning model consists of four stages (Healey & Jenkins, 2000):

- Concrete experience (or 'DO');
- Reflective observation (or 'OBSERVE');
- Abstract conceptualization (or 'THINK');
- Active experimentation (or 'PLAN').

Throughout these stages, students are able to improve their understanding of their own learning through critical reflection through active learning (Penny, et al., 2012). Additionally, through students' experiential activities they are able to examine the knowledge and skills that they have gained with cognitive reflection (Penny, et al., 2012). Students are able to see new relationships and complexities in the course materials and related concepts as a result of their involvement in experiential activities (Penny, et al., 2012). When students reflect on their feelings that arose as a result of their experiential learning activities they are able to determine whether and how these learning's have influenced their attitudes and/or beliefs (Penny, et al., 2012). Lastly, students are able to examine how they behave in group settings and what effect their actions had on the group dynamics. Finally, students consider what they have learned from the process itself as well as examining how they work with others and the consequences of their actions (Penny, et al., 2012). For the social software interventions on the INF112 course, students are asked to assess and reflect on their experiences of the social software group work that they had to conduct as part of the collaborative learning component of the course work which was conducted via experiential learning activities.

2.2.2 Application in higher education

There is a trend in educational circles that supports the view that experiential learning should be a core component of curricula in higher education (Rosenbaum, 2001). According to the literature, this trend can be attributed to three primary reasons, being:

1. Educators are concerned with ensuring that their students are able to enter the workplace successfully upon graduation despite market pressures (Getts, 1990) (Rosenbaum, 2001);
2. Students of today, also known as the Net Generation, have varied modes of learning and demand unique and customised learning environments (Kerka, 1989) (Prensky, 2001);
3. There are concerns regarding student retention and graduation rates (Seibert & Sypher, 1989)(Baker, Jensen, & Kolb, 2002).

In order to alleviate the concerns listed above, experiential learning has been suggested as a counter strategy (Baker, et al., 2002). According to Cantor (1995), experiential education can be defined as: "*…immersing students in an activity and then asking for their reflection on the experience."* (Cantor, 1995:116). The motivational benefits that students experience as a result of active and participative learning are well documented in research findings pertaining to experiential learning activities in higher education (Cantor, 1995). To quote Cantor (1995) on his view on experiential learning in higher education: "*…it is possible to maintain academic integrity and yet build a climate in which students can experience the body of knowledge and skills within a subject, in an active and collaborative manner, wherein they are challenged to master and learn, and where they also have an opportunity to gain those reasoning, decision making, cultural, social, and leadership skills so badly needed in today's and tomorrow's societies."* (Cantor, 1995:5). Because my research study is focused on the collaborative learning element of the social software interventions in a practical (active) learning environment, experiential learning is well suited to my topic.

Applications of experiential learning in higher education currently fall into one or more of the following three categories (Lewis & Williams, 1994) :

1. Field-based experiences;
2. Prior learning assessment, and;
3. Experiential applications for personal development and classroom-based learning.

My research study falls into the third category, being experiential applications for personal development and classroom-based learning, and focuses on the personal development aspect conducted during the collaborative learning component of the course work. One of the seven principles of good practice for excellence in undergraduate education is ***'active learning'*** (Chickering & Gamson, 1987). Active learning (learning by doing) involves students in learning activities and allows them to reflect on their learning's (Lewis & Williams, 1994). Assignments that are created to

assist students in relating theory to practice by engaging them in experiential learning activities have been proven to have a positive effect on student learning (Lewis & Williams, 1994).

Because the focus of my study is on the collaborative learning component of the experiential learning activities that involve social software tools, it is important to review research on collaborative learning in the experiential learning context in higher education. This will be discussed during the literature review in Chapter 3.

2.2.3 Support for Experiential Learning

Experiential learning is supported by a variety of other theories that support the view that value can be derived from it (Boud & Miller, 1996). An example of this is where experiential learning is considered one of the foundations of adult learning because of the following reasons (Caffarella & Barnett, 1994):

- Adults can reflect on past experiences to make and re-make meanings;
- Different individuals construct different meanings;
- The learning process usually involves active engagement by the learners';
- Group interaction is important, and
- Adults' unique life situations form contexts for their meaning.

Experiential learning broadens the amount of learning opportunities for students by going outside of the boundaries of traditional education strategies (Keen & Howard, 2002). Jackson and MacIsaac (1994) support Keen and Howards (2002) view above by saying that "*…experiential learning is not a theory of learning . . . but is a broad perspective on learning that focuses on authentic learning experiences as the necessary basis for meaningful skill acquisition and human development.*" (Jackson & MacIsaac, 1994:22).

As mentioned during Chapter 1 in section 1.4.3, Kolb's work is widely cited by others researchers but it is important to recognise that his work is also based on the work of others, such as Dewey. Dewey (1993) stated that *"…all genuine education comes from experience and all learning has an experiential basis."* (Weil & McGill, 1993:195). There is a growing body of knowledge that is questioning the traditional view that knowing and doing is separate and that learning is an individual mental experience (Gonczi, 1999) – instead the evolving view, based on theoretical and practical research is that learning is enhanced through learners actively engaging with the topic at hand and

the associated content (Gonczi, 1999). By creating opportunities for students to apply theory in a practical setting, they are able to learn, validate and reformulate meaning (Cranston, 2006).

In order for learners to acquire new knowledge and advanced meaning perspectives, certain 'ideal' conditions are required (Cranston, 2006). These 'ideal' conditions include "*…a safe, open and trusting environment that allows for participation, collaboration, exploration, critical reflection, and feedback.*" (Mezirow, 1991:20). This ideal learning space can be provided through experiential learning as it provides an environment in which student motivation is nurtured (Garrison, 1997). Experiential learning not only facilitates the development of a diverse pedagogical approach to learning activities in order to cater for different learning styles but also promotes 'higher level learning' (Rosenthal, 1999). Most under-graduate teaching focuses on summative knowledge acquisition and to a much lesser degree on formative knowledge acquisition, which means that courses generally incorporate minimal amounts of higher level learning strategies (Barr & Tagg, 1995). As such, educators have a pivotal role to play in designing and implementing experiential learning activities for their courses (Caffarella & Barnett, 1994).

2.2.4 Criticisms: Rethinking Experiential Learning

A number of limitations of experiential learning have been identified, being (Zepke & Leach, 2002:207):

- Experiences are personal and cannot be generalized by placing them behind empirically established reality;
- Memories of experiences vary;
- The stories we tell change according to our purpose; they are political and cannot be trusted as accurate accounts;
- For experience to become educational it has to be subjected to critical analysis; and
- Individual experiences do not supersede shared or group experiences as defined by, for example, socio-economic class, gender or culture.

Zepke and Leach (2002) go on to say that educators must further develop the social dimensions of experiential learning. It has also been suggested that the context in which experiential learning takes place needs to be scrutinised more closely (Cranston, 2006). There is evidence that educators are placing too much emphasis on the individual in experiential learning (Zepke & Leach, 2002).
In terms of the experiential learning model, some limitations have been identified, being (Miller, 2000):

- The cyclic learning process may be too simplistic (Kolb's 4 stages);
- The learning model does not allow for enough time and space for reflective processes.

A revised model was developed by Jarvis containing 9 stages as depicted in Figure 7 below (Miller, 2000):

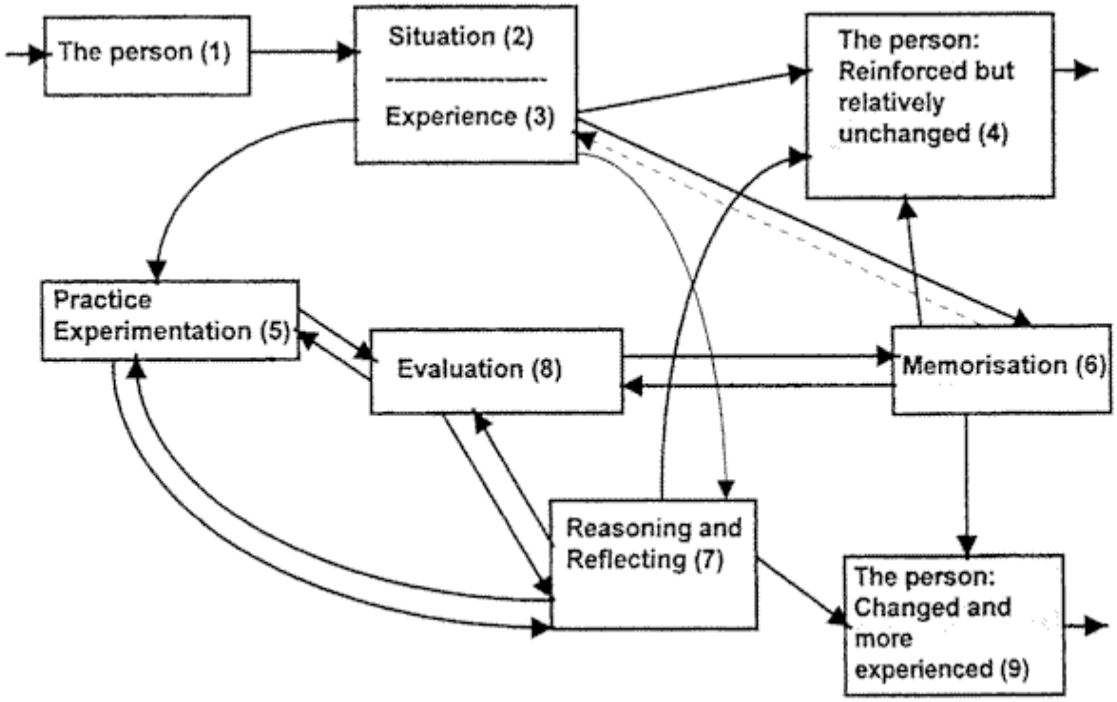

Figure 7: Jarvis's Revised Experiential Learning Model

Jarvis (1987) categorised these stages into three levels, being:

1. Non-learning
   - Presumption that people react through mechanical responses or a presumption that what has previously worked will work again;
   - Non-consideration when a person does not respond to a potential learning situation;
   - Rejection when a person consciously chose to reject the opportunity to learn.
2. Non-reflective learning
   - Pre-conscious when having experiences in daily living that are not really thought about;
   - Practice when a person practices a new skill until it is learned;

- Memorization when acquiring presented information the learner learns the information so it can be reproduced at a later time.

3. Reflective learning
   - Contemplation when a person thinks about what is being learned;
   - Reflective practice when there is reflection prior to an action and during the action;
   - Experiential learning when there is actual experimenting on one's environment.

For the purposes of my thesis, I will be using Kolb's original four stage model as discussed in section 1.4.3 and depicted in Figure 4 as it best fits my research process.

2.2.5 Summary

Sufficient evidence exists to support the notion that experiential plays a critical role in student education (Cranston, 2006). This can be attributed to the fact that experiential learning provides the following for learners (Kerka, 1989):

- Authentic, goal-directed activities;
- Close assistance to expert knowledge and skills;
- Everyday engagement in real-world problem-solving, and;
- An assimilated natural reinforcement.

In saying that though, educators must take cognisance of the limitations and/or criticisms of experiential learning when planning to implement it. For the purposes of my thesis, I am aware of the limitations as mentioned during this chapter and have incorporated those learning's into the design of my experiential learning activities.

2.3 RESEARCH QUESTIONS

Based on the research objectives of this thesis, as discussed in section 1.5 and section 2.1.3 of this thesis, as well as the literature reviewed, I will attempt to answer the following research questions for this thesis:

- Can social software be used to support Collaborative Learning for the Net Generation in higher education?
- Are certain types of social software more conducive to providing support for collaborative learning for the Net Generation in higher education?
- Can a framework be developed that can be used to design collaborative learning activities using social software for the Net Generation in higher education?

2.4 RESEARCH METHOD

2.4.1 Research Paradigm (Philosophical Assumptions)

The dominant paradigm that will be used for the purposes of this research project is that of an **interpretive**, mainly **qualitative** paradigm of inquiry operating on the principles of **social constructivism** (Orlikowski & Baroudi, 1991). According to Barr and Tagg (1995), a paradigm is "… *like the rules of a game: one of the functions of the rules is to define the playing field and domain of possibilities on that field. But a new paradigm may specify a game played on a larger or smaller field with a larger or smaller domain of legitimate possibilities".* (Barr & Tagg, 1995:15).

The three main philosophical perspectives or 'paradigms' *are* the positivist, interpretive and critical perspectives (Myers, 2009) as depicted in Figure 8 below.

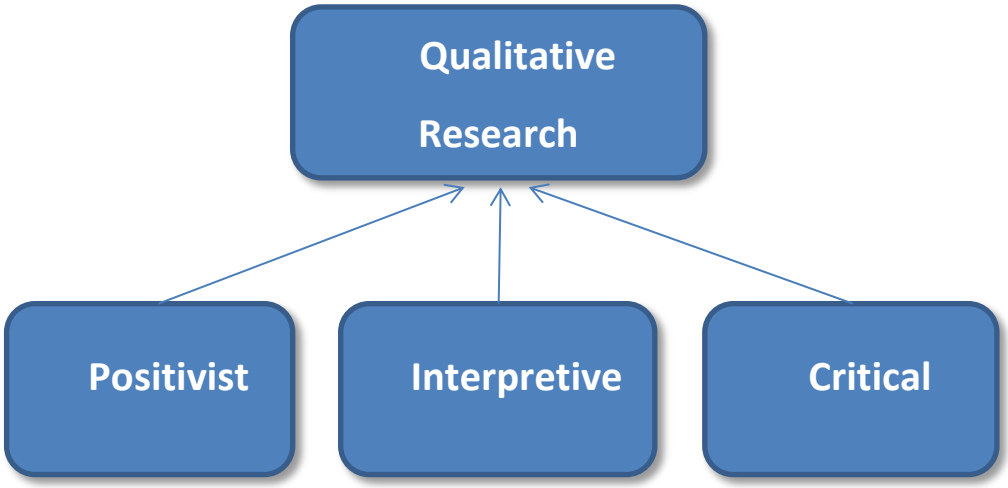

Figure 8: Underlying Philosophical Assumptions (Myers, 2009)

Each of these paradigms will be discussed below and I will highlight my reasons for selecting the interpretive paradigm for this thesis.

The word *'paradigm'* evolved through the centuries and was given a unique scientific research angle during the 20th century by Thomas Kuhn, a prominent scholarly historian of science. Kuhn published a book called "The Structure of Scientific Revolutions" in which he defined a scientific paradigm as having four fundamental components namely: *what* is to be observed and scrutinised; the kind of *questions* that are supposed to be asked and probed for answers in relation to this subject; *how* these questions are to be structured; *how* the results of scientific investigations should be

interpreted (Kuhn, 1962). In Kuhn's view, a paradigm has a finite lifespan because as research progresses, examples of instances that do not fit within the existing paradigm or model surface and it is the emergence of these instances that signal the end of an existing paradigm (Kuhn, 1962). But as with most things in life, the end of one thing is the beginning of another, and the end of one paradigm leads to the birth of another. One could indeed argue that the 'death' of a paradigm is what gives life to another paradigm: it involves the replacement of an outdated way of thinking with a newer, more inclusive and hopefully better way of thinking. Paradigms as such are then in a perpetual cycle of 'life' and 'death' and are continually faced with the challenge of continuous self-improvement which is driven by mankind's thirst for renewed knowledge amongst others.
Positivism is the brain-child of French philosopher Auguste Comte who lived during the 19th century (Chen & Hirschheim, 2004). Comte viewed positivism not only as a way of thinking but also as a methodology by which anything could be analysed. This paradigm involves the formulation of hypotheses, models and causal relationships and the subsequent testing of these models and/or theories using quantitative methods by making use of the researchers' independent objective interpretation (Chen & Hirschheim, 2004). This implies then that any type of research, including social and natural sciences as examples, can be conducted by researchers without being influenced in any manner by their own views, opinions and/or perceptions. Therefore, positivism assumes complete independence on the part of the researcher, meaning that the researcher is considered completely objective, neutral and detached (Lee, 1999). At its very essence, positivism entails the belief that social sciences research can be treated in exactly the same manner as natural sciences research (Masterman, 1970). The topic of my thesis, which at its essence is the exploration of social software's ability and the extent to which it supports collaborative learning for the Net Generation in higher education, could be viewed through the positivist paradigm by assuming the belief set that has been described above. Therefore, even though a research project of this nature has a social/human component to it, I as the researcher would be viewed as completely impartial in the sense that I make no judgments of the situation/scenario being studied. I would therefore have to assume a scientific research stance in the sense that I would view the research project as an experiment of sorts containing a number of elements, theories/hypotheses and cause-and-effect relationships.

So, in studying the social situation that will drive the derivation of the findings, a number of different variables will be measured and the relationships between them will be formed by applying formal models to them through quantitative means (Shanks & Parr, 2003). An example in terms of my topic at hand may be to measure how many students have previously used certain types of social

software, as well as measuring the level of enjoyment derived by students when using certain types of social software. These two variables could then be analysed statistically by making use of correlation models to determine the level of correlation between them. In this example, none of the students' social realities would be taken into account. By assuming this way of thinking there are a number of implications for the topic at hand. Firstly, from an ontological perspective, it would be assumed that reality exists independently of human experience (Abbott, 1990) which means that the study would be conducted without any consideration for what the realities and experiences are of the students within the social setting being studied. This implies that the students experience when engaging with social software will not be taken into consideration and such the findings will be derived independently of that. Secondly, from an epistemological perspective, it would be assumed that I as the researcher and the situation being studied are completely independent – this implies that I as the researcher would remain neutral, objective and detached. If any of these implied characteristics of me as the researcher were to be questionable, then the validity of the research study could be doubted. In terms of the topic at hand the epistemological implications would be that I as the researcher would not in any way engage in the social situation within which the study will be conducted. Additionally, I as the researcher will not view my opinion of the social situation nor will I attempt to influence or interfere with it in any way. As such, the role of me as the researcher will be one of a detached observer.

In contrast, interpretivism is based on a diametrically opposed paradigm in relation to positivism, meaning that it follows an approach which is the complete opposite. Interpretivism takes the stance that in order to understand social reality, it is imperative to understand and/or interpret the beliefs and value systems of the social actors within the social setting (Nandhakumar & Matthews, 1997). The emphasis therefore from a interpretivism perspective is on the 'human factor' – this implies that the vast majority of the research effort is spent on understanding the social complexities of the social reality whilst at the same time recognizing the role of the researchers own beliefs, values and norms in influencing the research study. Interpretivism therefore places value on social action in recognizing that social action is intimately intertwined within the social context and as such should be studied and included in order to interpret it. Interpretivism can be said to be double hermeneutic which means that both the researchers and actors are interpreting their experiences, as well as including the possibility that explanatory social action concepts can form part of the actor's experiences constitute the theory and methodology of interpretation. Interpretivism is inherently subjective which means that both the researcher and the actors within the social setting interpret their experiences through their 'lenses', meaning their mental models which is based on beliefs,

values and norms amongst others – therefore their interpretation within the social context is highly subjective.

The chosen topic, which is the exploration of social software's ability and the extent to which it supports collaborative learning for the Net Generation in higher education, can be viewed through the interpretive paradigm by assuming the belief set that has been described above. As such, I as the researcher will engage with the students enrolled for the INF112 course at the University of Pretoria in order to ascertain, understand and interpret their experience of using social software for collaborative learning. I will therefore be closely involved with and engaged in dialogue and interactions with the students and environment at large in terms of the social context. I may even choose to use the social software tools themselves in order to attempt to understand what the students' experiences are when they use social software for collaborative learning. By assuming this way of thinking there are a number of implications for my topic at hand. Firstly, from an ontological perspective, it would be assumed that reality exists interdependently with human experience which means that the research involved in the exploration of social software's ability and the extent to which it supports collaborative learning for the Net Generation in higher education, would be conducted with due consideration for what the realities and experiences are of the students within the social setting being studied. This implies that the researcher's (me) and actors (students') experiences when engaging with the social software tools will be taken into consideration. Additionally, because interpretivism is based on the premises of 'internal realism' and 'subjective idealism' (Nandhakumar & Matthews, 1997), the topic will be approached from the perspective that the reality of the social context is comprised of the collective subjective constructions between individuals (actors) as well as the individual constructions of each actor (student). An example in terms of the topic at hand would be discovering that the vast majority of the students feel that social software are not a feasible learning tool to implement for collaborative learning on the INF112 course because it serves more of an entertainment and/or social purpose over-and-above any other purpose. At the same time the researcher would explore what each student's thoughts are about the use of social software across the Information Systems curriculum. This therefore implies a duality in terms of the ontology for this topic and will also mean that a number of different perspectives and/or social constructs will need to be taken into account. Secondly, from an epistemological perspective (which refers to the relationship between the researcher and what can be known), because interpretivism is based on the premises of 'anti-positivism' and 'normativism' (Orlikowski & Baroudi, 1991) it would be assumed that the researcher and the situation being studied are completely interdependent – this implies that the researcher will be highly engaged with

and will influence the facts at hand due to his/her value system. Over-and-above this, the researcher would recognise that facts and values cannot be separated, and so the nature of the facts will be embedded with actor values, including the researcher's own values. An example in terms of the chosen topic would be that the researcher may have previous social software experience and as such may favour the use of social software for collaborative learning for the Net Generation in higher education. This may result in the researcher influencing the student's perceptions of the use of social software for collaborative learning in a positive manner. In terms of the topic at hand the epistemological implications would be that the researcher would fully engage with and be intimately involved in the social situation within which the social software intervention will take place. As such, the role of the researcher will be one of a participant observer.

The third paradigm which I will now discuss is known as Critical Social Theory (CST). CST can be traced back to the 1930's, where the founding father of the term 'CST', Max Horkheimer, compared traditional social theory, which is rooted in positivism, against that of certain social theorists such as Adorno, Marcuse, and himself (Ngwenyama & Lee, 1997). In analysing traditional social theory's roots in positivism, Horkheimer found that traditional social theory researchers saw themselves as mere observers of social situations whereas critical social theory researchers approached their research from the outset with the mindset that they themselves are intimately intertwined and involved with the social situation within which they are conducting their research. Another defining feature of CST is that at the outset, it focuses on what is wrong instead of what is right with the social situation under investigation (Ngwenyama & Lee, 1997). Additionally, there is some form of 'emancipation' involved during the process which implies that the researcher should focus on identifying and understanding instances of for example inequality and then set out to emancipate the actors that are the subjects of this inequality. So when viewing the chosen topic through the CST paradigm, the researcher would firstly focus on what the shortcomings are of using social software for collaborative learning for the Net Generation in higher education by placing specific emphasis on areas of potential inequality. An example in this case would be to investigate whether social software tools cater for students with disabilities, and if not, what can be done to improve these social software tools to alleviate the inequality in terms of disabled students.
From an ontological perspective, CST is similar to, but not the same as interpretivism because it recognises that reality is socially constructed or is a social construct itself (Stahl, 2005) in the sense that it is subjective and is continually evolving through the human social interaction process. The implications for the chosen topic from a CST perspective would then be that the researcher (me) must approach the topic from the viewpoint that reality relating to this topic is a product of the

social interaction process, meaning that reality is a subjective construct of the actors involved in the adoption process. From an epistemological perspective, CST is based on the principle that because reality is a social construction, the researcher must actively be involved in and engage with the social context in order to fully understand (Stahl, 2005). As such, CST recognises that there is no impartiality on the side of the researcher and that in order to make recommendations to alleviate areas of inequality, the researcher must have intimate knowledge of and experience with the social context (Ngwenyama & Lee, 1997). For the chosen topic the implication is that the researcher must be actively involved with and engage in the social context under study which translates into the researcher having to engage with both students and teachers at the University of Pretoria who are involved with the INF 112 curriculum. Additionally, CST is based on the premise that transformative (emancipatory) knowledge is composed of the production and application of theory amongst others and that this indeed forms an integral part of knowledge formation (Ngwenyama & Lee, 1997). For the chosen topic the implication of this is that the researcher will not only need to apply certain theories related to the use of social software in education but will also need to produce some theory of his/her own in order to form transformative knowledge. An example in terms of the chosen topic would be to study areas of inequality such as disabled students and to subsequently update theories and/or frameworks to cater for disabled students so as to alleviate the existing inequalities if social software was to be implemented in the INF 112 curriculum.

As can be seen from what has been discussed so far in terms of CST, there are a number of implications which need to be considered in terms of the chosen topic when viewing it through the CST paradigm, being: motivation, research focus, choice of theory and influencing others (Walsham, 2005). For this topic, a critical lens must be applied and in doing so an investigation must also take place to determine whether the implementation of social software, which is viewed as a technological education innovation, across the INF 112 curriculum, will be to the benefit of the students.

As shown in Figure 6 in this chapter, I have selected interpretivism as the philosophical assumption. The dominant paradigm that will be used for the purposes of this research project is that of an **interpretive**, mainly **qualitative** paradigm of inquiry operating on the principles of **social constructivism** (Orlikowski & Baroudi, 1991). The three research paradigms, being positivist, interpretivist and critical, were discussed above. Table 4 below summarises these three paradigms as well as highlighting why I have selected the interpretivist paradigm for the purposes of my research:

	Positivist	**Interpretivist**	**Critical**	**Justification for Selection**
Role of researcher	Impartial; Independent (Abbott, 1990)	Intervention by the researcher; Participant observer (Walsham, 1995)	Intimately involved (Avgerou, 2005)	I will be conducting social software interventions into the INF112 course over three iterations – hence I will be a participant observer and will be conducting interventions
Research stance	Scientific Quantitative (Weber, 2004)	Social Mainly qualitative (can have quantitative elements) (Nandhakumar & Matthews, 1997)	Social (identify & understand instances of inequality) Qualitative (Kvasny & Richardson, 2006)	I have selected a mainly qualitative research stance based on the principles of social constructivism – the context of my study is social because it relates to the students experiences of the social software interventions
Purpose	Prove / disprove hypotheses (Shanks & Parr, 2003)	Study Change in social setting (Trauth & Jessup, 2000)	Emancipation (Ngwenyama & Lee, 1997)	I will be studying if and how social software can be used to support collaborative learning for the students on the INF112 course – hence it involves studying possible change
Focus on	Theories/hypotheses; Cause-and-effect relationships; Experiments (Weber, 2004)	Human factor (understanding social complexities& recognizing role of researcher) Social action (Nandhakumar & Matthews, 1997)	What is wrong (Ngwenyama & Lee, 1997)	My research focus is on the human factor and social action as I will be conducting social software interventions of the INF112 course during which the students will have an opportunity to do group work using these tools

Social context	Ignored (not taken into account) (Lee, 1999)	Taken into account; Multi-variate (Chen & Hirschheim, 2004)	Taken into account (Kvasny & Richardson, 2006)	The social setting of my research, INF112 at the University of Pretoria, and the role-players involved on that course are taken into account

Table 4: Research Paradigm Comparison

I have selected this paradigm because of the following contributing factors (Baskerville & Wood-Harper, 1998):

- The multi-variate social setting in which the research will occur;
- Intervention by the researcher will take place;
- The researcher will be a participant observer;
- The research involves the study of change within a social setting.

Another reason for me, as the researcher, selecting an interpretive approach is because it provides different dimensions for the research investigation (Chen & Hirschheim, 2004) and the chosen topic has a number of different dimensions which need to be considered.

2.4.2 Research Method

There are four key qualitative research methods which can be selected when conducting a research project, being (Myers, 2009):

- Action research;
- Case studies;
- Ethnography;
- Grounded theory.

Ethnography is deemed to be the research method of choice when conducting research about organisational culture (Myers, 2009). Given the fact that my research study does **not** involve the study of organisational culture, I have excluded it from the discussion regarding research methods below.

Table 5 below is a comparative table where three research methods are summarised, each of which could have been selected as the research method for my research project.

	Action Research	Case Studies	Grounded Theory
Definition	Clinical research method that is founded upon a qualitative post-positive philosophy of science (Baskerville & Myers, 2004)	Is an empirical enquiry that investigates a contemporary phenomenon within its real-life context especially when the boundaries between phenomenon and context are not clearly evident that relies on multiple sources of evidence (Darke, Shanks, & Broadbent, 1998)	Theory that is derived from data systematically gathered and analysed through the research process (Corbin & Strauss, 1990)
Uses	Information Systems Organisational Development (esp. Information Systems Development & Software Process Improvement Programmes) Education (Baskerville & Pries-Heje, 1999)	Understanding interactions between IT related innovations and organisational contexts Information Systems Development and it's use in the field (Darke, Shanks, & Broadbent, 1998)	Strategic Information Systems Planning (SISP) Information Systems Interpretivist Studies (Hughes & Jones, 2003)
Issues	Lack of impartiality of researcher Lack of discipline Mistaken for consulting Context-dependency therefore difficulty generalising findings (Baskerville & Wood-Harper, 1998)	Data collection and analysis processes are subject to researchers character and background Relies heavily on researchers interpretation of documents, events and interview material Data analysis difficult due to qualitative nature Volume makes analysis time consuming (Flyvberg, 2004)	Interpretivist by nature May achieve a standing beyond its usefulness (Sarker, Lau, & Sahay, 2001)
Pro's	Improves practical relevance of IS research Advances scientific theory Solves real-world	Develops analytic and problem solving skills Allows for exploration of solutions for complex issues Allows student to	Rigorous approach Good for Novice Researchers (Provides useful template) Useful in developing context-based process-

	problem (Iversen & Matthiasen, 2004)	apply new knowledge and skills (Flyvberg, 2004)	orientated descriptions & explanations of phenomenon Assist with articulation of lessons learnt (Sarker et al., 2001)
Con's	Cannot be wholly planned & directed down particular path IS rights to an action paradigm questionable Validity in IS action research questionable Necessity for intellectual heritage makes it difficult Research-practice distinctions make it challenging Selection of proper form may be challenging Explicit methodology (Orlikowski & Baroudi, 1991)	Designing & scoping project to ensure that research question is properly answered is difficult Data collection is time –consuming & tedious Large amounts of data gathered Availability of case studies is limited Reporting is difficult Lacks vigor (Ruddin, 2006)	Can be time-consuming Problematic where researcher knows little about Grounded Theory (Baskerville & Pries-Heje, 1999)
Criteria	Roles Documentation Control Usefulness Theory Transfer (Baskerville & Myers, 2004)	Clear Chain of Evidence Contextual & Data Richness Reasoning in establishing cause-&-effect clearly stated + defended (Darke et al., 1998)	Empirical Grounding of Findings Research Process (Corbin & Strauss, 1990)

Table 5: Research Methods Compared

My research topic involves the study of whether and how social software can be used to support collaborative learning for the Net Generation in higher education. Action research is well suited to this topic because it can be used to solve a real-world challenge which is being experienced in educational circles: can social software be used successfully to support collaborative for the Net Generation in higher education. The social setting within the University of Pretoria is multi-variate and the introduction of social software will involve a change in the social setting and as such I believe that action research will be most appropriate. I will also be a participant observer and will be intervening in the process. The process itself will involve implementing a number of social software

tools across the INF112 curriculum, hence an iterative process will be undertaken during which the selection of social software tools will be refined after each iteration. Ultimately I aim to introduce organisational change in the form of implementing social software tools at the university in the INF112 course whilst at the same time studying the process in order to develop and/or refine a social software CSCL framework.

Case study research methods are potentially relevant to my topic because of the fact that I intend to collect and analyse qualitative and quantitative data. Whilst I could use the case study research method, its primary use is for understanding interactions between Information Technology (IT) related innovations and organisational contexts (Darke et al., 1998) and as such it not well suited to my research topic as I will be studying the use of social software for collaborative learning in the INF112 course.

Grounded research methods can be used for the qualitative elements of my research efforts where it is anticipated that a number of open-ended questions will be used. However, given that the action research method caters for that it is not necessary to use the grounded method unless I identify a particular use for it. There are five elements in a research project which need to be present to some degree in order for the research to be classified as action research, these elements are (Elden & Chisholm, 1993:121-124):

1. Purpose and value choice;
2. Contextual focus;
3. Change-based data and sense-making;
4. Participation in the research process;
5. Knowledge diffusion.

Participatory action research (PAR), which was discussed in the Theoretical Underpinnings section of Chapter 1, is well suited to this topic because it can be used to solve a real-world challenge which is being experienced by educators at all levels of education, and that is whether social software can be used to support collaborative learning for the Net Generation of learners in higher education. Action research includes the following steps (Baskerville & Myers, 2004):

1. Analysis;
2. Fact-finding;
3. Conceptualisation;
4. Planning;

5. Implementation of Action;
6. Evaluation.

I, as the researcher, intend following these proposed steps by consolidating them into four steps as per Figure 1 in section 1.4.1, being: plan, act, observe and reflect, for the purposes of my research project, and will amend them as necessary in order to cater for the iterative nature of my research project. The diagram below depicts the steps of my participatory action research activities that will take place.

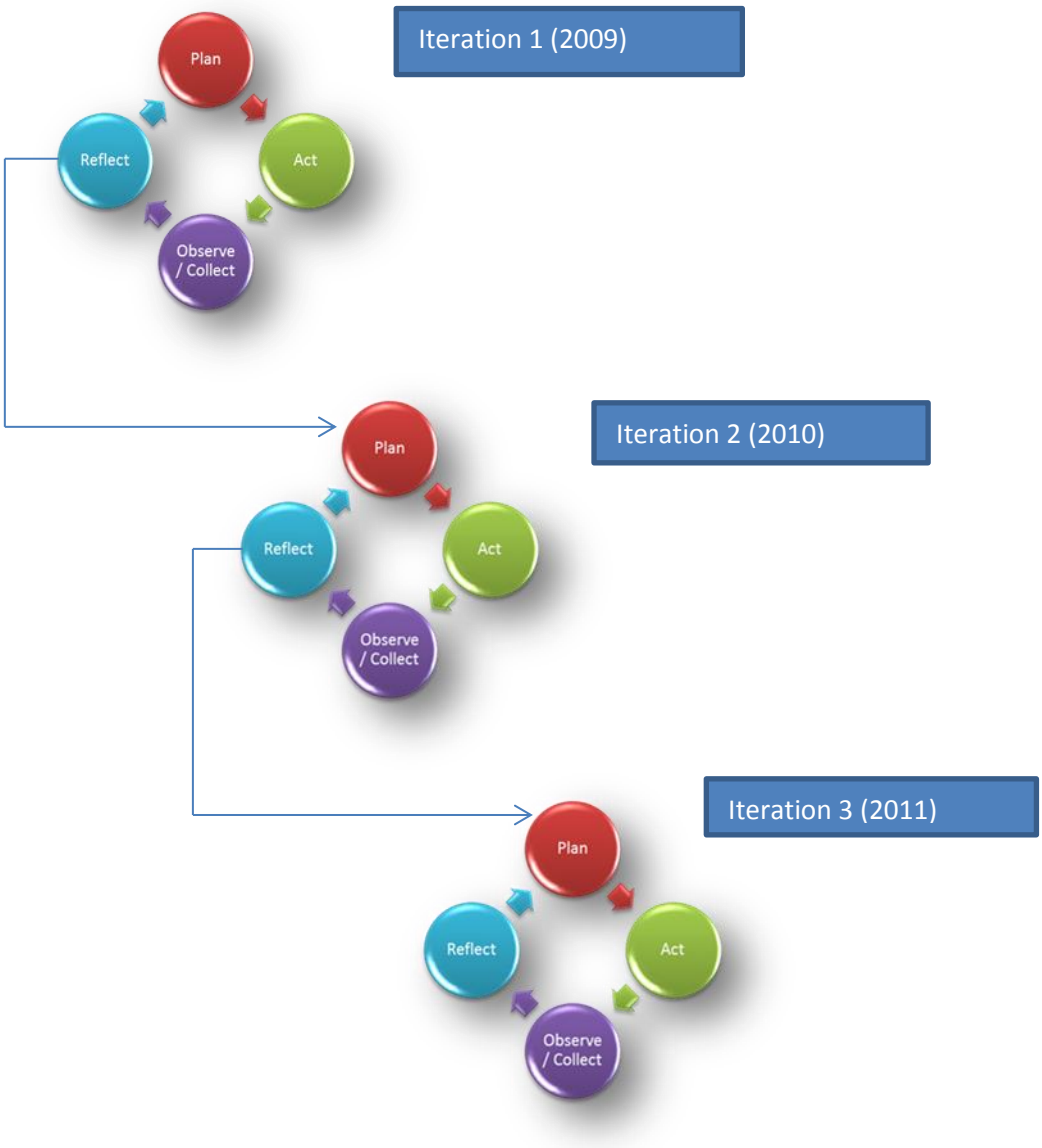

Figure 9: My Participatory Action Research Process

As such, the following steps are proposed:

1. Plan the social software intervention that I will be implementing for iteration 1 of my participatory action research cycle - ***PLAN***;
2. Implement the social software intervention on the INF112 course at the beginning of the semester for iteration 1 - ***ACT***;
3. Observe what is happening during the social software intervention for iteration 1 and gather data from the students regarding their experiences of the social software intervention – ***OBSERVE/COLLECT***;
4. Reflect on the process and the findings from the data collection and refine the according to the learning's - ***REFLECT***;
5. Plan the social software intervention that I will be implementing for iteration 2 of my participatory action research cycle - ***PLAN;***
6. Implement the social software intervention on the INF112 course at the beginning of the semester for iteration 2 - ***ACT;***
7. Observe what is happening during the social software intervention for iteration 2 and gather data from the students regarding their experiences of the social software intervention – ***OBSERVE/COLLECT;***
8. Reflect on the process and the findings from the data collection and refine the according to the learning's - ***REFLECT;***
9. Plan the social software intervention that I will be implementing for iteration 3 of my participatory action research cycle - ***PLAN;***
10. Implement the social software intervention on the INF112 course at the beginning of the semester for iteration 3 - ***ACT;***
11. Observe what is happening during the social software intervention for iteration 3 and gather data from the students regarding their experiences of the social software intervention – ***OBSERVE/COLLECT;***
12. Reflect on the process and the findings from the data collection and write up the results for all three iterations – ***REFLECT.***

Each of these iterations will be discussed in detail in separate chapters, being as follows:

- Participatory Action Research Iteration 1 – Chapter 4;
- Participatory Action Research Iteration 2 – Chapter 5;
- Participatory Action Research Iteration 3 – Chapter 6.

2.5 RESEARCH APPROACH

2.5.1 Research Design

As discussed in Section 2.1 I have selected ***interpretivism*** as the philosophical assumption, ***participatory action research*** as the research method, ***on-line questionnaires*** as the data collection technique and ***statistical analysis and coding*** as the data analysis approach as depicted in Figure 10 below.

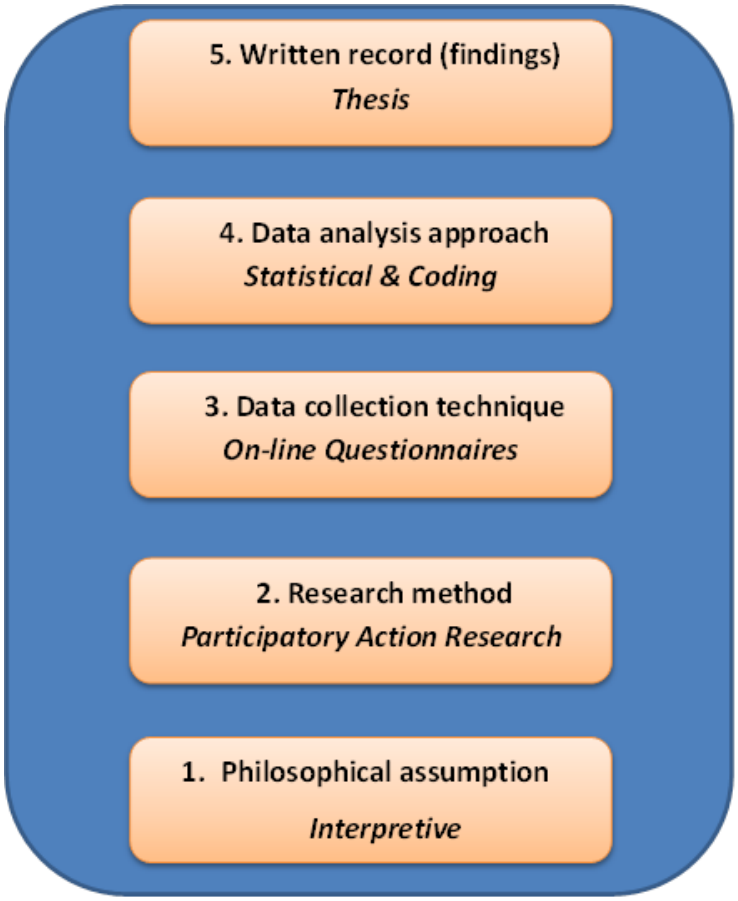

Figure 10: My chosen model for the research design (Myers, 2009)

Additionally, my research study is mainly qualitative in nature, based on principles of social constructivism. Research of any nature can be supported by three distinct methods, being (Berg, 2007):

- Quantitative – *traditionally used in natural science with mathematical rigour*;
- Qualitative – *used in social and human sciences for the study of highly complex and contingent phenomena*, and/or;
- Mixed – *combination of quantitative and qualitative*.

Information Systems research has gravitated towards qualitative methods because of the complex socio-technical nature of the phenomena it deals with (Myers, 2009). Qualitative research is well suited to my topic at hand as the nature and context of my study is of a complex socio-technical nature.

I created a web-based questionnaire containing both closed and open-ended questions for each iteration of the participatory action research (PAR) project. The same set of questions was asked in the context of the specific social software tool under discussion so that a comparative analysis could be conducted. It is important to note that students did not have to answer all of the questions – they could choose which ones they wanted to answer and which ones not. The questionnaire was uploaded onto the University of Pretoria's course Learning Management System (LMS) web-based platform for INF112 so that students could access the questionnaire both on-campus and off-campus. The questionnaire was setup to start at a certain time on a certain day and to end at a certain time on certain day and no maximum time limit was set for the completion of the survey. Students were informed of this in class, on Facebook (through the course group) and on the course platform via a pop-up announcement for each iteration of the PAR.

2.5.2 Research Population

2.5.2.1 Course Overview

The course, INF112, is titled 'Business Driven Technology' and is a mandatory subject for all first-year undergraduate students enrolling in the Faculty of Economic and Management Sciences at the University of Pretoria and runs over the course of one semester. The purpose of this course is to introduce students to Information Systems and more specifically its application within a business context.

The research population was selected from 1st year undergraduate commerce students, over three iterations, who are enrolled on this mandatory business driven technology course. Purposive sampling is best suited when subjects are chosen because of some characteristic used as these students represent the Net Generation which is part of the research topic at hand (Patton, 1990).

2.5.2.2 Participatory Action Research Cycle 1 - Iteration 1 Population

The target population for Iteration 1 of the Participatory Action Research project is 1580 students registered for the INF112 course at the University of Pretoria in the Faculty of Economic and Management Sciences. This iteration will be discussed in detail during Chapter 4 of this thesis.

2.5.2.3 Participatory Action Research Cycle 2 - Iteration 2 Population

The target population for Iteration 2 of the Participatory Action Research project is 1411 students registered for the INF112 course at the University of Pretoria in the Faculty of Economic and Management Sciences. This iteration will be discussed in detail during Chapter 5 of this thesis.

2.5.2.4 Participatory Action Research Cycle 3 - Iteration 3 Population

The target population for Iteration 3 of the Participatory Action Research project is 1387 students registered for the INF112 course at the University of Pretoria in the Faculty of Economic and Management Sciences. This iteration will be discussed in detail during Chapter 6 of this thesis.

2.5.3 Data Collection Technique

2.5.3.1 On-line Questionnaires

Questionnaires (also known as 'surveys') are one of a number of data collection techniques that is more relevant in Information Systems research (Creswell, 2007). Using questionnaires means that the subjects (in this case the students) complete a questionnaire without the intervention of the researcher (in this case me) (Berg, 2007). Questionnaires are useful when the subject population is large, majority opinions are sought, and the subjects are motivated to respond (Berg, 2007). In the case of my research, questionnaires are a useful data gathering tool as my subject population is large (on average 1500 students per year) and I am seeking majority opinions in order to make the findings more relevant and representative.

I have selected questionnaires as my primary source for data generation. Given the qualitative, interpretive nature of my research study, questionnaires as a data gathering technique has been selected. According to Myers (2009), well-designed surveys include open-ended questions that allow for insight into the respondents interpretation (Myers, 2009). As such my questionnaires include both closed-ended and open-ended questions.

As the emergence of the qualitative paradigm in educational research takes place, there are concerns around ensuring content validity (Johnson, 1997). One of the primary concerns is whether qualitative research can be defined as scientific (Johnson, 1995). A definition of validity in qualitative research is *"…whether the data is plausible, credible and reliable, and can be defended when challenged."* (Kirk & Miller, 1986:16).
There are three types of validity that need to be catered for when conducting qualitative research (Maxwell, 1992:282):

1. **Descriptive Validity**: This is defined as the accuracy of the behaviours, events, objects, settings and others reported by the researcher.
2. **Interpretive Validity**: This is defined as the accuracy of interpretation as to what happened in the minds of subjects and the extent to which the researcher understands exactly the opinions, thinking, feelings, intentions and experiences of subjects.
3. **Theoretical Validity**: This is defined as the extent to which the theoretical explanations developed are in congruent with the data and is reliable and can be defended.

I, as the researcher, have reviewed the three types of content validity listed above whilst referring to my topic at hand, as well as the research methodology that I will be following, in order to ensure that the content is valid.

This research will be self-administered electronically online. I have selected this method of administration because (Leung, 2001):

- The respondents are students who are familiar with the course LMS onto which the questionnaire will be available and can be easily reached via electronic means on-campus and off-campus;
- This technique “preserves confidentiality”;
- This questionnaire can be completed at the students convenience, and;
- This questionnaire can be administered in a standard manner.

Questionnaires allow for the clarification of ambiguity and participation by less literate people is catered for (Leung, 2001). It is important to note that the questionnaires for iteration 1 -3 included over 100 questions on average but not all of these questions will be discussed as part of this thesis as this thesis focusses only on the use of social software tools for CSCL and not on other categories such as ‘Access to infrastructure’.

2.5.4 Data Analysis Approach

2.5.4.1 Introduction

The data analysis approach which qualitative researchers selected is based on the research questions, the types of data collected and the philosophical assumptions of the study (Miles & Huberman, 1994). According to Miles and Huberman (1994), there are three approaches to analysing qualitative data, being (Miles & Huberman, 1994):

1. An interpretive approach
2. Collaborative social research

3. Social anthropology.

According to Savenge & Robinson (2005), an '*interpretive*' approach would be "*…phenomenological in nature or based on social interactionism. Researchers using this approach would seek to present a holistic view of data rather than a condensed view. They might seek to describe a picture of 'what is.' They would generally not choose to categorize data to reduce it. Miles and Huberman note that the interpretive approach might be used by qualitative researchers in semiotics, deconstructivism, aesthetic criticism, ethnomethodology, and hermeneutics."* (Savenye & Robinson, 1996:1059). According to Savenge & Robinson (1996), collaborative social research is *"…often used by action researchers in partnerships composed of members of many, and sometimes opposing, organizations."* (Savenye & Robinson, 1996:1059). The final approach, 'social anthropology' relies "*…primarily on ethnography. Researchers using this approach seek to provide detailed, or rich, descriptions across multiple data sources. They seek regular patterns of human behavior in data, usually sifting, coding, and sorting data as they are collected, and following up analyses with ongoing observations and interviews to explore and refine these patterns."* (Savenye & Robinson, 1996:1059). As mentioned in section 2.4.1 I will be using an interpretive approach as my study is based in the foundations of social constructivism.

2.5.4.2 Methods for Analysis

According to Miles and Huberman (1994), qualitative data analysis consists of *"three concurrent flows of activity: data reduction, data display and conclusion drawing/verification"* (Miles & Huberman, 1994:4). For the purposes of my research study I will be using **data reduction** and **coding** as my two primary sources of data analysis. Data reduction is transformation of numerical or alphabetical digital information derived empirical or experimentally into a corrected, ordered, and simplified form (Ehrenberg, 2000). I will use this technique as the data output from my questionnaires will be imported into spreadsheets using MS Excel and will then need to be sorted, organised and simplified, with particular emphasis on the closed-ended questions. I also use the Stata software package (ref: StataCorp. 2009. Stata Statistical Software: Release 11. College Station, TX: StataCorp LP.) for this.

Data coding involves using tags that categorize the data collected in order to assign meanings to them (Gibbs, 2007). I will be using coding for the open-ended questions in the questionnaires as coding makes it easier to search the data, make comparisons and identify patterns that require further investigation (Gibbs, 2007). I will be using a number of software tools including MS Excel,

NVivo and Atlas TI which can be used for coding and helping organise the patterns (Gibbs, 2007). Additionally, descriptive and inferential statistics will be used to analyse and describe the data.

2.6 ETHICAL CONSIDERATIONS

2.6.1 Background

As a requirement of the Faculty of Economic and Management Sciences at the University of Pretoria (UP) any research undertaken is required to be approved by the Faculty Ethics Committee. Before data collection can take place, a document including an ethics form, overview of the methodology and instrument must be submitted for approval. Permission to conduct my research on the INF112 course has to be obtained from the Head of Department: Informatics. Due to the participants being students, in addition to obtaining permission to undertake research by the Head of Department, permission needs to be granted from each student. Due to the anonymity of the research, consent will be obtained from study participants by the means of a cover letter on the questionnaire. To ensure confidentiality and anonymity of the participants they will not be asked to submit their names and student numbers when completing the questionnaire, and they were asked to sign a consent form ensuring confidentiality.

The questionnaire that will be used includes questions asking the respondents ethnicity and gender. Thus, ethical issues might arise as a result of these questions. However, the option to leave the question unspecified has been provided for those who do not wish to disclose this information. Furthermore, a declaration will precede the questionnaire. This declaration will assure respondents that their data will be kept confidential and anonymous. I, as the researcher, have taken cognisance of what is required from me from the Ethics Committee of the Faculty of Economic and Managements Sciences.

2.6.2 Application for Ethical Clearance

The Ethics Committee of the Faculty of Economic and Management Sciences meets monthly to review applications for ethical clearance (UP, 2012). Each application must include:

- The completed Application for Ethical Clearance, including all relevant attachments;
- The title registration form;
- The Research Proposal approved by the Postgraduate Committee of the Faculty.

I, as the researcher, have followed the steps discussed above in order to obtain ethical clearance for my research project. My application documentation as well as the approval can be found in Appendix A. This documentation includes:

- My completed Application for Ethical Clearance Form;
- My title registration form;
- My research proposal approval form;
- My research instrument (questionnaire);
- My letter of informed consent.

2.7 CONCLUSION

The meaning of the term 'paradigm' was explored at the beginning of this Chapter and in doing so it was highlighted that paradigms are in a perpetual state of 'life and death' – one could then argue that this essay is in itself a paradigm and as such must also now conclude. In concluding this Chapter, I have made a recommendation in terms of which paradigm I intend using for my research topic at hand. As discussed, I recommend an **Interpretivist Participatory Action Research** approach which will make use of iterative cycles to determine whether social software can be used to support collaborative learning for the Net Generation in higher education. Additionally, I have recommended the modes of gathering and analysis of quantitative and qualitative data in order to strengthen the arguments made. I have recommended this approach because interpretivism involves engaging in the social setting and learning how interactions take place from a particular perspective (Chen & Hirschheim, 2004). Given the fact that the topic has people and learning as its cornerstones, it is imperative that the social reality of the topic be recognised and treated as such. Participatory Action Research is well suited to this topic because it can be used to solve a real-world challenge which is being experienced in educational circles. The social setting within tertiary education institutions is multi-variate and the introduction of social software for learning will involve a change in the social setting and as such I, as the researcher, believe that participatory action research will be most appropriate. I will also be a participant observer and will be intervening in the process. The methodological process involves implementing a number of social software tools over three iterations on the INF112 curriculum. I recommend making use of questionnaires as my data gathering technique, and will include both quantitative and qualitative data. Ultimately, I, as the researcher, intend to introduce organisational change in the form of using social software for collaborative learning for the Net Generation at the University of Pretoria whilst at the same time studying the process.

CHAPTER 3

LITERATURE REVIEW

CHAPTER 3: LITERATURE REVIEW

3.1 INTRODUCTION

This chapter discusses, in detail, the literature review which I conducted pertaining to the key themes of my thesis. The main themes from my research topic at hand are: The Net Generation, Social Software and Computer-Supported Collaborative Learning (CSCL). I will also be discussing De Villiers (1995) CSCL Theoretical Framework , as one of my research objectives is to develop a framework that can be used to design collaborative learning activities using social software for the Net Generation in higher education.

The pervasiveness of the internet globally has resulted in social software tools being readily adopted by society at large, and more specifically by the Net Generation of students (Berk, 2009b). Due to both the social nature of these technologies as well as the unique learning preferences of these learners, collaborative learning is proving to be a more optimal learning approach for these students (Oblinger & Oblinger, 2005). Group work is an essential component of collaborative learning and the features and functionality of social software tools are conducive to this type of learning. According to research conducted by Prensky (2007) it was also found that there is a sharp decline in learner boredom and the need for discipline in a collaborative learner environment. This literature review explores the use of social software to support computer-supported collaborative learning (CSCL) for the Net Generation in higher education, specifically for undergraduate students. These social software tools were selected specifically for their collaborative nature with regards to supporting group work as well as lending themselves to supporting large numbers of students as is the case in the INF112 course.

For each of these themes, the main aspect of the theme is defined. Following this, the review discusses ideas and concepts found in the literature.

3.2 DEFINITION OF THEMES

3.2.1 The Net Generation

According to Kennedy, Judd, Dalgarno and Waycott (2010) the Net Generation is a homogenous group of people who have advanced skills in the use of information and communication technologies (Kennedy et al., 2010). They are homogenous, in the sense that this generation is believed to be tech-savvy and immersed in the use digital technologies, and more specifically web technologies

(Bennett & Maton, 2010). The terms Digital Native, Net Generation and Millennial can be used interchangeably and are the most widely used terms for this newer generation (Jones, Ramanau, Cross, & Healing, 2010). Jones, Ramanau, Cross and Healing (2010) state that the main differences between these classifications is the birth date ranges that are used. The Net Generation is said to have been born in January 1977 and end in December 1997 (Tapscott, 2008). Palfrey and Gasser (2010) suggest that the Digital Natives started appearing after the 1980s (Gasser & Palfrey, 2010) and the Millennials can be classified as those born in or after 1982 (Oblinger & Oblinger, 2005). The table below shows the classification differences between the various generations by various author(s) (Reeves & Oh, 2008).

Howe & Strauss (2000)	**Silent Generation**	**Boom Generation**	**13th Generation**	**Millennial Generation**
	1925 - 1943	1943 - 1960	1961 – 1981	1982 - 2000
Lancaster & Stillman (2002)	**Traditionalists**	**Baby Boomers**	**Generation Xers**	**Millennial Generation Echo Boomer Generation Y Baby Busters Generation Next**
	1900 - 1945	1946 – 1964	1965 – 1980	1981 - 1999
Martin & Tulgan (2002)	**Silent Generation**	**Baby Boomers**	**Generation X**	**Millennials**
	1925 - 1942	1946 – 1960	1965 – 1977	1978 - 2000
Oblinger & Oblinger (2005)	**Matures Baby Boomers**	**Gen-Xers Gen-Y**	**Net Generation**	**Millennials**
	<1946	1947 – 1964	1965 – 1980	1982 - 1995

Tapscott (1998)		**Baby Boom Generation**	**Generation X**	**Digital Generation**
		1946 – 1964	1965 – 1975	1976 - 2000
Zemke, Raines & Filipczak (2000)	**Veterans**	**Baby Boomers**	**Gen-Xers**	**Nexters**
	1922 - 1943	1943 - 1960	1960 - 1980	1980 - 1999

Table 6: Generational Differences

Those born into the Net Generation are people who have grown up with technologies that include mobile phones, high powered computers and the internet (Duffy, 2008). When looking at the term 'Net Generation', the 'Net' part is an acronym for 'Internet'. They 'speak' the digital language of computers and the internet (Helsper & Eynon, 2010). Blogs, wikis, virtual worlds, instant messaging and media sharing (eg: online videos) are just a few of the activities enjoyed by the average Net Generation person (Jones et al., 2010). Duffy (2007) goes on to mention that people from the Net Generation operate at 'twitch speed', which means they respond and expect feedback almost instantaneously (Duffy, 2008). Digital Natives also like to parallel process or multi-task and they prefer gathering information through pictures and videos over text (Helsper & Eynon, 2010).
For the purpose of my thesis I will be using the definition by Oblinger and Oblinger (2005), which means that anyone born after 1982 will be characterized as part of this new generation, and the term Net Generation will be used to in reference to them.

3.2.2 Social Software

The Internet has become a part of mainstream social life for many people in the world. There are a number of social technologies available to users, from email and instant messaging services (IM) to blogs and social networking services (SNS), which are now widely used. The term 'social software' is defined as referring to "*…any Internet (web-based) software which enables groups of people to communicate and to collaborate, from something very familiar such as email, IM, and group forums, to new applications such as blogs, SNS, and web-based collaborative editing tools.*" (Gao, Dai, Fan, & Kang, 2010:1846). Another definition from Shirky (2003) is that social software may be defined as "*…software that supports group interaction*" (Shirky, 2003). Current social software tools support

social interaction, feedback, conversation and networking and are also flexible and modular enough to allow for collaborative endeavours (Boyd, 2007).

Meijas (2005) goes on to include categories of social software as shown in Table 7 below:

Category	Examples
Multi-player online gaming environments / virtual worlds	Multi-User Dungeons (MUDs); Massively Multiplayer Online Games (MMOGs) such as Second Life, Active Worlds, World of Warcraft, Everquest
Discourse facilitation systems	*Synchronous:* Instant messaging (IM, e.g. Windows Live, Google Chat) *Asynchronous:* Email, Discussion boards
Content management systems	Blogs, wikis
Product development systems	Sourceforge, Savane
Peer-to-peer file sharing systems	BitTorrent, Napster, Limewire
Selling / Purchasing management systems	eBay
Learning management systems	Blackboard/WebCT; ANGEL; Moodle; .LRN; Sakai; ATutor
Relationship management systems	MySpace; Friendster; Facebook; Faceparty; Orkut; eHarmony
Syndication systems	List-servs; RSS aggregators
Distributed classification systems	*Social bookmarking:* del.icio.us; Digg; Furl *Social cataloguing (books):* LibraryThing; neighborrow; Shelfari (*music*): RateYourMusic.com; Discogs (*movies / DVDs*): Flixster; DVDSpot; DVD Aficionado (*scholarly citations*): BibSonomy; Bibster; refbase; CiteULike; Connotea *Other*: Flickr

Table 7: Social Software Categorisation

For the purposes of my thesis, I will be using the social software definition by Dron (2007) who states that *"social software…is where control and structure can arise through the process of communication, not as a result of design, but as an emergent feature of group interaction."* (Dron, 2007:233). The reason for me selecting this definition is because of the fact that my study involves the use of social sofware for collaborative learning, ie: group work.

It is important to make a distinction between the terms social software versus Web 2.0. Web 2.0 is a term used to describe technologies and applications that place on increased emphasis on user

generated content, data and content sharing and collaborative effort (Harris & Rea, 2010). Web 2.0 also describes new ways of interacting with web applications as well as the use of the web as a social platform to generate, consume and reposition content (Harris & Rea, 2010). The term Web 2.0 was coined by O'Reilly (2005). Web 2.0 tools, as mentioned above, encourage sharing and collaboration. Examples of Web 2.0 tools includes blogs, wikis, podcasts, instant messaging, social networks virtual worlds, RSS feeds and social bookmarking as well as websites such as YouTube (Duffy, 2008; Harris & Rea, 2010; Hazari, North, & Moreland, 2010). The term 'social software' was coined in 2002 to include Web 2.0 technologies that are socially based tools and systems (McLoughlin & Lee, 2007). For the purposes of my thesis I will be focussing on using social software in the form of certain Web 2.0 technologies in order to facilitate a participative educational process for collaborative learning for the Net Generation in higher education. As such, for the purposes of my study, I will be using the term **social software** and not web 2.0 due to the social nature of my study.

3.2.3 Computer-Supported Collaborative Learning (CSCL)

The term '**computer-supported collaborative learning**' was coined by O'Malley and Scanlon in 1989 (Marshall, 1995). It has increasingly been regarded as an important focus area by researchers with the emergence of technology in the past two decades (Hakkinen, Arvaja, Makitalo, 2003). A material amount of recent research on the use of technology in education is exploring technology's possibilities to facilitate social interaction between educators and students, and among students (Hakkinen et al., 2003).

Collaborative learning is also referred to as group work in education or small group learning, although not all group work can be called collaborative learning. There is a consensus among researchers, that collaboration involves the construction of meaning through interaction with others and can be characterised by a joint commitment to a shared goal (Häkkinen et al, 2003). Collaborative learning is often defined in a way that necessitates participants to be engaged in a co-ordinated effort to solve a problem or perform a task together (Littleton & Hakkinen, 1999). This coordinated, synchronous activity is the result of a continued attempt to construct and maintain a shared conception of a problem (Roschelle & Teasley, 1995). For a learning process to be considered collaborative, two or more people (students) must learn something together and the learning objective can only be achieved if the group works in collaboration (Gros, 2001).

The full-term, CSCL, is a learning approach wherein learning takes place via social interaction using a computer or through the Internet (Dillenbourg, 2002). In the case of my thesis, CSCL will be taking

place using certain types of social software over the course of three iterations in the learning context of collaborative learning via group work.

3.3 EDUCATING THE NET GENERATION

3.3.1 Background

Growing up with and being surrounded by technology has shaped the way in which members of the Net Generation learn and participate in the classroom (Berk, 2009b; Duffy, 2008; Jones et al., 2010; Oblinger & Oblinger, 2005; Prensky, 2001; Harry, 2012; Roodt & Peier, 2013). Educating and engaging the Net Generation has become a challenge as educating and engaging students from the Net Generation has become difficult (Berk, 2009b; Merlino & Rhodes, 2012).

The Net Generation, also known as the Millennials, Generation Y and the Digital Natives, is the term used to describe the generation born between 1982 and 2003 (Berk, 2009a). This group, which will be referred to as the Net Generation throughout my thesis, grew up with the digital technology that arrived in the last decades of the 20th century (Prensky, 2001). The term 'Net Generation' was first mentioned by Tapscott (Tapscott, 2008). The term Net Generation comes from the fact that members of this generations' birth coincided with the emergence of the Internet and digital technology (Berk, 2009b).

Members of the Net Generation have grown up with computers and the Internet and are said to have a natural aptitude and high skill levels when using new technologies (Jones et al., 2010). Prensky (2001) used the term 'Digital Natives' to describe this group as he stated that members of this generation were so accustomed to using digital technology that they speak the digital language (Prensky, 2001). In order to educate and engage the Net Generation, various suggestions have been made. A popular suggestion of educating and engaging the Net Generation is the use of various Web 2.0 elements in the classroom (Agazio & Buckley, 2009; Berk, 2009a; Berk, 2009b; Duffy, 2008; Hrastinski & Aghaee, 2011; Merlino & Rhodes, 2012; Oblinger & Oblinger, 2005). Other suggestions include adapting teaching methods (Wilson & Gerber, 2008). Merlino and Rhodes (2012) suggested that teaching strategies for Net Generation students include using real world examples, creating participatory activities (projects, group work) and providing clear structure (Merlino & Rhodes, 2012).

3.3.2 Lifestyle

The Net Generation has been exceedingly more dependent and intertwined with technology than the preceding generations (Mthembu, 2012). The Net Generation uses technology as part of their daily lives and relies heavily on technology as a means to complete daily tasks and socialize (Oblinger & Oblinger, 2005)(Mthembu, 2012).

The interactive and digital media of today has provided the group with the tools to freely access information. The interactive and digital media enables the Net Generation to question and challenge ideas and become a generation of critical thinkers (Tapscott, 2008). The Net Generation have a strong sense of independence and autonomy, are assertive, self-reliant, emotionally and intellectually expressive, innovative and curious (Tapscott, 2008).

3.3.3 Media Habits

The Net Generation has become inseparable from technology (Mthembu, 2012). As technology advances and the Net Generation readily embraces these advances significant changes will be apparent in the way individuals interact with one another and in the way they participate in their daily lives (Tapscott, 2008).

3.3.4 Learning Style Preferences

These young adults exhibit a number of characteristics that make them unique, largely attributable to their fascination and familiarity with new technologies (Oblinger & Oblinger, 2005). One of these characteristics is described by Howe and Strauss (2000), who argue that these people, many of whom are now university students, mentally process information differently because they were raised with the personal computer (Howe & Strauss, 2000; Mthembu, 2012). Oblinger and Oblinger (2005:16) refer to this mental processing as *"…the ability to process or piece information together from multiple sources."* The other defining characteristics are (Oblinger & Oblinger, 2005):

- Ability to read visual images—they are intuitive visual communicators.
- Visual-spatial skills—perhaps because of their expertise with games they can integrate the virtual and physical.
- Inductive discovery—they learn better through discovery than by being told.
- Attentional deployment—they are able to shift their attention rapidly from one task to another, and may choose not to pay attention to things that don't interest them.
- Fast response time—they are able to respond quickly and expect rapid responses.

For the academic community, these students present a paramount challenge, not only because they learn differently from traditional learning methods but also because they want to learn differently (Roodt et al., 2009).

In terms of the defining characteristics mentioned above, there are ten features that have a potential impact on higher education (Oblinger & Oblinger, 2005):

- Digitally Literate – They can operate a variety of technological devices and are familiar with the internet, for example: laptops, cellphones and/or iPods ®.
- Connected – They are almost always connected to a technological network of some sort, for example: cellular networks and/or the internet.
- Immediate – They have fast response time and multi-task, for example: playing a game and instant messaging at the same time.
- Experiential – They have an exploratory style of learning and have a preference for 'learning by doing' which results in better memory retention of the subject matter, for example: creating an animation to teach peers about green IT instead of writing a document.
- Social - They seek to interact with others, whether in their personal lives, their online presence, or in class, for example: blogging and having social network profiles on a network such as Facebook ®.
- Teams – They prefer to learn and work in teams, for example: a peer-to-peer approach where students help each other.
- Structure – They like to know what it will take to achieve a goal, for example: rules, priorities and/or procedures for doing a task.
- Engagement and Experience – They like interactivity, for example: watching a YouTube ® video on a topic instead of reading slides.
- Visual and Kinesthetic – They are more comfortable in image-rich environments than text, for example: looking at pictures showing the impact of global warming instead of reading text.
- Things that Matter – They readily take part in community activities and want to learn about things that matter, for example: environmental concerns.

The consequences of this is that educators have to adapt not only their teaching methods, learning tools, content and assessment criteria, but also themselves in order to effectively help educate these students (Roodt et al., 2009). I, as the researcher, have chosen to adapt the **teaching method**, **learning tools**, **content** and **assessment criteria** to be geared towards educating the Net Generation

of students at the University of Pretoria for the INF112 course (Roodt et al., 2009). This will be discussed in Chapter 4 – 6 for each iteration of my PAR project.

3.3.5 The Net Generation and Higher Education

It has been widely believed that educating the Net Generation is a difficulty and may pose a challenge for many educators, because unlike their teachers, students and scholars have greater interest and higher capabilities in the use of technology (Abell, 2011). The demand for instant access to information and the expectation of technology to enrich a student's learning experience are further assumptions that have been made (Kennedy, Judd, Dalgarno, & Waycott, 2010). Jones et al. (2010) raise the point that it is also accepted, that Net Generation students have developed rapid study techniques, and that students rely on modern technologies to help with their studies and deliver the relevant course materials (Jones et al., 2010).

3.3.6 Criticisms of the Net Generation Categorisation

It is important to note that while suggestions have been made as to how to educate and engage the Net Generation, Beck (2009b) noted that generalisation of a generation and its characteristics can be limiting (Berk, 2009b; Roodt & Peier, 2013). The suggestion that members of the Net Generation have a different learning style has been challenged by Margaryan, Littlejohn and Vojt (Margaryan et al., 2011). Furthermore, Jones et al. (2010) and Kennedy et al. (2010) suggested that the Net Generation is not necessarily homogenous in their use of technology and that skill and comfort level with technology differs within the generation (Jones et al., 2010; Kennedy et al., 2010). It appears that the Net Generation is not as homogenous as originally anticipated (Jones et al., 2010). Socioeconomic background, field of study, age, exposure to technology and teaching approach can influence the way Digital Natives experience technology, both in a social and educational context (Hargittai, 2010; Jones et al., 2010; Margaryan et al., 2011; Thinyane, 2010).

A number of quantitative studies reveal that the relationship between the Net Generation, education and technology is not as simple as perceived (Jones et al., 2010; Roodt & Peier, 2013). A study performed by Margaryan, Littlejohn and Vojt (2011) concluded that, in the case of learning and socializing, the amount of technological tools used depended greatly on whether or not the students were enrolled in a technical subject; for example, an engineering major would use more technological tools than a philosophy major. These tools were, however, established technologies, which included Google and Wikipedia (Margaryan et al., 2011). Established technologies are frequently used by students, but there is only a small subset of students that use newer and more specialized technologies to fulfil their educational needs, in other words, students seem to be more

comfortable with basic tools (e.g. Google, email) than they are with specialised tools (Kennedy et al., 2010). Jones and Healing (2010) also mentioned that there appeared to be no significant difference in the skill levels of males and females for most applications, but age was a large factor in determining the use of collaboration and communication technologies, which included Instant Messaging and social networking. Furthermore, Hargittai's (2010) study revealed that different socioeconomic backgrounds and race can determine the student's established technological capabilities and impact the frequency a student will access those relevant technologies. It was found that people from African American and Hispanic descent exhibit a lower level of engagement and skill with technology than people from Asian American descent (Hargittai, 2010).

Margaryan et al.'s (2011) study found that there was no supporting evidence for the claim that Net Generation students adopt a more radical approach to learning, or that they expect more technological integration in their educational experience. It was revealed that students still rely on the guidance from their lecturer and their attitudes to learning are influenced by the various teaching approaches used in class (Margaryan et al., 2011). A study performed by Thinyane (2010) concluded that the people from the Net Generation should be portrayed as part of a population, rather than a generation, because about only 1 billion of Earth's populace have access to digital technologies.

Beck (2009b) noted that defining and labelling groups of people and ascribing characteristics to them can lead to problems of misrepresentation and generalisation (Berk, 2009b). Various studies (Jones et al., 2010; Kennedy et al., 2010) have shown that the Net Generation is not homogenous in their use of technology and thus some of the assumptions made about the Net Generation are not entirely true (Roodt & Peier, 2013; Harry, 2012).

3.4 SOCIAL SOFTWARE IN HIGHER EDUCATION

3.4.1 Background

Using social software for teaching and learning can be seen in higher education today (Dawson, 2006) (Murugesan, 2007). Social software allows students to '*create*' instead of simply '*consume*' content (Sandars & Schroter, 2007). Because of this characteristic of social software, a number of authors argue that social software can be used successfully for teaching and learning in higher education, and particularly for the Net Generation of students (Duffy & Bruns, 2006; Alexander, 2006; Bryant, 2006; Evans & Larri, 2006; Richardson, 2006; Sandars & Schroter, 2007).

In higher education, certain types of social software such as blogs, wikis and podcasts are enjoying widespread use (Duffy & Bruns, 2006). Blackey and Chew (2009) have compiled a list of benefits that social software can have for students in higher education and includes (Blackey & Chew, 2009):

- Widely spread, easy and free usage without much support from the higher education institution;
- Enhances communication skills, widening participation and social engagement and collaboration;
- Encourages peer-support and review;
- Creates learning interest through community of learning;
- Creates educational engagement and sense of ownership when the learning process is published on the web. Ability to retain access to their work, communication and learning history after they leave the higher education institution.

3.4.2 Facebook (Social Networking)

3.4.2.1 Overview

In the past, Manual Castells has highlighted a sociological theme called the 'Networked Society', as part of his description of social forms which are emerging. This emergence can be seen in the move from Web 1.0 to Web 2.0, including the wide range of online applications, from Wiki's, Podcasts and Blogs, to social network sites such as Facebook (Cloete, De Villiers & Roodt, 2009). Online social networks are defined by Kay (2007) as "*Web sites that enable people to create a network of connections to other individuals. Through the Internet communities that make up social networks, people can contact others they would like to know for personal or professional reasons but whom they might otherwise be unlikely to meet"* (Kay, 2007:56).

"Social networking sites are not the new Learning Management Systems", but it *"has pedagogical potential"*, and *"should be considered a supplement to other tools"* (Dalsgaard, n.d.).

There is a movement in most communities towards online interactions beyond face-to-face interactions (Cho, Lee, Stefanone & Gay, 2005). Social networking is taking up more and more time of students at university and changing the way in which they interact socially. These social interactions can be characterised as more global, accessible and diverse as in the past (Cloete, et al., 2009). Boyd and Ellison (2008) also state that "*social networks are increasingly attracting the attention of academic and industry researchers*" (Boyd & Ellison, 2008:212)and Beer (2008) supportively states that there is a "*burgeoning academic interest in this phenomenon*" (Beer, 2008:518).

It is the responsibility of higher education institutions to present courses which develops students' knowledge and skills in 'collaborative networked environments' (Minocha & Thomas, 2007). Students need these skills to be competitive when they enter the workforce (Cloete et al., 2009). Eberhardt (2007) argues that "*online social networking can enhance students' educational experience or interfere with learning and development"* (Eberhardt, 2007:19). One of the most widely adopted social networks in society is Facebook©. Given the fact that I have used Facebook as one of the social software tools in my study, a discussion of Facebook follows.

"Facebook is a social utility that connects you with the people around you" (Facebook, n.d.), and it "*is a highly interactive virtual social network"* (Mazer, Murphy, & Simonds, 2007:2). Facebook members are able to create personalised profiles, find people, invite friends, collaborate via email and other multimedia methods, and socially interact with other members (Cloete et al., 2009). Facebook and other social networks have an immense impact on social and academic interactions in academic institutions (Cloete et al., 2009). According to Mazer et al.(2007), Facebook is a unique social networking site because it creates connections between students and faculty within an online academic community (Mazer, et al., 2007). Facebook was initially used for social interactions, but people soon started forming groups for academic purposes, where peer learning takes place (Cloete et al., 2009). Mayer & Puller (2008) mention how social networks have an impact on student learning (Mayer & Puller, 2008). Thus, sites such as Facebook are characterised by personal, academic and professional (work-related) groups where members interact for different purposes and to fulfil different needs (Cloete et al., 2009). Facebook is focused towards college and high school students (Acquisti & Gross, 2006), but Dodge (Dodge, n.d: 9) adds that Facebook is now also focusing on work groups: "*Facebook became a professional utility almost two years ago when it added work networks to what until then had just been schools"*. Other social networks include Friendster, LiveJournal, MySpace, Xanga, WiredSafety, etc. (Cloete et al., 2009). Also, social networking has been applied in the business environment for increased collaboration (Baker-Eveleth, Stone, & Pendegraft, 2007), thus the participation of students on these sites is valuable to gain skills for their future careers.

The following are potential benefits of making use of Facebook in university courses (Ellison, 2007):

- Already integrated into students' daily practices;
- Higher level of engagement;
- Potential to make identity information more salient during class discussions;

- Adds social peer-to-peer component; and
- Enhances digital literacy skills.

Cho et al. (2005) mention how social networks are solving the coordination problems of groups as they are able to meet at desired working times despite geographical distance between group members (Cho et al., 2005). Students who have fully packed timetables, transport restrictions and who struggle to find the time to meet with group members face to face can benefit from doing group work via a social network (Cloete et al., 2009).

3.4.2.2 Advantages and Disadvantages

My study focuses on students' feedback on the use of social networking, specifically Facebook, for learning and as such advantages and disadvantages will be discussed in this context.

The following are some advantages regarding social networking related to the student's perspective:

- Companionship, access to information, and emotional and material support (Donath, 2008);
- An opportunity to get to know their lecturers better (Hewitt & Forte, 2006);
- Expands human social reach (Donath, 2008);
- More confidence because of the reason that they can act anonymously (Chester & Gwynne, 1998);
- Students have more opportunities to develop personal relationships with their peers (Mazer et al., 2007);
- Students self-disclose more about themselves which can positively affect peer relationships (Mazer et al., 2007); and
- Students are aware of the lecturer's attempt to develop positive relationships via Facebook (Mazer et al., 2007).

The following are some disadvantages regarding social networking related to the student's perspective:

- The risk of procrastination in terms of delays (Cho et al., 2005);
- The online setting is viewed as an isolated participation mode (Thomas, 2002);
- A member hindering the work of others (Sparrowe, Liden, Wayne, & Kraimer, 2001);
- Creates opportunities for deception (Sandars, 2005);
- Members manipulate relationships (Donath, 2008);
- 'Flaming' (aggression) and a decrease in trust (Chester & Gwynne, 1998; Sandars, 2005);

- Lecturers may show improper behaviour and lower their credibility according to students (Mazer et al., 2007);
- Not all students have access or skill for technology, and this could impact students' learning (Mazer et al., 2007); and
- Some students form negative opinions about their new peers before they ever personally meet them (Eberhardt, 2010).

Some students are 'overly engaged online' and spend too much time on social networking and other online sites (Cloete et al., 2009). This can have a negative impact on students' personal development, especially if they only connect online with people from their past (Cloete et al., 2009). Face-to-face interactions with diverse people are extremely important for the development of needed skills (Eberhardt, 2010). Too much time spent on online sites can possibly decrease the educational value that group work or any academic interactions online could have generated for the student (Cloete et al., 2009).

3.4.3 pbWiki (Wikis & Blogs)

3.4.3.1 Overview

A wiki or online encyclopaedia is a group of web pages that resemble a blog, but give others permission (sometimes freely) to create, edit or delete content (Conole & Alevizou, 2010; Harry, 2012). This differs from a blog in that a blog is normally written by one person and receives comments from others, whereas a wiki entry is generated by the collaboration of numerous users (Nentwich, 2010; Harry, 2012). This allows for on-going evaluation by others who are interested in the same topic (Cain & Fox, 2009). A further difference between a wiki and a blog is the structure: wikis have no inherent structure and can be organized however the author sees fit, as opposed to the reverse chronological ordering of a blog (Duffy, 2008; Harry, 2012). Duffy (2008) also states that because Wiki pages are commonly interlinked, they tend to form broad networks of related topics which can easily be traversed.

Wikis can also make contributions to education and have been used in courses like chemistry, accounting, information technology and languages (Nentwich, 2010; Waycott, Gray, Clerehan, Hamilton, Richardson, Sheard, & Thompson, 2010). A Wiki can be created and peer edited by collaborating students to present and discuss materials covered in their courses (Dohn, 2009). By doing this, a group of students can generate their own co-authored bibliographies or research papers, allowing the wiki to act as an on-going documentation tool (Duffy, 2008). This presents

students with the opportunity to interact with evolving documents over time and receive continuous feedback and commentary from educators (Duffy & Bruns, 2006). Wikis have also been known to foster interaction between students by sharing questions, definitions and general notes to course-related material (Williams & Chinn, 2010).

For my study, the wiki platform that was used in iteration 1 of the PAR study is pbWiki©. It is important to note that pbWiki was rebranded to pbWorks© in 2009. For my study, blogs were not used as one of the social software tools but it is important to discuss blogs as they are one of a number of social software tools that can be used in education amongst others. Harris and Rea (2010) described a blog as a type of website that is maintained by an individual with regular entries. These entries include event descriptions, personal opinions and materials such as videos or images (Harris & Rea, 2010). The use of blogs in education has been researched by various authors (Churchill, 2009; Duffy & Bruns, 2006; Grosseck, 2009; Harris & Rea, 2010; Virkus, 2008) and different uses of blogs in education are found.

Duffy (2008) found that the use of blogs in education can be described from three different perspectives. These perspectives were: personal academic, organisational and pedagogical. From the personal academic perspective Duffy (2008) stated that blogs could support academics with reflection on teaching experiences; descriptions of teaching resources and methodologies; teaching tips for other academics and 'ramblings' about professional challenges and illustration of tips for other colleagues. Harris and Rea (2010) also found that blogs could be used by academics for networking and collaborating with other academics.

From the organisational perspective, Duffy (2008) stated that the use of blogs could support a common online presence for course administration information such as calendars, events, assignments and resources. Blogs could also provide an area for students to post queries relating to assessments. Harris and Rea (2010) also found that blogs can be used to give instructional tips to students and to post announcements and readings related to the course. Grosseck (2009) also found that blogs can be used as a tool to help manage course administration.

From the pedagogical perspective, Duffy (2008) found that the use of blogs could support feedback and comments from students based on content, a collaborative space for students to review course material, a gallery space for review of works and writings, academics encouraging reactions and reflections by commenting on students' blogs and the development of a student portfolio of work.

Churchill (2009), Grosseck (2009), Harris and Rea (2010) and Virkus (2008) have also found that blogs can be used to develop and practice reflective writing and real world writing. Blogs can also be used as a peer network where students can share and develop knowledge, a discussion platform for group work and to encourage students to help each other out.

3.4.3.2 Advantages and Disadvantages

While the use of blogs and wikis can be useful in the classroom, there are also disadvantages in using these tools. This section discussed the advantages of blogs and wikis in the classroom not mentioned previously. This section also discusses the disadvantages of using blogs and wikis in the classroom. Harris and Rea (2010) outlined four advantages to using blogs and wikis as well as other Web 2.0 tools in the classroom. These were: students become part of the lesson, the world becomes the classroom, collaboration and competition increases learning and the classroom is available 24/7. Similar findings were made by Grosseck (2009) and Hazari et al. (2010).

Grosseck (2009) added that another advantage of Web 2.0 tools such as blogs and wikis are cost reductions, flexibility in the choice of technologies used, low complexity of use and reliability in continuous usage. Duffy (2008) also found that low complexity of blogs and wikis make the use of said tools easier. Finally, Duffy (2008) and Hazari et al (2010) found that the use of Web 2.0 tools such as blogs and wikis amongst students provides skill building for technology that could be used in the workplace. Thus, exposure to tools such as blogs and wikis, especially wikis, can help students in the workplace.

Harris and Rea (2010) also outlined four disadvantages to using blogs and wikis as well as other Web 2.0 tools in the classroom. These were: availability of computing resources is required; resources can be vandalised or sabotaged; plagiarism and apprehensiveness over the level of openness. In order to utilise Web 2.0 tools such as blogs and wikis, access to a computer with an internet connection is required and students might not have access to this. Allowing students to contribute to resources could lead to sabotage or vandalism of the resource. Plagiarism could arise in the students' contributions to the resources and has to be controlled and monitored. Lastly, the level of openness could cause apprehension amongst students as all feedback (and thus possible criticism) is public. Grosseck (2009) outlined a similar set of disadvantages to Harris and Rea (2010). However, Grosseck (2009) added that security, or lack thereof, is a disadvantage with certain Web 2.0 tools.

3.4.4 Google Groups and Google Sites (Collaboration Tools)

3.4.4.1 Overview

Google Groups © is a service that allows users to create announcement lists, mailing lists, and discussion boards (Karch, 2012). Boards can be publicly visible or private (Karch, 2012). Google Sites ©, as the new site publishing service is known, is a scaled back version of JotSpot, an easy-to-edit service for organizations and individuals to set up and edit Web sites (Auchard, 2008).

According to Lindoo (2009), Google Groups can be used in higher education for online and ground-based classes (Lindoo, 2009). For ground-based courses, an example is where Google Groups offers an online group meeting place (Lindoo, 2009). A prominent feature of Google Groups is that group members are sent an email every time any updates (postings) are made within the group (Lindoo, 2009). Additionally, users (students) can also upload files to the group site (Lindoo, 2009).

Google Sites© allows non-technical users to organize and share digital information such as Web links, calendars, photos, videos, presentations, attachments and other documents in an easy-to-maintain site (Auchard, 2008). Google Sites enables any user invited to join a site to edit pages without requiring knowledge of Web coding or design. Individual team members can also create profile pages of their activities, interests and schedules. In school settings, Google Sites can function as virtual classrooms for posting homework assignments, class notes or other student resources (Auchard, 2008).

For my study, Google Groups and Google Sites were used, amongst other social software tools, in iteration 2 of the PAR study, whereas Google Sites was used, amongst other social software tools, in iteration 3.

3.4.4.2 Advantages and Disadvantages

Advantages of using Google Groups and Google Sites in higher education include (Henthorne, 2011):

- Adopting Google Groups and Sites could provide an integrated platform for synchronous and asynchronous work on group projects for both on-campus and e-campus students and faculty;
- In classes where students bring laptops (or laptops/tablets are available), they can work on projects during class and, because the sites are sharable, individuals and groups could receive 'real time' feedback from instructors in and out of the classroom;

- Providing rich out-of-class interaction using the cloud opens up the possibility for doing more interesting work in class. For example, there may be creative ways to interact with research resources obtained through the library such as linking directly to sources;
- Google Sites could provide an integrated platform for work on group projects for other off-campus applications, especially in its work with pre-college youth and life-long learners;
- Google Groups and Google Sites provide a common platform free of charge. More energy can be focused on content rather than the tools used to create the content;
- Google Groups and Google Sites provides a platform that academic support units could use for synchronous and asynchronous communication and sharing;

Disadvantages of using Google Groups and Google Sites in higher education include (Henthorne, 2011):

- Certain students and faculty members may be unfamiliar with the entire Google Apps suite of products and as such extensive up-skilling may have to take place;
- Students and faculty members would have to be made aware of the ethical and confidentiality policies of the university as conflicts of interest could arise where sensitive information is publicly published on the internet.

3.4.5 YouTube (Media Sharing)

3.4.5.1 Overview

The use of YouTube in the class has been suggested as a tool for student engagement (Duffy, 2008). The literature reviewed on the uses of YouTube in education found that YouTube was used in different manners and aspects (Roodt & Peier, 2013). The uses included: video creation as a part of assessment, posting videos of guest speakers and using commenting as a platform for discussion, having students search for videos related to questions posted at the end of lectures, showing students real world examples of material and theory covered in class and asking students to post video vignettes (Duffy, 2008; Roodt & Peier, 2013). Sherer and Shea (2011) discussed the use of YouTube and other online video platforms in supporting student learning and engagement (Sherer & Shea, 2011). They found that videos could be used for class discussion and that videos could be used inside and outside the classroom.

YouTube was founded in February 2005 by Chad Hurley, Steve Chen and Jawed Karim. It is currently one of the biggest hosts for online video content and the third most popular website after Google

and Facebook (Tan & Pearce, 2012). YouTube is a popular form of the Web 2.0 technology (Duffy, 2008) and access to YouTube and creating YouTube accounts is free of charge (Agazio & Buckley, 2009). Playlists and channels are some of the popular features which aid in the reduction of search time and playback efficiency (Tan & Pearce, 2012).

YouTube has grown steadily from 30,000 viewers in April 2005 to 100 million video views per day in July 2006 (Agazio & Buckley, 2009).YouTube was bought by Google in 2006 (Miller, 2000) and in 2007, YouTube had 20 million users and hosted about 60% of all the videos posted on the Internet (Roodt & Peier, 2013). YouTube is a participatory culture, meaning that it does not only host material like sports clips and music videos (Tan & Pearce, 2012), but can also be seen as a repository for user generated video content (Jarrett, 2010). During 2009 YouTube had a total of 258 million users and it was assumed that 65,000 video clips were uploaded on a daily basis, and that every minute, 10 hours' worth of video were uploaded (Agazio & Buckley, 2009). Currently, YouTube is a website which caters for high volumes of traffic, a platform for broadcasting, a media archive and a social network (Jones & Cuthrell, 2011). As a social network, YouTube allows for sharing, uploading and viewing a wide variety of videos hosted online (Jones & Cuthrell, 2011).

Using YouTube in the classroom is an innovative and cost-effective way to bridge the gap between students from the Net Generation and their teachers (Abell, 2011). It is a tool that has been utilized in nursing education (Burke, Snyder, & Rager, 2009; Clifton & Mann, 2011). Because most students already use YouTube in their personal lives, seeing this platform in the classroom should not be unfamiliar to them – this also gives those that are unfamiliar with YouTube the opportunity to experience a new technology (Burke et al., 2009). The website offers a wide variety of multimedia content that could be used in teaching (Tan & Pearce, 2012). Tan and Pearce (2012) further mention that this content could be teacher-created or general content that may be useful in illustrating key ideas and showing students some theoretical aspects of their courses in a practical setting. Additionally, YouTube provides students with the ability to receive information from guest speakers, without actually having the guest speaker present in the classroom (Abell, 2011). Lecturers also have the ability to share the videos with their students allowing them to review what was covered in class at a place and time which suits them – all that is required is an active internet connection (Clifton & Mann, 2011).

3.4.5.2 Advantages and Disadvantages

YouTube, just like most technologies also has constraints and disadvantages.

Because YouTube is an environment where every user is free to share what he or she wants, this can create a scenario where students access misleading, incorrect or potentially harmful information (Tan & Pearce, 2012).This can occur, since YouTube has no formal quality regulations (Clifton & Mann, 2011).It is important that educators and students research the credibility of any multimedia which they intend to use for educational purposes to avoid the spread of misinformation (Duffy, 2008). This will also help students in identifying whether or not information is relevant and unbiased (Clifton & Mann, 2011). Prior to displaying videos in class, faculty must review the entire clip for language and content to ensure its relevance and reliability (Abell, 2011).

Using YouTube in the classroom can also pose as a challenge, because locating appropriate and class-related material in YouTube's huge video storage can be both difficult and time consuming, especially if the lecturer has no specific video clip in mind (Burke, et al., 2009). Burke et al. (2009) mentions that search efficiency can be improved by searching personalized YouTube pages with similar content or by using appropriate descriptive key words. A further limitation in using YouTube in education is technology availability (Jones & Cuthrell, 2011). Jones and Cuthrell (2011) state that this can be due to having limited bandwidth, the institution's proxy and firewall settings or the general lack of hardware in the classroom. Limited bandwidth happens to be a common issue in South Africa (Chetty, Banks, Bernheim Brush, Donner, & Grinter, 2011). It must also be noted that videos are not always available and can be removed from YouTube for a number of reasons (Abell, 2011).

Further important challenges associated with using YouTube in the classroom are intellectual property and copyright laws (Abell, 2011). It is therefore recommended that faculty include a disclaimer for each video link in the course outline, state that the content of the material is from YouTube and consult with the appropriate officials prior to displaying the video in class (Abell, 2011).

3.4.6 Support for the use of Social Software in Education

Grosseck (2009) lists a number of advantages of using social software in education as listed below (Grosseck, 2009):

- Reduction of costs;
- Flexibility, as far as the possibility of choosing technologies is concerned;
- Easier and faster access to information, when and where it is needed;

- The integration of a variety of Web 2.0 (social software) technologies in the teaching-learning activities;
- Extensive opportunities of information and collaboration by the agency of social bookmarking services;
- Possibility to control access to resources by authenticating users;
- Sharing accumulated experiences (blogs, microblogs, wikis, Flickr©, YouTube) and resources;
- Independence from the platform (a computer, with browser and Internet connection is enough);
- Compatibility with the elements of the educational field and the existing contextual dynamics;
- The low level of complexity needed for use (minimum skills in using the Internet);
- Reliability in continuous usage, over an extended period of time;
- Redistribution of effort, so that less and less time and energy are spent during search and information management (del.icio.us, RSS);
- The increase in number of modalities of use and the heterogeneity of didactic practices and of types of formation, due to the diversity of the new technologies;
- The possibility to test the existing didactic practices, without great changes in the current modus operandi;
- The major focus on didactic innovation, and not on the technology per se;
- Creating digital content (especially media, podcasting, videocasting).

3.4.7 Criticisms against the use of Social Software in Education (Limitations & Challenges)

A challenge that any social software adoption in education faces, is that there must be a faculty member who is willing to use Web 2.0 technologies as a learning tool (Cain & Fox, 2009). Further challenges to social software adoption in education according to Grosseck (2009) include:

- An internet (specifically broadband) connection is required;
- There are limited security measures and controls;
- Different browsers may determine variations in interpretation;
- Social software creates a community without rules.

According to Franklin and Van Harmelen (2007), problems and issues that arise in relation to social software adoption in higher education are (Franklin & Van Harmelen, 2007):

- Much Web 2.0 based student work is about content sharing and repurposing. This can easily be seen by students as part of a new '*copy-and-paste culture*' that runs counter to traditional notions of plagiarism, and adjustments may need to be made, either to redefine plagiarism, or to help students transcend this culture in higher education environments;
- There may be changes in teacher roles. For example, in describing 'Learning 2.0', Stephen Downes writes: "*Learning is characterised not only by greater autonomy for the learner, but also a greater emphasis on active learning, with creation, communication and participation playing key roles, and on changing roles for the teacher, indeed, even a collapse of the distinction between teacher and student altogether*." (Downes, 2005). It could be argued, however, that changes in teacher role will only happen in areas where the teacher and student knowledge are either roughly equivalent or complementary.
- There may be a skills and/or culture crisis as '*old world*' teachers are forced to use unfamiliar tools and work and in unfamiliar ways and alien environments;
- There may be economic factors at work, particularly in a world of widening participation in higher education. Not all students may be digitally connected with a computer and Internet connection at home or in their student residences. These students would be at a profound disadvantage in a new world of Web 2.0 enabled learning without specific care being taken to address their computational and connectivity needs.

3.5 USING SOCIAL SOFTWARE FOR COMPUTER-SUPPORTED COLLABORATIVE LEARNING

3.5.1 Background

Collaborative learning has gained a lot of interest in the use of Web 2.0 technologies. As mentioned previously I will be using the term social software to refer to Web 2.0 technologies used in the learning context. The main advantage of using social software in collaborative learning is that they encourage user participation (Krebs, Ludwig, & Muller, 2009). According to Krebs et al. (2010) social software also has an advantage of encouraging students to be responsible for their own active learning. Active learning means that "*content is created in cooperative learning settings*" (Krebs et al., 2009).

As mentioned previously, collaborative learning refers to an instructional approach whereby students are required to work together on problem-solving or learning tasks (Francesca, Porcelli,

Mebane, Cuddetta, Klobas, & Renzi, 2005). Ideally this collaboration involves the mutual engagement of learners in a coordinated effort to solve a problem and in the process to acquire new knowledge (Larusson & Alterman, 2009). Collaborative learning is therefore concerned with newer conceptions of teaching and learning as opposed to the traditional passive teaching model involving where lecturers vocalise content to students in classroom with limited amounts of student engagement (McLoughlin & Lee, 2010). Collaborative learning using technology, CSCL, is showing much promise as a teaching and learning method with opportunities to improve instruction and learning outcomes (Strijbos, Martens, & Jochems, 2004).

The use of social software for learning purposes is considered to transform the learning context by providing multiple opportunities for shared content and resources, self-directed learning, collaborative learning, ubiquitous and lifelong learning (Ravenscroft, 2009; Roussinos & Jimoyiannis, 2011). McLoughlin and Lee (2010) build further on this by adding that "*Web 2.0 tools are proposed as self-directed and personalised learning environments within collaborative learning contexts*" (McLoughlin & Lee, 2010: 29).

3.5.2 Computer-Supported Collaborative Learning Theoretical Underpinnings (Roots)

During the latter part of the 1990's, CSCL was recognised as an emerging paradigm for educational technology by Koschmann (Lipponen, 2002). Our understanding of cognition and learning has been influenced by the development of technology (Koschmann, 1996). The emergence of the internet to provide innovative ways for people to interact has been one of the drivers of CSCL (Kreijns, Kirschner & Jochems, 2003). According to Koshmann, the main driver of CSCL emerging as a paradigm was research on Computer-Supported Cooperative Work (CSCW) (Koschmann, 1996). As an example of CSCW, a number of authors explored topics related to the collaborative nature of work supported by groupware (Galegher, Kraut, & Egido, 1990; Greenberg, 1991). As such it could be argued that CSCL is a direct derivative of CSCW.

In defining CSCL, Lipponen states that "*CSCL is focused on how collaborative learning supported by technology can enhance peer interaction and work in groups, and how collaboration and technology facilitate sharing and distributing of knowledge and expertise among community members*." (Lipponen, 2002:1). Collaborative learning is described as *"an organizational structure in which a group of students pursue academic goals through collaborative efforts. Students work together in small groups, draw on each other's strengths and assist each other in completing the tasks"* (Hilke, 1990) cited in (Roodt, 2010).

According to Su, Yang, Hwang, and Zhang (2010), in order for collaborative learning activities to succeed, the requirement is the constant generation, transfer, and understanding of knowledge. These make the effort of the whole group to be a fundamental process which is very valuable (Su, et al., 2010). Elgort, Smit and Toland (2008) mention the elements that are required for success in a learning environment when learners are collaborating with their peers (Elgort et al., 2008):

- **Positive interdependence**

  The way that collaborative learning works is that the success of one individual is the success of the whole group of learners that are involved in a certain task together.
- **Individual responsibility and group responsibility**.

  Each learner will have a chance to make a contribution to the work to contribute in the activity.

Kirschner (2001) lists the following elements as being part of CSCL (Kirschner, 2001):

- Learning is active;
- The teacher is usually more a facilitator than a '*sage on the stage'*;
- Teaching and learning are shared experiences;
- Students participate in small-group activities;
- Students must take responsibility for learning;
- Students are stimulated to reflect on their own assumptions and thought processes;
- Social and team skills are developed through the give-and-take of consensus-building.

3.5.3 Computer-Supported Collaborative Learning in Higher Education

CSCL is directly concerned with education at all levels from for example primary school through to graduate education in higher education (Chan & van Aalst, 2004). Technology plays a pivotal role in this as institutions around the world are attempting to increase access to internet-enabled computers for students. Group work in the form of having students learn together has gained popularity too (Chan & van Aalst, 2004). CSCL is designed to address the challenge of effectively enhancing learning using technology (Chan & van Aalst, 2004).

McLoughlin and Lee (2010) conducted a study to identify global examples of higher education institutions that are making use of social software to enable learning. Their findings are detailed in Table 8 below:

Institution and Location	Reference	Context
Fashion Institute of Technology, USA	(Harris, 2007)	Students studying an art history class visit the Metropolitan Museum of Art in New York City, where they take photos of exhibits using mobile phones, upload them to Flickr, and use the site's tools to tag, annotate and write descriptions and comments about the photos.
Victoria University of Wellington, New Zealand	(Elgort, et al., 2008)	A mixture of on campus and distance education students enrolled in a Master of Library and Information Studies (MLIS) program work in groups to collaboratively produce web based information resource guides using a wiki.
Bentley College (now Bentley University), USA	(Frydenberg, 2006)	Students studying an information technology (IT) fundamentals course purchase Pocket PCs instead of textbooks, which they use to explore IT concepts in a hands on, learner centred approach. They form pairs or groups and work together to plan and produce vodcasts (video podcasts). Each pair/group produces a vodcast based around a topic in the course schedule, for sharing with the rest of the class (via a Really Simple Syndication or RSS feed), as a form of peer or reciprocal teaching.
The Open University of Hong Kong, China	(Lui, Choy, Cheung, & Li, 2006)	Students studying a year long Software Engineering and Project Management course are required to write reflective blog entries in response to stimulus questions. The blog sites are used both as knowledge sharing and personal work/ information spaces.
University of Leicester, UK	(Edirisingha, Salmon, & Fothergill, 2007)	Second- and third-year undergraduate engineering students make use of 'profcasts', i.e. material designed to support learning distinct from that which is facilitated through structured on campus or e-learning processes alone.
The Open University, UK	(Kukulska-Hulme, 2006)	Students attending German and Spanish summer schools use digital voice recorders and mini-camcorders to record interviews with other students and with native speakers of the languages they are studying, as

		well as to create audio-visual tours for sharing with their peers via the Internet.
Queensland University of Technology, Australia	(English & Duncan-Howell, 2008)	Pre-service teacher education students use the social networking tool Facebook during their teaching practicum placements to facilitate mutual support, encouragement and the sharing of stories/anecdotes.
Charles Sturt University, Australia	(Peacock, Fellows, & Eustace, 2007)	Students undertaking an online course on computer-supported collaborative work (CSCW) learn with and about collaborative groupware tools and information environments, including a range of Web 1.0 and 2.0 technologies. The students form groups of three or four students called 'PODs' (Pools of Online Dialogue), and each group is given a fortnight to complete each of four collaborative activities/ exercises.

Table 8: Global examples of higher education institutions using social software for learning (adapted from McLoughlin, 2010)

It is important to note that this list is not conclusive as the authors only included examples that had been published.

3.5.4 Technology's Role in Computer-Supported Collaborative Learning

Computer-supported collaborative learning (CSCL) is an educational approach where learning takes place through social interaction using a computer or through the Internet (Wheeler, Yeomans, & Wheeler, 2008). Computer-supported collaborative learning is characterized by the sharing and creation of knowledge among individuals using technology as their primary means of communication or as a shared resource (Clark & Mayer, 2002).

Technology has a central role to play in enabling collaborative learning by being both a learning resource and an '*artefact of mediation*' (Suthers, 2006). Kolodner and Guzdial (1996) suggested that technology can support collaboration by (Kolodner & Guzdial, 1996):

- Promoting conversation;
- Facilitating knowledge building;
- Providing recordkeeping;
- Enabling communication at a distance;
- Promoting reflection, and;

- Supporting teacher planning and implementation of collaborative activities.

The ability of technology to support collaborative learning is becoming increasingly important as the use of social software globally becomes more pervasive (Suthers, 2006). As these social software tools are fundamentally social by nature, they can be used to support social acts that constitute collaborative learning activities (group work) (Porcaro, 2011). By understanding how technology can be used to support collaborative learning interactions, educators are able to identify the potential of using CSCL for teaching and learning to create a more workplace-ready student pool (Porcaro, 2011).

3.5.5 Using Social Software for Computer-Supported Collaborative Learning for the Net Generation in Higher Education

Social software tools, including blogs, wikis, podcasting and social networking sites amongst others, are receiving growing interest in higher education sectors across the world (McLoughlin & Lee, 2010). Given the learning needs of the Net Generation students of today, social software tools offer potential for meeting these learning needs through (Bryant, 2006):

- Customisation;
- Personalisation;
- Rich opportunities for networking and collaboration.

Gruber (2008) points out that Web 2.0 provides technology applications that are more appropriate for supporting collaborative learning (Gruber, 2008) . In defining the relationship between Web 2.0 and a collaborative learning environment, four themes that have been identified in the literature are (Gruber, 2008):

- The transformation of scholarly processes;
- Learner participation;
- Social relevance;
- Knowledge sharing (Gruber, 2008).

Transformation of scholarly methods

For successful change in the way learners work collaboratively, students need to put a lot of effort into their studies and a number of learning approaches and methods need to be put in place to manage how learning activities are carried out when learners are working in teams, learners also need to acquire certain skills in order to maintain a meaningful learning environment.

Cavus and Kanbul (2009) point out that "*change is difficult, but it is probable that the rapid development in and implementation of new technologies and social changes make change in the educational provision inevitable*" (Cavus & Kanbul, 2010:5824). Wells, de Lange and Fieger, (2008) echo this by pointing out that the advancement in technology has been revolutionalizing the way educators carry out their teaching and the way that students acquire the educational content (Wells, et al., 2008). Technology has moved as far as making learning and teaching to easily become community based learning as well as a platform for easy delivery of knowledge. Web 2.0 technologies offer great accessibility to learning for individuals by offering tools that allow convenient delivery of content which can be acquired anytime and anywhere. The learners also get a change to control how they want to learn with their peers. The recent technological developments have proven to be slowly becoming the dominant form of the social organisation; also Learners are now having the freedom of choosing when and where they want to start working on their group projects or group tasks. Greenhow, Robelia and Hughes (2009) believe that the use of Web 2.0 technologies by learners used in their everyday lives will increase their preparation as well as their engagement (Greenhow et al., 2009).

Provision of a Web 2.0 educational environment should mean that it is no longer necessary for teachers to get too involved in facilitating and managing activities that learners get involved in (Greenhow et al., 2009). According to Greenhow et al. (2010) teachers have not yet fully shifted their teaching to respond to the new ways that learners communicate and use the web which is not in the traditional classroom (Greenhow et al., 2009). Cram, Kuswara and Richards (2008) add to this by pointing out that teacher's roles needs to shift from knowledge transmitter to facilitator in order to be able to help the students to evaluate their own beliefs and understand the general traditional conceptions (Cram et al., 2008). According to Chen, Ou, Liu & Liu (2001) teachers need to facilitate group learning on Web 2.0 activities by using management and organization that is based on certain strategies in order to ensure greater achievement for all learners involved in the activities (Chen et al., 2001).

Learner Participation

The use of web 2.0 technologies allows the learners to be allocated to groups, and work in a reliable environment where they are allowed to participate in tasks that involve visual content and listening. Learners are allowed time to reflect on what they are busy working on. Their participation also involves giving feedback to their peers as well as expressing their own opinions on the material that is being dealt with.

Social Relevance

Typically, Web 2.0 is usually thought of as being social software, Parker and Chao (2007) point out the reason for this as being that these technologies are always seen as being mainly connected, provide users with the opportunity to develop Web content collaboratively among their peers and open to the community (Parker & Chao, 2007). Social software uses the web as a social platform which allows users to communicate, work together and share and publish their ideas and thoughts, all this is done bottom-up with a very high degree of self-organization (Rollett, Lux, Strohmaier, Gisela Dosinger & Tochtermann, 2007). Parker and Chao (2007) indicate that the use of social software as Web 2.0 technologies "*makes one to realize the original vision of the Web as a space in which anyone can participate*" (Parker & Chao, 2007:57). Cho et al. (2007) believe that in the context of social networking, some learners may be in the better position than their fellow peers. Krebs et al. (2009) point out that active participation means that learning content is created in cooperative learning settings (Krebs et al., 2009).

Knowledge Sharing

The use of web 2.0 technologies allows the learners to be allocated to groups, and working a reliable environment where they are allowed to participate on tasks that involve visual content and listening. Learners are allowed time to reflect on what they are busy working on. Their participation also involves giving feedback to their peers as well as expressing their own opinions on the material that is being dealt with.

Collaborative learning activities (Group work) can often be aided by having social software tools available – this is no surprise when we note that social software is software that facilitates group processes. Thus, for example: Blogs can be used in personal writing and group's critiques thereof. Wikis can be used by groups co-operatively producing artefacts directly in the wiki, or documenting group processes and external products (Shaklee, Barbour, Ambrose, & Hansford, 1997).

McCloughlin and Lee (2007) conducted a study to identify examples of universities around the world that were using social software for the Net Generation of students for various types of pedagogy. The findings of this study are detailed in Table 9 below:

Institution and Location	Reference	Context	Pedagogy Employed
Drexel University, USA	(Read, 2005)	Drexel distributed iPod Photo players to their Education freshmen in September 2005. Read reported there were plans for a variety of learner-centred applications, including but not limited to having students record study-group sessions and interviews, as well as having them maintain audio blogs to connect with administrators and peers during the work experience semester.	Peer-to-peer learning, distributed intelligence approach
Charles Stuart University, Australia	(Lee, Chan & McLoughlin, 2006)	Second year undergraduate students take charge of producing talkback radio-style podcasts to assist first year students undertaking a unit of study that the former group previously completed.	Learner-centred instruction; student-generated content
Swathmore College, USA	(Evans & Larri, 2006)	Students studying a literature course read short passages aloud and record them as podcasts, as well as creating separate podcasts discussing the passage they chose and its relationship to other material.	Development of digital and social competencies
University of Connecticut, USA	(Miller, 2006)	Three types of podcasts are used to support a General Psychology course: • iCube podcasts – Informal discussions with students following each week's lectures; • Precasts – Short enhanced podcasts previewing material prior to each lecture; • Postcasts – Short post-lecture podcasts containing re-explanations of selected concepts.	Blending of formal and informal learning; mobile, ubiquitous learning
Bentley College, USA	(Frydenberg, 2006)	Students in an introductory information technology class work in pairs or groups to produce vodcasts to teach topics from the course schedule to their peers.	Peer teaching, reciprocal learning
University of Leicester, UK	(Edirisingha et al., 2007)	Students make use of "profcasts", i.e. material designed to support learning distinct from that which is facilitated through structured on-campus or e-learning processes alone. E.g., weekly 'profcasts' to supplement online teaching through updated information and guidance.	Extended learning, enrichment and extension activities, personalisation of learning content
Open University, UK	(Kukulska-Hulme, 2006)	Students studying German and Spanish courses in distance mode use digital voice recorders and mini-camcorders to record interviews with other students and with native speakers, as well as to create audio-visual tours for sharing with their peers.	Peer-to-peer learning, student-generated content

Osaka Jogakuin College, Japan	(McCarty, 2005)	Students are interviewed by their professor, perform roles, and/or present their own creations, in contribution to the professor's bilingual podcast feed and blog targeted to those studying Japanese or English as a foreign language.	Cross-cultural collaborative work using student-generated content
University of North Carolina at Pembroke, USA	(Sener, 2007)	A wiki-based encyclopaedia is created by students, the goal being to create entries on a variety of subjects related to law, criminal justice, sociology and criminology.	Student-generated content, collaborative writing, organising and editing content
Macomb Independent School District	(Richardson, 2006)	Social bookmarking is used to compile and share resources with teacher training participants / student teachers. The instructor also subscribes to the RSS feeds of the students' Furl sites, to see what they are reading as well as their comments about the sites.	Resource-based and collaborative learning
University of Michigan, USA	(Yew, Gibson & Teasley, 2006)	Learners organise and display blog posts and bookmarks, with keywords or tags, openly and in a collaborative manner. This allows all stakeholders to use social software to organise, share and coordinate knowledge.	Community of learning
University of Plymouth	(Boulos, Maramba & Wheeler, 2006)	Blogs, wikis and podcasts are used for virtual collaborative clinical practice in health and paramedical education, to foster sharing and reflection.	Anytime, anyplace, peer-to peer learning community, self-regulated learning

Table 9: Global examples of social software being used by universities for the Net Generation (adapted from McLoughlin & Lee, 2007)

As can be seen in Table 9 above, there are examples of social software being used for CSCL for the Net Generation in higher education for example McCarty (2005).

3.6 THEORETICAL FRAMEWORK FOR COMPUTER-SUPPORTED COLLABORATIVE LEARNING

3.6.1 Background

De Villiers (1995) developed a theoretical framework which enables the understanding of the CSCL environment as a whole but also focuses on the design of CSCL learning environments. At the time of the framework's development, CSCL was known as Computer-Supported Co-operative Learning, and there was much debate taking place about what constitutes a useful CSCL environment (De Villiers & Roode, 1998). In order to address some of the questions pertaining to that debate, De

Villiers proposed a theoretical framework for not only designing CSCL environments but also in order to be able to understand CSCL environments as a whole (De Villiers, 1995).

It must be noted that social software tools as we know them today, had not yet begun to appear on the internet at that time and as such, that framework in its original form does not cater for the nuances which arise because of that. One of my research objectives is to amend that original framework to cater for the use of social software for CSCL for the Net Generation in higher education.

3.6.2 The CSCL Theoretical Framework Overview

The framework developed by De Villiers (1995) is a detailed theoretical framework for CSCL (note that in its original form it refers to *'co-operative learning'* and not *'collaborative learning'* based on Orlikowski's (1992) structurational perspective of information technology (which in itself is based on Structuration Theory) and the key concepts of structuration and appropriation as defined in DeSanctis & Poole's Adaptive Structuration Theory (AST) (De Villiers & Roode, 1998). It is further enhanced by feedback from case studies that De Villiers (1995) conducted. Orlikowski's structural model of technology has the dual nature of technology at the heart of the structuration process – the model posits that organisations are shaped by technology and are influenced by social and political processes and by the members of the organisations (Pozzebon & Pinsonneault, 2001:207). Structuration Theory (ST) as originally defined by Giddens (1984) can be considered a '*meta-theory'* which "*…recognises and accommodates both subjective and objective dimensions of social reality and assumes a duality of structure and action."* (Pozzebon & Pinsonneault, 2001:205). Understanding human agency and social interactions is the focus points of ST (Cohen, 2000) where structuration can be defined as *"…a dynamic process in which structures are produced and reproduced by human action over time."* (De Villiers, 1995:251). ST is being increasingly used in studies that assess IT-based organisational change (Pozzebon & Pinsonneault, 2001:205). Adaptive Structuration Theory (AST) was derived from ST by adapting Giddens' theory to *"…study the interaction of groups and organizations with information technology."* (Maznevski & Chudoba, 2000:474). According to DeSanctis & Poole (1994), AST studies the change process from two points (DeSanctis & Poole, 1994:121):

1. The types of structures that are provided by advanced technologies,
2. The structures that actually emerge in human action as people interact with these technologies.

As a model, AST encompasses the interplay between advanced information technologies, social structures, and human interaction. Given its roots in ST, AST focuses on social structures, rules and resources provided by technologies and organisations as the basis for human activity (DeSanctis & Poole, 1994:125). The original AST model can be seen in Figure 11 below (DeSanctis & Poole, 1994:132).

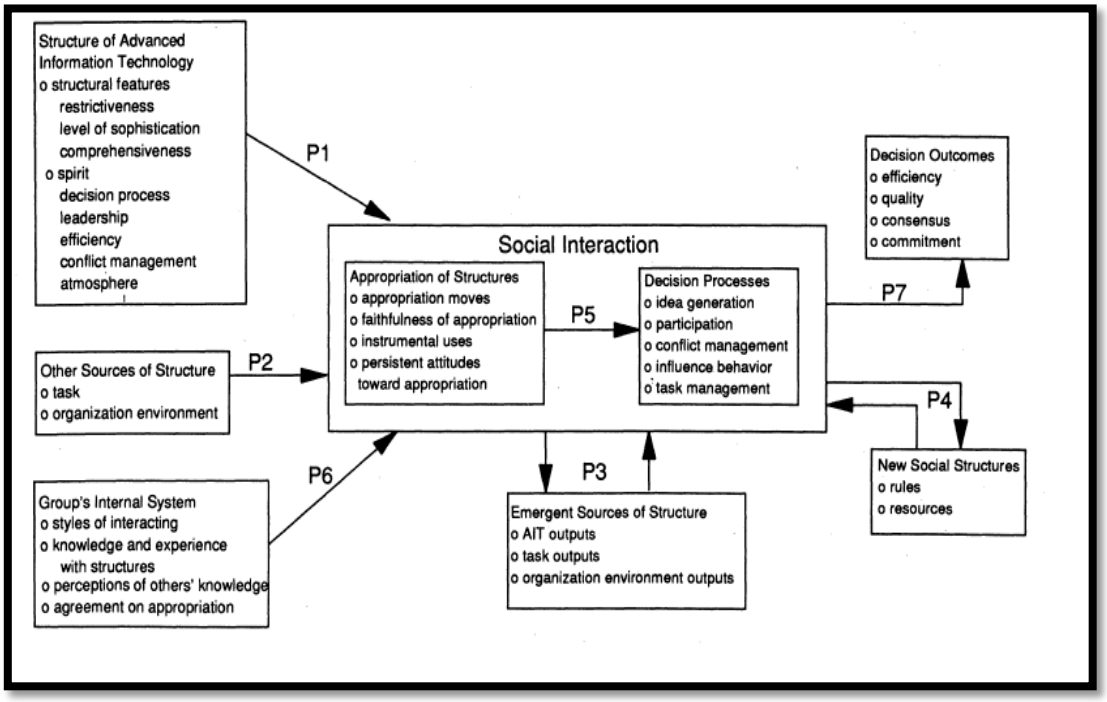

Figure 11: Original AST Model Constructs and Propositions (taken from DeSanctis & Poole)

De Villiers (1995) used AST to develop a theoretical framework for CSCL environments. The generic theoretical framework for CSCL can be seen in Figure 12 on the next page.

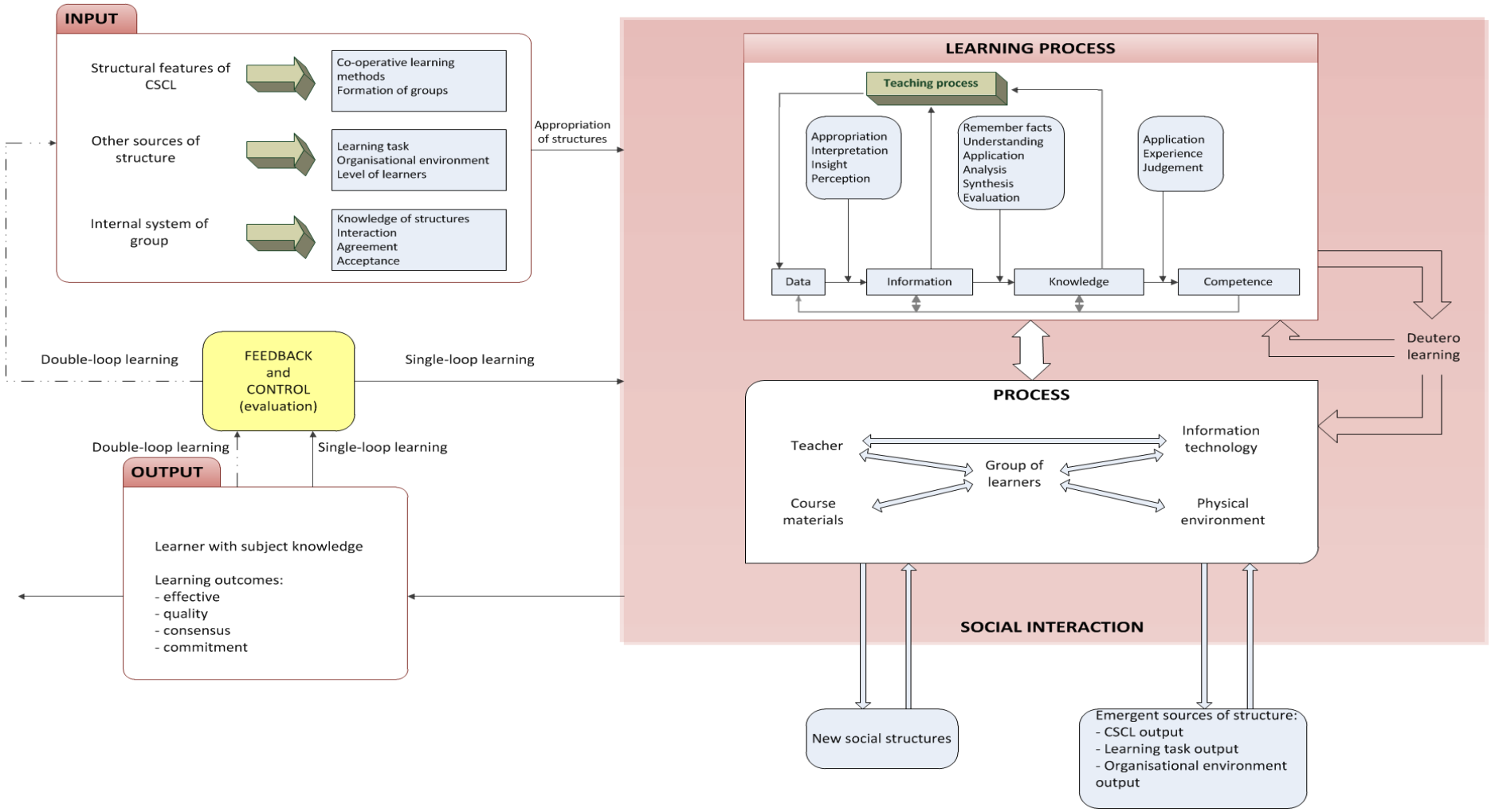

Figure 12: Original Theoretical Framework for CSCL (De Villiers, 1995)

The framework in Figure 12 above includes concepts from Computer-Supported Collaborative Work (CSCW) and two specific theories were used to define the framework, being Giddens (1984) Structuration Theory and DeSanctis & Poole's Adaptive Structuration Theory (AST) (1994) (De Villiers, 1995). The framework points out what needs to be taken into account when designing CSCL interventions. Each of the components and functions will now be discussed.

As can be seen from Figure 12, the CSCL environment consists of the following components (De Villiers, 1995:156-158):

- Groups of learners:
  - This relates to the fact that individual learners should be grouped by taking into account group theory and group dynamics;
- Teacher:
  - This relates to the role of the teacher (lecturer) in a co-operative learning environment and includes task such as facilitation, coaching and the ability to be able to use and manage the information technology required in the CSCL environment;
- Co-operative learning methods:
  - This relates to the different co-operative learning methods that can be applied as well as the instructional design principles (eg: structure of the course and evaluation methods) that should be taken into consideration;
- Information technology:
  - This relates to the use of information technology in relation to the subject/course/topic to be taught and the fact that there should be a need for the technology;
- Physical learning environment:
  - This relates to the arrangement of the physical learning environment which should be considered when designing CSCL environments (eg: ergonomics);
- Course materials:
  - This relates to the course materials that should be accumulated by the teacher (lecturer).

Additionally, this CSCL framework contains five functions that interact with each other and the corresponding components, namely (De Villiers, 1995:158-159):

1. Input:

- This is the elements that enter the system in order to be processed. In the CSCL environment the input will be the learners with little or no subject knowledge;

2. Processing:
   - This involves the transformation of the input into output. In the CSCL environment, processing involves the teaching and learning process;
3. Output:
   - This is the goal of the transformation process. In the CSCL environment the output will be learners with subject knowledge;
4. Feedback:
   - This is data about the performance of the system. One of the core elements of co-operative learning is the monitoring of the group processes by the teacher (lecturer) and the subsequent adjustment and coaching of the group(s);
5. Control:
   - This involves the monitoring and evaluation of the system to determine whether or not the system is achieving its goal. Evaluation is a core part of the teaching process and should be done with the intention of ensuring that the learners have achieved the objectives and goals set for the course/topic/subject.

According to De Villiers (1995:159), during this evaluation process single-loop learning can take place which means that "*…the learning environment will respond to changes in the external and internal environment by detecting and correcting errors in order to maintain an effective CSCL environment.*" An example is when a teacher realises during evaluation and feedback that the course material(s) should be adapted before continuing with the process (De Villiers, 1995:159).

As can be seen in Figure 12, double-loop learning can also occur. According to De Villiers (1995:159), double-loop learning "*…involves the correction of errors by inquiring and changing the norms or assumptions of the CSCL environment…and involves the changing of the teaching process and includes the basic elements of co-operative learning methods, co-operative learning methods, information technology used in the CSCL environment and the learning process*." The basic elements of co-operative learning are (Johnson & Johnson, 1986):

1. Positive goal interdependence;
2. Face-to-face promotive interaction;
3. Individual accountability;
4. Social skills;

5. Group processing.

Lastly, deutero-learning will occur in the CSCL environment if the teacher(s) (lecturers) involved in CSCL learn more about CSCL and adapt their teaching methods accordingly (De Villiers, 1995). De Villiers (1995) makes the point that the CSCL environment can be viewed as a system, with components and functions that interact with each other as part of a wider educational system.

3.6.3 Components of the CSCL Theoretical Framework

3.6.3.1 Input

The initial input to the CSCL environment consists of three elements, namely the structural features, other sources of structure and the internal system of the group (De Villiers & Roode, 1998). During evaluation of the process, it may become clear to the teacher that changes should be made to one or more of the input components (double-loop learning) (De Villiers & Roode, 1998). The outcome of the evaluation process may thus be new input to the CSCL process.

Structural Features

Under the structural features of CSCL, consideration should be given to the cooperative learning method that is applicable for the learning task, as well as the formation of the groups (De Villiers & Roode, 1998).

Other Sources of Structure

Other sources of structure that need consideration are the learning task, organisational environment and level of the learners (De Villiers & Roode, 1998).

Internal System of Group

DeSanctis & Poole (1994) list four factors that may have an influence on how a group appropriates available structures, being (DeSanctis & Poole, 1994; De Villiers, 1995):

1. The degree of *knowledge and experience* of the group of learners with the structures involved in the CSCL environment;
2. Style of *interaction* among group members;
3. The degree to which members believe that other members *know and accept* the use of the structures;
4. The degree to which members *agree* on which structures should be appropriated.

3.6.3.2 Learning process

When teaching in a CSCL environment, the teacher (lecturer) needs to be aware of the teaching and learning process that is taking place (De Villiers & Roode, 1998). The data conveyed to the learner (student) should become information through appropriation, interpretation, insight and perception (De Villiers & Roode, 1998). Once the learner remembers the facts, understands, applies, analyses, synthesizes and evaluates the information, it can become knowledge that in time can lead to competence (De Villiers & Roode, 1998). This relates to Bloom's revised taxonomy as discussed in Chapter 1.

The backward loop followed by the learner should also be acknowledged, namely that competence, knowledge and information can all revert back one or more steps (De Villiers & Roode, 1998). At the same time the teacher should be able to convert his/her knowledge to either information or data for the learner (De Villiers & Roode, 1998).

3.6.3.3 Process

For effective learning to take place, the role of the teacher, the course material and information technologies that are going to be used, the physical environment in which the CSCL will take place and the characteristics of the group of learners need to be considered as discussed in section 3.6.2.

3.6.3.4 Social interaction

The CSCL process involves social interaction where the teacher needs to look at the formation of new social structures and take note of the emergent sources of structure, such as the (De Villiers & Roode, 1998):

- CSCL output;
- Learning task output;
- Organisational environment output.

3.6.3.5 Output

The output includes the learner with subject knowledge as well the desired learning outcomes, including:

- Effective;
- Quality learning;
- Consensus within the learning groups;
- Commitment amongst learners to the learning process.

These desired learning outcomes are more likely to occur if (De Villiers & Roode, 1998):

- Appropriations are faithful (rather than unfaithful) to the spirit of the CSCL environment,
- The number of technology appropriation moves is high, rather than low,
- The instrumental uses of the technology are more task or process-oriented rather than power or exploration-oriented;
- Attitudes towards appropriation are positive rather than negative.

The output from the CSCL environment should be evaluated and reconsidered. In the process of evaluation it may be necessary to change some of the components of the process (single-loop learning). It may be necessary to go back to the initial designing of the environment, changing some of the input components (double-loop learning). Deutero-learning will occur in the CSCL environment if the teacher(s) (lecturers) involved in CSCL learn more about CSCL and adapt their teaching methods accordingly (De Villiers, 1995).

3.6.4 Summary of the CSCL Theoretical Framework

CSCL environments form social structures which enable and constrain interaction in a learning environment. CSCL supports these activities as well as co-ordination among learners (students) and between the learner (student) and the teacher (lecturer), and provides procedures for accomplishing communication. The social structures provided by CSCL can be described using the structural features of the environment and the spirit of the structural features (De Villiers, 1995).

The structural features of the CSCL environment, along with the other sources of structure as discussed in section 3.6.3.1 act as opportunities and constraints in which appropriation occurs (De Villiers, 1995). The structural feautures of the CSCL environment shape the group but the group also shapes its own interaction (De Villiers, 1995). New structures emerge from the use of the CSCL environment and over time changes may be made to the learning environment, resulting in new social structures (De Villiers, 1995).

As can be seen in Figure 12, the input to the CSCL environment has been expanded to include the insight given by AST (De Villiers, 1995). Also, the output of the CSCL environment has been expanded to include the learning outcomes (De Villiers, 1995). The appropriation of the structures in the CSCL environment is included to emphasise the dynamic process that takes place as structures are produced and reproduced by human action over time (De Villiers, 1995). The fact that new social

structures may be as a result of the CSCL process, as well as the influence of other emergent sources of structure, such as the output from the CSCL environment and learning task output, are included in the framework (De Villiers, 1995).

3.7 CONCLUSION

This literature review discussed the main themes of this research paper. The themes discussed were the Net Generation, Social Software and Computer-Supported Collaborative Learning (CSCL). Based on the literature reviewed, it was found that the Net Generation refers to the generation born after 1982 (Prensky, 2001) around the same time as the emergence of digital technology (Berk, 2009b). Due to this fact, this group is seen as being technologically literate. Furthermore, the learning preferences of this group differ from previous generations. The literature found that Net Generation students prefer immediate responses, active participation, social environments, teamwork, structure, engaging visual aids and learning about things that matter (Oblinger & Oblinger, 2005). Social software is particularly well-positioned to provide a wide-range of potential educational applications for the Net Generation of students amongst others. Social software allows learners choice in controlling their own learning and are providing students with unprecedented learning opportunities. Of particular interest is the actual and potential use of social software for CSCL activities. A CSCL Theoretical Framework that was developed in 1995 was presented as the basis for a revised CSCL Framework for social software.

The next chapter presents the activities and findings from iteration 1 of my PAR project.

CHAPTER 4

PARTICIPATORY ACTION RESEARCH ITERATION 1

CHAPTER 4: PARTICIPATORY ACTION RESEARCH – ITERATION 1

4.1 INTRODUCTION

This chapter details the steps of the first iteration of my participatory action research (PAR) project. It describes each phase of iteration 1 in detail, based upon the PAR model depicted in Figure 9 in Chapter 2, which is again depicted below in figure 13:

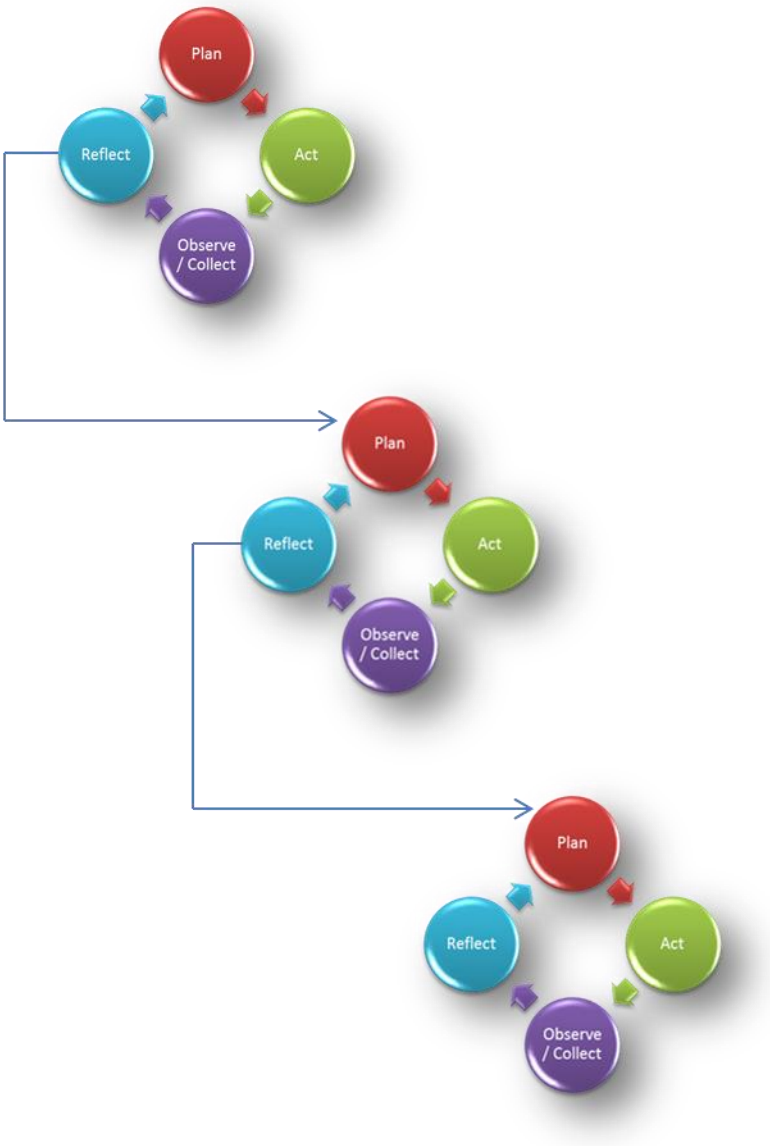

Figure 13: My Participatory Action Research Process

I will be following the PAR phases and steps as proposed by Baskerville and Wood-Harper (1996) which I discussed in Chapter 1 under the Theoretical Underpinnings section. This chapter ultimately presents the findings of the data analysis of Iteration 1 of my PAR project in order to inform the planning phase of iteration 2 of my PAR project and to refine my proposed CSCL Framework.

4.2 CONTEXT AND PURPOSE

4.2.1 Context

This iteration of my PAR project occurred during the 1st semester of 2009 on the INF112 course at the University of Pretoria. The contexts for this iteration were the university, the course and the students. The participants in this iteration were the students, and the participant researcher being me.

The target population for Iteration 1 of the PAR project is 1580 students registered for the INF112 course at the University of Pretoria in the Faculty of Economic and Management Sciences.

4.2.2 Purpose of Participatory Action Research Iteration 1

The purpose of my PAR iteration 1 is two-fold. Firstly, it seeks to establish the baseline for the remaining two iterations of the PAR project in terms of the constructs against which the iterations will take place. By this I mean that iteration 1 will define the nature of the course intervention on the INF112 course, as well as selecting specific social software tools for that intervention which can then be used as a baseline for the subsequent iterations.

Secondly, iteration 1 involves the gathering and analysis of data pertaining to the initial social software intervention on the INF112 course. The findings of this will be used to inform iteration 2 of my PAR project.

4.3 PHASE 1: Plan

The first phase of my participatory action research project's iteration 1 is **planning**. As discussed above, the purpose of this phase is to determine (plan) what action I will take in phase 2 (action). For this research project, the steps of my PAR project for the planning phase of iteration 1 were as follows in Table 10 below:

PHASE	PROPOSED STEPS	ACTUAL STEPS TAKEN
Plan	Develop a detailed plan of action	Review course evaluation from previous year to identify problems Decide which aspect of course to intervene on Identify the possible social software tools that will be used as part of the intervention Determine how and when the data will be gathered
	Decide on the time frame	The 1st semester of 2009 during which the INF112 course runs
	Select the resources you will need	The actual social software tools that will be used are Facebook and pbWiki
	Devise strategies to carry out your plan	Action plan of course intervention

Table 10: The Actual Planning Phase of my PAR project Iteration 1

Upon reviewing the INF112 course evaluation of the year prior to iteration of my PAR project iteration 1, feedback received from students is that they dislike the subject as they do not understand what it is about nor do they see the point in taking it (Roodt, 2010; INF112 Course Evaluation, 2008). Based on this feedback, I as the researcher, decided to implement selected social software tools for the collaborative learning component of the course in the form of group work. The reason for me selecting the group work component of the course is based on the research pertaining to the Net Generation which points to the fact that these students want learning environments that are active, social (collaborative) and learner-centered (Oblinger & Oblinger, 2005). As mentioned in Chapter 1, the Net Generation gravitate towards group activity (collaborative learning). Additionally, social software share many characteristics with the learning preferences of the Net Generation and as such are potentially particularly useful for collaborative learning environments for the Net Generation (Li et al., 2012).

In terms of my research topic at hand, I had to select which social software tools I was going to use for the collaborative learning component of the INF112 course. For this iteration of the PAR project, Facebook© and pbWiki© were selected as the social software tools that the students used for the group work component. I nominated to use these educational tools because of their mainstream adoption both within the public and educational sectors (Roodt et al., 2009). It is argued that the

students' learning processes are inhibited if different learning styles are not considered when the learning environments, that will be used to educate students, are chosen (Huang & Behara, 2007). Table 11 below shows the social software tools that I nominated to use for iteration 1, based on the characteristics and learning preferences of the Net Generation:

Social computing concept	Technology chosen
Social Networking	Facebook
On-line Collaboration	pbWiki

Table 11: Social Software Tools selected for Iteration 1

Students were given a group assignment (group work / collaborative learning) which was multi-faceted and included the following tasks:

1. Creating an animation on Green Information Technology using the Alice application in order to generate awareness on reducing the carbon footprint of individuals and organisations alike;
2. Creating a Facebook group which all of their team members need to join, containing their student details;
3. Creating a pbWiki page for their group to which they needed to upload their Alice animation to;
4. Linking 1, 2 and 3 above by placing a link to their pbWiki page on their Facebook group profile.

Certain factors needed to be taken into account when assigning this sort of project to students, for example some students may not have access to computer resources off campus while others may not have any experience in using technology and may perhaps find it difficult to work with the applications. The students were assessed on the following criteria: completeness, creativity, functional and originality.

The focus of this PAR project is on the use of social software tools for collaborative learning for the Net Generation so for this iteration the focus is on Facebook and pbWiki and not on the use of Alice (with Alice being another non web-based tool).

A decision was made to gather the data via an on-line questionnaire which was available on the course Learning Management System (LMS) so that it was easy for students to access as well as being visible to them. The questionnaire was made available once lectures for the course concluded, including the conclusion of all of their assignments.

4.4 PHASE 2: Act

The second phase of my participatory action research project's iteration 1 is **action**. As discussed above, the purpose of this phase is to take the action that was devised in phase 1, planning.

For this research project, the steps of my PAR project for the action phase of iteration 1 were as follows in Table 12 below:

PHASE	PROPOSED STEPS	ACTUAL STEPS TAKEN
Act	Implement your plan	INF112 course commenced in January of 2009 Students were provided with course study guide and informed of both individual and group assignments
	Note any deviations from your plan (with reasons)	Towards the end of semester 1, pbWiki was rebranded to pbWorks and moved from being free to a subscription plan as well as being targeted at organisations instead of individuals Because of religious reasons certain students were limited by what information they could put on Facebook

Table 12: The Actual Action Phase of my PAR project Iteration 1

During this phase, the course commenced and students were familiarised with the course outline and expectations in terms of assignments. The students were informed of the assignments via the course LMS, the study guide and lectures dedicated to explaining the individual and group assignments.

Two unexpected events occurred during this phase. Firstly, pbWiki was rebranded to pbWorks which meant that the service changed from being free to being subscription based as well as the target

audience being organisations and no longer individuals. The action taken by me, the course convenor and researcher, for those students who had not yet finished their group assignment, was that they should register for a free trial offering with pbWorks in order to complete their group assignments. The second unexpected event related to certain students not being allowed to put certain personal information on their Facebook group due to religious reasons – those students were granted an exemption for the information which they could not post on Facebook.

4.5 PHASE 3: Observe/Collect

The third phase of my participatory action research project's iteration 1 is **observing/collecting**. As discussed above, the purpose of this phase is to observe/collect data (plan) based on the action(s) I took in the previous step.

For this research project, the steps of my PAR project for the observe/collect phase of iteration 1 were as follows in Table 13 below:

PHASE	PROPOSED STEPS	ACTUAL STEPS TAKEN
Observe/Collect	Using different data gathering techniques (eg: journals, student feedback, videos, questionnaires, peer observation)	On-line questionnaires
	Collect and analyse the data	Course evaluation read On-line questionnaire conducted

Table 13: The Actual Observe/Collect Phase of my PAR project Iteration 1

During this step, I gathered data by means of an on-line questionnaire that students from the INF112 course completed. For this iteration, they were incentivised to complete the on-line questionnaire in the form of bonus marks. Upon completion of the group assignment, the students were asked to complete the on-line questionnaire which assessed the effectiveness of the teaching and learning approach with regards to the use of Facebook and pbWiki (social software) for collaborative learning for the Net Generation in higher education. The analysis of the data was also conducted by me using data reduction techniques and coding for the open-ended questions. The result of the data analysis is discussed below.

The target population for Iteration 1 of the Participatory Action Research project is 1580 students registered for the INF112 course at the University of Pretoria in the Faculty of Economic and Management Sciences. Of these 1580 students, 686 responded to the questionnaire, which equals a response rate of 43.4%. The high response rate could be attributed to the fact that students were incentivised to complete the on-line questionnaire in the form of bonus marks. The full questionnaire can be found in Appendix B.

4.5.1 Demographics

The gender distribution of the 686 respondents can be seen in Table 14 below:

Q1.1 Gender of Student (Multiple Choice)	Freq.	Percent
Female	358	52.19
Male	328	47.81
Total	686	100

Table 14: Gender Distribution for Iteration 1 Respondents

The age of the respondents is shown in Table 15 below:

Variable	N	Minimum	Maximum	Median	Mean	Std Dev.
Age	686	17	38	19	18.94	1.50

Table 15: Age Statistics of Respondents for Iteration 1

As can be seen from the table above, the average age of the respondents (students) is ~ 19, with the minimum age being 17 and the maximum age being 38. This means that most of the students can be classified as being part of the Net Generation as they were born in/after 1982 (2009 – 19 = 1990) as defined by Oblinger & Oblinger (2005). The age distribution of these respondents (students) can be depicted graphically as in Figure 14 below:

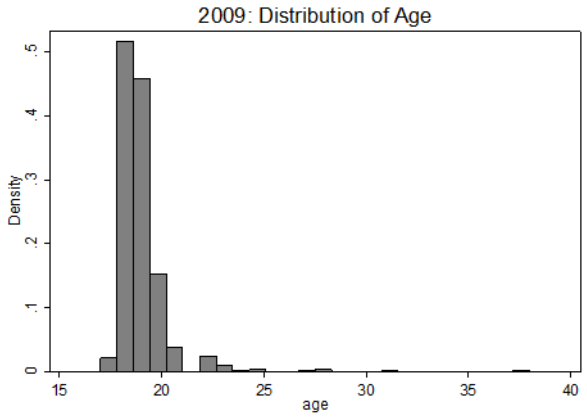

Figure 14: Age Distribution for Iteration 1 Respondents

The race of the 686 respondents can be seen in Table 16 below:

Q1.4 Race (Multiple Choice)	Freq.	Percent
Asian	8	1.17
Black	249	36.46
Caucasian	219	32.06
Coloured	13	1.9
Indian	42	6.15
Other	152	22.25
Total	683	100

Table 16: Race Statistics of Iteration 1 Respondents

As can be seen from Table 16 above, the most represented race is Black (36.46%), followed by Caucasian (32.06%), Other (22.25%), Indian (6.15%), Coloured (1.9%) and Asian (1.17%). The reason for the Other category being relatively high at 22.25% could be that certain respondents have sensitivities regarding race categorisation and that the list was not comprehensive enough to depict the race they identify most with.

4.5.2 Closed-ended questions

For the closed-ended part of the questionnaire pertaining to the use of Facebook and pbWiki for collaborative learning, there were 14 questions that respondents were asked to answer for each tool. These questions were exactly the same for each tool so that a comparative analysis could be done.

A Likert scale was used for the first 13 questions, with the answer options being:

1. Always / Definitely;
2. Frequently / Nearly always;
3. Occasionally / Seldom;
4. Never.

For the last question, there were two answer options being:

1. Yes;
2. No.

The results of these 14 questions for Facebook and pbWiki will now be discussed.

4.5.2.1 Facebook

In Table 17 below, the most frequent response to each question pertaining to the use of Facebook for the collaborative learning component of the group work is detailed.

Question	Facebook	Most Frequent Response	Count (%)
3.5	I have learnt more in the group when using Facebook than on my own	Occasionally / Seldom	251 (36.75%)
3.6	I enjoyed working in a group using Facebook	Frequently / Nearly always	217 (31.82%)
3.7	The group motivated me to do my share of the work for the Facebook component	Always / Definitely	268 (39.35%)
3.8	The group work relating to Facebook helped me to understand the course material better	Frequently / Nearly always	252 (36.95%)
3.9	I learned to co-operate with other people using Facebook	Always / Definitely	269 (39.68%)
3.10	The Facebook group work caused me to be dependable	Frequently / Nearly always	287 (42.08%)
3.11	It was fun working in a group using Facebook	Always / Definitely	293 (43.02%)
3.12	In the group I got the benefit of everyone's ideas when using Facebook	Always / Definitely	262 (38.42%)
3.13	When I had problems I got help from group members via Facebook	Frequently / Nearly always	188 (27.65%)
3.14	The work got done faster and more work was done using Facebook	Frequently / Nearly always	234 (34.41%)
3.15	The Facebook group work gave me an opportunity to talk and discuss the course material	Frequently / Nearly always	254 (37.52%)
3.16	The Facebook group work made the course material more interesting	Always / Definitely	251 (37.08%)

3.19	I experienced group learning using Facebook as successful	Frequently / Nearly always	255 (37.83%)
3.30	Do you think that learning to use Facebook as part of the INF 112 course was successful	Yes	594 (87.87%)

Table 17: Facebook and Group work (Iteration 1)

In Table 17 above, there are a number of noteworthy observations that can be made concerning how the student respondents experienced the use of Facebook (social software tool) for group work (group task) on the INF112 course. For questions 3.7, 3.9, 3.11, 3.12 and 3.16 the most frequent response was 'Always / Definitely' (1 on the Likert scale that was used. For questions 3.6, 3.8, 3.10, 3.13, 3.14, 3.15 and 3.19 the most frequent response was 'Frequently / Nearly always' (2 on the Likert scale that was used). This indicates that overall, students felt that using Facebook to support the group work component of the course was beneficial. For question 3.5 (36.75%) it is interesting to note that the most frequent response was 'Occasionally / Seldom' (3 on the Likert scale that was used). This seems to indicate that certain students felt that they did not necessarily learn more in a group using Facebook than they would have if they had been working alone. For Facebook, the attitude of the students was positive, with the majority of them claiming to have enjoyed using it, possibly because they were using it mostly for socialisation (Roodt et al., 2012). This correlates with the social feature of social software for the Net Generation as mentioned by Oblinger and Oblinger (2005).Overall it appears that the students generally felt that the use of this tool had a positive effect on their learning process and experience (Roodt et al., 2009). They also generally felt that the use of this tool helped encourage group work and assisted them in their self-development. Working in teams is once again a critical feature as discussed by (Oblinger & Oblinger, 2005:16). In terms of how they experienced the course making use of Facebook, the majority of them felt that the use of these tools in the course was highly successful (87.87%).

Figure 15 below (in the form of a heat-map) shows what all of the student responses were to 13 questions (out of the 14 questions in total) pertaining to the use of Facebook for group work.

Facebook	Missing	4. Never	3. Occasionally / Seldom	2. Frequently / Nearly always	1. Always / Definitely	Total
3.5. I have learnt more in the group when using Facebook than on my own	6	96	251	181	155	683
3.6. I enjoyed working in a group using Facebook	7	52	199	217	214	682
3.7. The group motivated me to do my share of the work for the Facebook component	8	57	123	233	268	681
3.8. The group work relating to Facebook helped me to understand the course material better	11	67	193	252	166	678
3.9. I learned to co-operate with other people using Facebook	7	40	134	239	269	682
3.10. The Facebook group work caused me to be dependable	8	50	118	287	226	681
3.11. It was fun working in a group using Facebook	7	57	126	206	293	682
3.12. In the group I got the benefit of everyone's ideas when using Facebook	9	50	136	232	262	680
3.13. When I had problems I got help from group members via Facebook	9	146	186	188	160	680
3.14. The work got done faster and more work was done using Facebook	12	73	192	234	178	677
3.15. The Facebook group work gave me an opportunity to talk and discuss the course material	12	78	186	254	159	677
3.16. The Facebook group work made the course material more interesting	7	52	142	237	251	682
3.19. I experienced group learning using Facebook/pbWiki/Alice as successful	15	47	148	255	224	674

Figure 15: Heat-map of Student responses to Facebook & Group work questions - Iteration 1

As can be seen in Figure 15 above, the vast majority of students felt that for each question, with the exception of question 3.5, Facebook successfully supported the group task at hand.

When looking at Figure 15 above, it is clear that the students' perceptions of the ability of Facebook to support collaborative learning are overwhelmingly positive as evidenced by the majority of responses being '1.Always/Definitely' and '2.Frequently/Nearly always' . As mentioned, the only exception to this is question 3.5, where the most common student response was '3.Occassionally/Seldom' which indicates that the students felt that they did not always learn more in the group using Facebook than they would have on their own using Facebook.

Additional graphical representations (graphs and heat-maps) of the data analysis for Facebook and Group work for iteration 1 are contained in Appendix C.

4.5.2.2 pbWiki

In Table 18 below, the most frequent response to each question pertaining to the use of pbWiki for the collaborative learning component of the group work is detailed.

Question	PBWiki	Most Frequent Response	Count (%)
4.5	I have learnt more in the group when using pbWiki than I would have learnt on my own	Always / Definitely or Frequently / Nearly always	222 (32.74)
4.6	I enjoyed working in a group using pbWiki	Frequently / Nearly always	238 (35.16)
4.7	The group motivated me to do my share of the work for the pbWiki component	Frequently / Nearly always	252 (37.33)
4.8	The group work relating to pbWiki helped me to understand the course material better	Frequently / Nearly always	241 (35.86)
4.9	I learned to co-operate with other people using pbWiki	Frequently / Nearly always	237 (35.22)
4.10	The pbWiki group work caused me to be dependable and do my assignment	Frequently / Nearly always	243 (36.21)
4.11	It was fun working in a group using pbWiki	Frequently / Nearly always	229 (33.88)
4.12	In the group I got the benefit of everyone's ideas when using pbWiki	Frequently / Nearly always	244 (36.15)
4.13	When I had problems I got help from group members via pbWiki	Never	242 (35.75)
4.14	The work got done faster and more work was done using pbWiki	Occasionally / Seldom	230 (34.12)
4.15	The pbWiki group work gave me an opportunity to talk and discuss material	Frequently / Nearly always	234 (34.56)
4.16	The pbWiki group work made the course	Frequently / Nearly	238 (35.36)

	material more interesting	always	
4.19	I experienced group learning using pbWiki as successful	Frequently / Nearly always	243 (35.95)
4.30	Do you think that learning to use pbWiki as part of the INF112 course was successful	Yes	541 (80.51)

Table 18: pbWiki and Group Work (Iteration 1)

In Table 18 above, there are a number of noteworthy observations that can be made concerning how the student respondents experienced the use of pbWiki (social software tool) for group work (group task) on the INF112 course. For questions 4.5 – 4.10, 4.11, 4.12, 4.15, 4.16 and 4.19 the most frequent response was 'Frequently / Nearly always's (2 on the Likert scale that was used. Only one question, 4.5, had a most frequent response of 'Always / Definitely' (33%). This indicates that overall, students felt that using pbWiki to support the group work component of the course was beneficial. For question 4.14 (34.12%) it is interesting to note that the most frequent response was 'Occasionally / Seldom' (3 on the Likert scale that was used). This seems to indicate that certain students felt that they did not get work done faster nor more work using pbWiki. Another interesting point to note arises from question 4.13 where even though the students enjoyed using pbWiki and felt that it supported them in terms of group work, when the students needed assistance from each other they generally preferred not to use pbWiki, and most likely reverted to face-to-face discussions (35.75% answered 'Never' to the question 'When I had problems I got help from group members via pbWiki').

For pbWiki, the attitude of the students was positive, with the majority of them claiming to have enjoyed using it, possibly because they were using it mostly for socialisation (Roodt et al., 2012). This correlates with the social feature of social software for the Net Generation as mentioned by Oblinger and Oblinger (2005).Overall it appears that the students generally felt that the use of pbWiki had a positive effect on their learning process and experience (Roodt et al., 2009). They also generally felt that the use of these tools helped encourage group work and assisted them in their self-development. Working in teams is once again a critical feature as discussed by (Oblinger & Oblinger, 2005:16). In terms of how they experienced the course making use of pbWiki, the majority of them felt that the use of these tools in the course was highly successful (80.51%).
Figure 16 below (in the form of a heat-map) shows what all of the student responses were to 13 questions (out of the 14 questions in total) pertaining to the use of pbWiki for group work.

PBWiki	Missing	4. Never	3. Occasionally / Seldom	2. Frequently / Nearly always	1. Always / Definitely	Total
4.5. I have learnt more in the group when using pbWiki than I would have learnt on my own	11	81	153	222	222	678
4.6. I enjoyed working in a group using pbWiki	12	77	188	238	174	677
4.7. The group motivated me to do my share of the work for the pbWiki component	14	63	166	252	194	675
4.8. The group work relating to pbWiki helped me to understand the course material better	17	73	211	241	147	672
4.9. I learned to co-operate with other people using pbWiki	16	77	172	237	187	673
4.10. The pbWiki group work caused me to be dependable and do my assignment	18	62	161	243	205	671
4.11. It was fun working in a group using pbWiki	13	71	182	229	194	676
4.12. In the group I got the benefit of everyone's ideas when using pbWiki	14	60	170	244	201	675
4.13. When I had problems I got help from group members via pbWiki	12	242	153	147	135	677
4.14. The work got done faster and more work was done using pbWiki	15	91	230	220	133	674
4.15. The pbWiki group work gave me an opportunity to talk and discuss material	12	113	203	234	127	677
4.16. The pbWiki group work made the course material more interesting	16	75	203	238	157	673
4.19. I experienced group learning using pbWiki as successful	13	57	176	243	200	676

Figure 16: Heat-map of Student responses to pbWiki & Group work questions - Iteration 1

As can be seen in Figure 16 above (heat-map), the vast majority of students felt that for each question, with the exception of question 4.13, pbWiki successfully supported the group task at hand. When looking at the Figure 16 above, it is clear that the students' perceptions of the ability of pbWiki to support collaborative learning are as evidenced by the majority of responses being '1.Always/Definitely' and '2.Frequently/Nearly always'. As mentioned, the only exception to this is question 4.13, where 59% of students felt that they did not use pbWiki to get help from their group members when they had problems with the task. It must be noted that there are a substantial amount of students that selected '4.Never' for all of the group work questions pertaining to pbWiki. Additional graphical representations (graphs and heat-maps) of the data analysis for pbWiki and Group work for iteration 1 are contained in Appendix C.

4.5.2.3 Comparative Analysis – Facebook vs pbWiki

Social Software Tool (Web 2.0 Technology)	Facebook			pbWiki			Lowest mean value	
Statistic	N	Mean	Std. Dev	N	Mean	Std. Dev	Mean	Web 2.0 Technology
Q5. I have learnt more in the group when using the Web 2.0 technology than I would have learnt on my own	683	2.649	1.191	678	2.243	1.137	2.243	PBWiki
Q6. I enjoyed working in a group using the Web 2.0 technology	682	2.346	1.2	677	2.412	1.146	2.346	Facebook
Q7. The group motivated me to do my share of the work for the Web 2.0 technology component	681	2.051	1.095	675	2.298	1.13	2.051	Facebook
Q8. The group work relating to the Web 2.0 technology helped me to understand the course material better	678	2.423	1.142	672	2.518	1.148	2.423	Facebook
Q9. I learned to co-operate with other people using the Web 2.0 technology	682	2.057	1.112	673	2.348	1.138	2.057	Facebook
Q10. The Web 2.0 technology group work caused me to be dependable and do my assignment	681	2.088	1.045	671	2.267	1.135	2.088	Facebook
Q11. It was fun working in a group using the Web 2.0 technology	682	2.023	1.12	676	2.357	1.159	2.023	Facebook
Q12. In the group I got the benefit of everyone's ideas when using the Web 2.0 technology	680	2.088	1.119	675	2.295	1.144	2.088	Facebook
Q13. When I had problems I got help from group members via the Web 2.0 technology	680	2.526	1.126	677	2.61	1.044	2.526	Facebook
Q14. The work got done faster and more work was	677	2.412	1.156	674	2.62	1.147	2.412	Facebook

done using the web 2.0 technology								
Q15. The Web 2.0 technology group work gave me an opportunity to talk and discuss material	677	2.43	1.125	677	2.579	1.105	2.43	Facebook
Q16. The Web 2.0 technology group work made the course material more interesting	682	2.125	1.124	673	2.481	1.15	2.125	Facebook
Q19. I experienced group learning using the Web 2.0 technology as successful	674	2.177	1.119	676	2.309	1.152	2.177	Facebook

Table 19: Comparative Analysis - Facebook vs pbWiki (Iteration 1)

From Table 19 shown above, a couple of noteworthy observations can be made concerning how the student respondents experienced the use of Facebook and pbWiki (social software tool) comparatively for group work (collaborative learning) on the INF112 course for iteration 1.

When looking at the column labelled 'Lowest mean value' (and in this study, the lower the mean the better the tool is at supporting the question), it is evident that students perceptions were that Facebook was a better social software tool than pbWiki (in most instances with the exception of question 5) at supporting collaborative learning (group work) activities for the Net Generation.

For both Facebook and pbWiki, the attitude of the students was positive, with the majority of them claiming to have enjoyed using it. For the section concerning group work, the students generally felt that the use of these tools had a positive effect on their learning process and experience. They also generally felt that the use of these tools helped encourage group work and assisted them in their self-development. Another interesting point to note is that even though the students enjoyed using these tools and felt that they could assist in terms of group work, when the students needed assistance from each other they generally preferred not to use the tools provided, and most likely reverted to face-to-face discussions.

In terms of how they experienced the course, the majority of the students felt that the use of these tools in the course was highly successful. Figure 17 below is a heat-map depicting all of the responses (not just the most frequent ones) to Facebook and pbWiki comparatively.

Comparison Across Tools: 2009				
Q5. I have learnt more in the group when using the Web 2.0 technology than I would have learnt on my own				
Facebook	14%	37%	27%	23%
PBWiki	12%	23%	33%	33%
Q6. I enjoyed working in a group using the Web 2.0 technology				
Facebook	8%	29%	32%	31%
PBWiki	11%	28%	35%	26%
Q7. The group motivated me to do my share of the work for The Web 2.0 technology component				
Facebook	8%	18%	34%	39%
PBWiki	9%	25%	37%	29%
Q8. The group work relating to the Web 2.0 technology helped me to understand the course material better				
Facebook	10%	28%	37%	24%
PBWiki	11%	31%	36%	22%
Q9. I learned to co-operate with other people using the Web 2.0 technology				
Facebook	6%	20%	35%	39%
PBWiki	11%	26%	35%	28%
Q10. The Web 2.0 technology group work caused me to be dependable and do my assignment				
Facebook	7%	17%	42%	33%
PBWiki	9%	24%	36%	31%
Q11. It was fun working in a group using the Web 2.0 technology				
Facebook	8%	18%	30%	43%
PBWiki	11%	27%	34%	29%
Q12. In the group I got the benefit of everyone's ideas when using the Web 2.0 technology				
Facebook	7%	20%	34%	39%
PBWiki	9%	25%	36%	30%
Q13. When I had problems I got help from group members via the Web 2.0 technology				
Facebook	21%	27%	28%	24%
PBWiki	36%	23%	22%	20%
Q14. The work got done faster and more work was done using the Web 2.0 technology				
Facebook	11%	28%	35%	26%
PBWiki	14%	34%	33%	20%
Q15. The Web 2.0 technology group work gave me an opportunity to talk and discuss material				
Facebook	12%	27%	38%	23%
PBWiki	17%	30%	35%	19%
Q16. The Web 2.0 technology group work made the course material more interesting				
Facebook	8%	21%	35%	37%
PBWiki	11%	30%	35%	23%
Q19. I experienced group learning using the Web 2.0 technology as successful				
Facebook	7%	22%	38%	33%
PBWiki	8%	26%	36%	30%
	Never	Occasionally / Seldom	Frequently / Nearly always	Always / Definitely

Figure 17: Heat-map of Student responses to Facebook and pbWiki & Group work questions (Iteration 1)

Additional graphical representations (graphs and heat-maps) of the data analysis for the comparative analysis between Facebook and pbWiki for Group work for iteration 1 are contained in Appendix C.

4.5.3 Open-ended questions

For the open-ended part of the questionnaire, students were asked for Facebook and pbWiki whether they had any additional comments. As mentioned in Chapter 2, Research Methodology, coding (see Method for Analysis in Chapter 2) was done on the data that was gathered and the results can be seen (*'Any other comments about Facebook/pbWiki?'*) for iteration 1 below.

4.5.3.1 Facebook

Table 20 below shows the results of the coding that was done on the data collected for the question (*'Any other comments about Facebook?'*) for Facebook for iteration 1.

Facebook 2009		
Categories (not mutually exclusive)	Freq.	Percent
No comment	267	38.75%
Enjoyable	98	14.22%
Improves communication	77	11.18%
Fun	61	8.85%
Social	51	7.40%
Difficult	35	5.08%
Waste of time/not relevant/boring/didn't like	25	3.63%
Interesting/Made course content more interesting	22	3.19%
Useful	19	2.76%
Easy to use	16	2.32%
Time consuming	13	1.89%
Other	13	1.89%
Good	11	1.60%
Innovative	9	1.31%
Relevant to course	7	1.02%
Exciting approach to group work	7	1.02%
Privacy concerns	6	0.87%
Better understanding of coursework	5	0.73%
Cost concerns	5	0.73%
Get work done faster	4	0.58%
Creativity	4	0.58%
Entertaining	3	0.44%
Recommend	2	0.29%

Table 20: Facebook Open-ended Responses (Iteration 1)

There are some interesting observations that can be made regarding students' feedback in terms of their experience of using Facebook for the collaborative learning component of the INF112 course for iteration 1. It must be noted though that 38% of the students had no comments for this open-ended question. Certain students experienced using Facebook for the collaborative learning component of the course as *'Enjoyable'* (14.22%), *'Fun'* (8.85%) and *'Social'* (7.40%). This is in keeping with research conducted by Prensky (2001), Oblinger and Oblinger (2005), Gruber (2008) and McLoughlin & Lee (2010) which posit that social software is well suited to collaborative learning activities for the Net Generation in higher education due to their characteristics being similar to the learning preferences of this generation, for example being based on the principle of social interaction. As discussed during the literature review, Chapter 3 of this thesis, social software provides learners with opportunities for (Chen et al., 2001) (Bryant, 2006) (Krebs et al., 2009):

- Learner participation;
- Social relevance;
- Knowledge sharing;
- Networking and collaboration.

When looking at Table 21 above, it appears that Facebook did realise all of the opportunities for these INF112 students for iteration 1 – this is evidence by the categories *'Enjoyable'* (14.22%), *'Fun'* (8.85%), *'Social'* (7.40%), *'Improves communication'* (11.18%). An interesting category is '*Difficult*' (5.08%), where certain students felt that using Facebook was difficult – this may be due to the fact that they are unfamiliar with Facebook.

4.5.3.2 pbWiki

Table 21 below shows the results of the coding that was done on the data collected for the question (*'Any other comments about pbWiki?'*) for pbWiki for iteration 1.

PBWIKI 2009		
No comment	362	52.54%
Difficult	53	7.40%
Enjoyable	45	6.53%
Useful	36	4.93%
Interesting/Made course content more interesting	35	5.08%
Did not enjoy	34	4.06%
Easy to use	28	4.06%

Good	26	3.48%
Fun	19	2.76%
Didn't use/didn't have sufficient exposure	15	2.18%
Didn't understand	12	1.74%
Average - OK	9	1.31%
Other	9	1.31%
Social	8	1.16%
Preferred Facebook	6	0.87%
Innovative	4	0.58%
Improves communication	3	0.44%
Get work done faster	3	0.44%
Exciting approach to group work	3	0.29%
Would like to learn more	3	0.44%
Creativity	2	0.29%
Costly	2	0.29%
Not relevant to course	1	0.15%
Recommend	1	0.15%
Entertaining	0	0.00%
Categories (not mutually exclusive)	Freq.	Percent

Table 21: pbWiki Open-ended Responses (Iteration 1)

There are some interesting observations that can be made regarding students' feedback in terms of their experience of using pbWiki for the collaborative learning component of the INF112 course for iteration 1. It must be noted though that 53% of the students had no comments for this open-ended question. Certain students experienced using pbWiki for the collaborative learning component of the course as *'Enjoyable'* (6.53%), *'Fun'* (2.76%) and *'Social'* (1.16%). This is in keeping with research conducted by Prensky (2001), Oblinger and Oblinger (2005), Gruber (2008) and McLoughlin and Lee (2010) which posit that social software is well suited to collaborative learning activities for the Net Generation in higher education due to their characteristics being similar to the learning preferences of this generation, for example being based on the principle of social interaction. As discussed during the literature review, Chapter 3 of this thesis, social software provides learners with opportunities for (Chen et al., 2001) (Bryant, 2006) (Krebs et al., 2009):

- Learner participation;
- Social relevance;
- Knowledge sharing;
- Networking and collaboration.

When looking at Table 21 above, it appears that pbWiki only realises all of the opportunities for these INF112 students for iteration 1 to a very limited degree – this is evidence by the categories *'Enjoyable'* (6.53%), *'Fun'* (2.76%), *'Social'* (1.16%), *'Improves communication'* (0.44%) where it can be seen that the percentage of students that felt this is justified is low. An interesting category is '*Difficult*' (7.40%), where certain students felt that using pbWiki was difficult – this may be due to the fact that they are unfamiliar with pbWiki and as such it must be noted that the net generation should not be considered homogenous as detailed in section 3.3.6. Additionally, 4.06% of students felt that they did not enjoy using pbWiki for the collaborative learning component of the course.

4.6 PHASE 4: Reflect

4.6.1 Reflection activities

The fourth phase of my participatory action research project's iteration 1 is **reflecting**. As discussed above, the purpose of this phase is to reflect based on the findings of the previous step.

For this research project, the steps of my PAR project for the reflection phase of iteration 1 were as follows in Table 22 below:

PHASE	PROPOSED STEPS	ACTUAL STEPS TAKEN
Reflect	Challenges encountered	Mid-semester rebranding of pbWiki to pbWorks Certain academics are not familiar with social software (web 2.0) tools Assessment criteria challenges as assessing creativity was highly subjective – clear guidelines needed Internal resources required to assess learning output artefacts
	Points to learn from	The Net Generation categorisation is not homogenous as pointed out in section 3.3.6 Not all students are 'web-proficient' Religion (cultural influences) The popularity of the social software tools with the students influences their perception of the tool(s) Informal off-campus support proved positive : Facebook course group enabled peer-to-peer assistance

	Celebrate and affirm positives	Students enjoyed it, fun – use open ended feedback
	Share findings and reflections	Change the social software tool that the students enjoyed the least – pbWiki to something else Published conference papers and journal article Shared findings with faculty and Education Innovation via presentations

Table 22: The Actual Reflection Phase of my PAR Iteration 1

The reflection phase of my PAR Iteration 1 produced a number of key outcomes but the main focus for my thesis is on the output from the data analysis in phase 3. That output relates specifically to the students perception of the use of Facebook and pbWiki as social software tools to support collaborative learning for the Net Generation in higher education.

When looking at the comparative analysis between Facebook and pbWiki, as well as the results of the coding of the open-ended questions, the findings are that Facebook appears to be better at supporting CSCL for these students. As such, I, as the participant researcher, have chosen to replace pbWiki with another social software tool(s) for iteration 2.

4.6.2 Amendments to Theoretical Framework for CSCL from Iteration 1

The findings from the data analysis of iteration 1 which is detailed during this chapter has highlighted certain items that can be amended / changes that can be made to the theoretical framework for CSCL as proposed by De Villiers (1995) as discussed in section 3.6 in Chapter 3. These changes include additions to the ***Input*** and ***Process*** components of the framework.

These additions are listed below in the components that they correspond to:

Input

- Structural features of CSCL:
  - Assessment criteria
  - Institutional internet usage policies, specifically the internal resources required to assess learning output artefacts
- Other sources of structure:
  - Learning style preferences

  - Web 2.0 proficiency of students
  - Popularity of social software tools
- Internal system of group:
  - Cultural influences (eg: religion)

Process

- Addition of ***'Learning support'*** with both ***'Formal'*** and ***'Informal'*** components;
- Creating two sub-components to ***'Physical Environment'***, being: ***'On-campus'*** and ***'Off-campus'***

These amendments will be discussed in detail in Chapter 8.

4.7 CONCLUSION

This chapter detailed all of the activities that took place as part of iteration 1 of this PAR project. It was divided into four sections, with each section dealing with a specific phase of the PAR.
Overall the students responses were overwhelming positive towards using Facebook, especially in the context of collaborative learning activities, which implies that not only do they enjoy using it they also find it easy to use even within the context of learning new and challenging material. From the results of the data analysis, it is evident that pbWiki is less suited than Facebook to support CSCL for the Net Generation in higher education.

These findings show that using tools that the Net Generation are familiar with allows the students to gain easier access to the actual process of learning, without needing a substantial investment of time into learning how to use a learning tool they are unfamiliar with. These findings indicate that group work can be significantly enhanced through the use of social software tools, in particular Facebook and to a lesser degree pbWiki. Facebook is designed to allow group work and collaboration in an open and distributed manner, and are thus ideal for supporting group work activities (Mazer et al., 2007). Furthermore Social Networks provide an interface with which increasingly more students are familiar, especially in terms of students being classified as part of the Net Generation, and thus reduce the initial learning curve they might have within the subject (Boyd & Ellison, 2008) (Kay, 2007) . It is also interesting to note that for many students the enjoyment gained from using tools such as Facebook®, enhances their entire learning experience. Overall, the findings from this chapter are used to refine the additions/amendments to the proposed CSCL framework which is discussed in Chapter 8.

The next chapter details the activities of iteration 2 of my PAR and follows a similar structure to this chapter.

CHAPTER 5

PARTICIPATORY ACTION RESEARCH ITERATION 2

CHAPTER 5: PARTICIPATORY ACTION RESEARCH – ITERATION 2

5.1 INTRODUCTION

This chapter details the steps of the second iteration of my participatory action research (PAR) project. It describes each phase of iteration 2 in detail, based upon the PAR model depicted in Figure 9 in Chapter 2. I will be following the PAR phases and steps as proposed by Baskerville and Wood-Harper (1996) which I discussed in Chapter 1 under the Theoretical Underpinnings section.

5.2 CONTEXT AND PURPOSE

5.2.1 Context

This iteration of my PAR project occurred during the 1st semester of 2010 on the INF112 course at the University of Pretoria. The contexts for this iteration were the university, the course and the students. The participants in this iteration were the students and the participant researcher being me.

The target population for Iteration 2 of the PAR project is 1411 students registered for the INF112 course at the University of Pretoria in the Faculty of Economic and Management Sciences.

5.2.2 Purpose of Participatory Action Research Iteration 2 (Cycle 2)

The purpose of my PAR iteration 2 is to define the nature of the social software course intervention for INF112, as well as selecting specific social software tools for that intervention and conducting the intervention.

Iteration 2 also involves the gathering and analysis of data pertaining to the social software intervention (iteration 2) on the INF112 course. The findings of this will be used to inform iteration 3 of my PAR project and to refine my proposed CSCL Theoretical Framework.

5.3 PHASE 1: Plan

The first phase of my participatory action research project's iteration 2 is **planning**. As discussed above, the purpose of this phase is to determine (plan) what action I will take in phase 2 (action). For this research project, the steps of my PAR project for the planning phase of iteration 2 were as follows in Table 23 below:

PHASE	PROPOSED STEPS	ACTUAL STEPS TAKEN
Plan	Develop a detailed plan of action	Review data analysis from iteration 1 Decide if (and how) to amend group assignment Identify the possible social software tools that will be used as part of the intervention, as well as the tools that carry over from iteration 1 Determine how and when the data will be gathered
	Decide on the time frame	The 1st semester of 2010 during which the INF112 course runs
	Select the resources you will need	The actual social software tools that will be used are Facebook, Google Groups and Google Sites
	Devise strategies to carry out your plan	Action plan of course intervention

Table 23: The Actual Planning Phase of my PAR project Iteration 2

Upon reviewing the data analysis from iteration 1, feedback received from students is that they preferred using Facebook more than pbWiki for their group work. Based on this feedback, I as the researcher, decided to implement selected social software tools, including the replacement of pbWiki, for the collaborative learning component of the course in the form of group work for iteration 2.

In terms of my research topic at hand, I had to select which social software tools I was going to replace for iteration 2 for the collaborative learning component of the INF112 course. For this iteration of the PAR project, Facebook©, Google Groups© and Google Sites© were selected as the social software tools that the students used for the group work. component. pbWiki has been replaced with Google Sites based on the data analysis from iteration 1 as pbWiki was the least supportive, compared to Facebook, of group work for that iteration. It is important to note that Alice will not be discussed here as Alice is a non web-based tool and as such is not included in my study. I nominated to use these educational tools, Facebook, Google Groups and Google Sites because of their mainstream adoption both within the public and educational sectors (Roodt et al., 2009). It is argued that the students' learning processes are inhibited if different learning styles are not

considered when the learning environments, that will be used to educate students, are chosen (Huang & Behara, 2007).

The table below shows the social software tools that I nominated to use for iteration 2, based on the characteristics and learning preferences of the Net Generation:

Social computing concept	Technology chosen
Social Networking	Facebook
On-line Collaboration	Google Groups
	Google Sites

Table 24: Social Software Tools selected for Iteration 2

Students were given a group assignment (group work / collaborative learning) which was multi-faceted and included the following tasks:

1. Creating a closed group on Facebook and Google Groups which all of their team members needed to join (and needed to invite the INF112 group assignment tutor as a member so that the tutor could access these pages in order to mark the assignments);
2. Creating a website for their group using the Project template on Google Sites. This also involved posting their group website address (URL) from Google Sites onto their Facebook group page;
3. Creating an animation on Green Information Technology using the Alice application in order to generate awareness on reducing the carbon footprint of individuals and organisations alike;
4. Embedding their Alice animation onto their group website on Google Sites.

Certain factors needed to be taken into account when assigning this sort of project to students, for example some students may not have access to computer resources off campus while others may not have any experience in using technology and may perhaps find it difficult to work with the applications. Another interesting consideration that arose is religious beliefs that arose from the findings of the iteration 1 data analysis. The students were assessed on the following criteria: completeness, creativity, functional, relevance and originality.

A decision was made to gather the data via an on-line questionnaire which was available on the course Learning Management System (LMS) so that it was easy for students to access as well as being visible to them. The questionnaire was made available once lectures for the course concluded, including the conclusion of all of their assignments.

5.4 PHASE 2: Act

The second phase of my participatory action research project's iteration 2 is **action**. As discussed above, the purpose of this phase is to take the action that was devised in phase 1, planning.
For this research project, the steps of my PAR project for the action phase of iteration 2 were as follows in Table 25 below:

PHASE	PROPOSED STEPS	ACTUAL STEPS TAKEN
Act	Implement your plan	INF112 course commence in January of 2010 Students were provided with course study guide and informed of both individual and group assignments Support for students for group assignment was provided through a course Facebook Group, the LMS and email.
	Note any deviations from your plan (with reasons)	Certain students did not want their group assignment to be visible to other students, wanted to make their webpages private (ie: not searchable and/or visible publically) Certain students did not customise any of the content provided by Google Sites on the template – students were informed that they would be penalised.

Table 25: The Actual Action Phase of my PAR project Iteration 2

During this phase, the course commenced and students were familiarised with the course outline and expectations in terms of assignments. The students were informed of the assignments via the course LMS, the study guide and lectures dedicated to explaining the individual and group assignments.

Two unexpected events occurred during this phase. Firstly, certain students were concerned about privacy and confidentiality regarding their group assignment. This concern pertained to their

assignment's visibility on the internet to other INF112 students. They did not want their fellow students to be able to see what they were doing. A decision was made by me to allow those students who wished to do so that they could change their privacy settings to enable this lack of visibility. Secondly, whilst creating their websites on Google Sites, certain students were using the content as provided on the template and were not customising it to reflect their group work, which resulted in penalties for their group assignment mark. This occurred though after the completion of the group assignment.

5.5 PHASE 3: Observe / Collect

The third phase of my participatory action research project's iteration 2 is **observing/collecting**. As discussed above, the purpose of this phase is to observe/collect data (plan) based on the action(s) I took in the previous step.

For this research project, the steps of my PAR project for the observe/collect phase of iteration 2 were as follows in Table 26 below:

PHASE	PROPOSED STEPS	ACTUAL STEPS TAKEN
Observe/Collect	Using different data gathering techniques (eg: journals, student feedback, videos, questionnaires, peer observation)	On-line questionnaires (MAIN)
	Collect and analyse the data	On-line questionnaire conducted

Table 26: The Actual Observe/Collect Phase of my PAR project Iteration 2

During this step, I gathered data by means of an on-line questionnaire that students from the INF112 course completed. For this iteration, they were incentivised to complete the on-line questionnaire in the form of bonus marks. Upon completion of the group assignment, the students were asked to complete the on-line questionnaire which assessed the effectiveness of the teaching and learning approach with regards to the use of Facebook, Google Groups and Google Sites (social software) for collaborative learning for the Net Generation in higher education. The analysis of the data was also conducted by me using data reduction techniques and coding for the open-ended questions. The result of the data analysis is discussed below.

The target population for Iteration 2 of the Participatory Action Research project is 1411 students registered for the INF112 course at the University of Pretoria in the Faculty of Economic and

Management Sciences. Of these 1411 students, 577 responded to the questionnaire, which equals a response rate of 40.82%. The high response rate could be attributed to the fact that students were incentivised to complete the on-line questionnaire in the form of bonus marks. The full questionnaire can be found in Appendix D.

5.5.1 Demographics

The gender distribution of the 576 respondents can be seen in Table 27 below:

Q1.1 Gender of Student (Multiple Choice)	Freq.	Percent	Cum.
Female	331	57.37	57.37
Male	246	42.63	100
Total	577	100	

Table 27: Gender distribution for Iteration 2 respondents

The age of the respondents is shown in Table 28 below:

Variable	N	Minimum	Maximum	Median	Mean	Std Dev.
Age	577	17	28	19	19.00	1.33

Table 28: Age Statistics for Iteration 2 Respondents

As can be seen from the table above, the average age of the respondents (students) is ~ 19, with the minimum age being 17 and the maximum age being 28. This means that most of the students can be classified as being part of the Net Generation as they were born in/after 1982 (2010 – 19 = 1991) as defined by Oblinger and Oblinger (2005). The age distribution of these respondents (students) can be depicted graphically as in Figure 18 below:

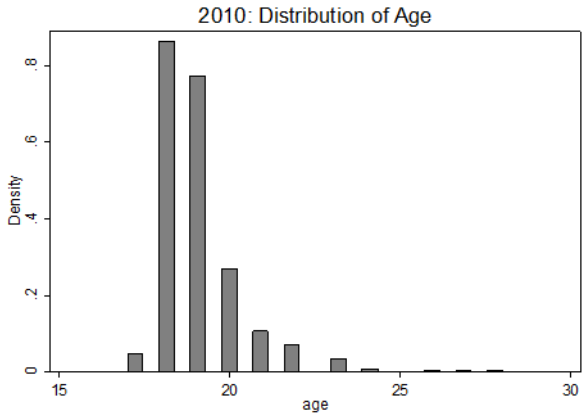

Figure 18: Age Distribution for Iteration 2 Respondents

The race of the 577 respondents can be seen in Table 29 below:

Q1.4 Race (Multiple Choice)	Freq.	Percent
Coloured	13	2.26
Other	94	16.17
Asian	9	1.57
Black	259	45.04
Caucasian	161	28
Indian	41	6.96
Total	577	100

Table 29: Race Statistics of Iteration 2 Respondents

As can be seen from Table 29 above, the most represented race is Black (45.04%), followed by Caucasian (28%), Other (16.17%), Indian (6.96%), Coloured (2.26%) and Asian (1.57%). The reason for the Other category being relatively high at 16.17% could be that certain respondents have sensitivities regarding race categorisation and that the list was not comprehensive enough to depict the race they identify most with.

5.5.2 Closed-ended questions

For the closed-ended part of the questionnaire pertaining to the use of Facebook, Google Sites and Google Groups for collaborative learning, there were 14 questions that respondents were asked to answer for each tool. These questions were mostly the same for each tool so that a comparative analysis could be done. A Likert scale was used, with the answer options being:

1. Always / Definitely;

2. Frequently / Nearly always;
3. Occasionally / Seldom;
4. Never.

5.5.2.1 Facebook

In Table 30 below, the most frequent response to each question pertaining to the use of Facebook for the collaborative learning component of the group work is detailed.

Question	Facebook	Most Frequent Response	Count (%)
3.5	I have learnt more in the group when using Facebook than on my own	Always/Definitely	188 (33.87%)
3.6	I enjoyed working in a group using Facebook	Always/Definitely	227 (40.75%)
3.7	The group motivated me to do my share of the work for the Facebook component	Always/Definitely	219 (39.39%)
3.8	The group work relating to Facebook helped me to understand the course material better	Frequently/Nearly Always	201 (36.22%)
3.9	I learned to co-operate with other people using Facebook	Always/Definitely	216 (38.85%)
3.10	The Facebook group work caused me to be dependable	Frequently/Nearly Always	226 (38.70%)
3.11	It was fun working in a group using Facebook	Always/Definitely	224 (39.58%)
3.12	In the group I got the benefit of everyone's ideas when using Facebook	Frequently/Nearly Always	222 (39.29 %)
3.13	When I had problems I got help from group members via Facebook	Frequently/Nearly Always	159 (28.19%)
3.14	The work got done faster and more work was done using Facebook	Frequently/Nearly Always	184 (32.68%)
3.15	The Facebook group work gave me an opportunity to talk and discuss the course material	Frequently/Nearly Always	179 (31.85%)
3.16	The Facebook group work made the course material more interesting	Always/Definitely	213 (37.83%)
3.19	I experienced group learning using Facebook as successful	Always/Definitely	209 (35.79%)
3.30	Do you think that learning to use Facebook as part of the INF 112 course was successful	Yes	512 (91.59%)

Table 30: Facebook and Group work (Iteration 2)

In Table 30 above, there are a number of noteworthy observations that can be made concerning how the student respondents experienced the use of Facebook (social software tool) for group work (group task) on the INF112 course for iteration 2 of this PAR project. For questions 3.5 - 3.7, 3.9, 3.11, 3.16 and 3.19 the most frequent response was ‘Always / Definitely’ (1 on the Likert scale that

was used). For questions 3.8, 3.10, 3.12 - 3.15 the most frequent response was 'Frequently / Nearly always' (2 on the Likert scale that was used). This indicates that overall, students felt that using Facebook to support the group work component of the course was beneficial. For Facebook, the attitude of the students was positive, with the majority of them claiming to have enjoyed using it, possibly because they were using it mostly for socialisation (Roodt, De Villiers, & Joubert, 2012). This correlates with the social feature of social software for the Net Generation as mentioned by Oblinger and Oblinger (2005).Overall it appears that the students generally felt that the use of this tool had a positive effect on their learning process and experience (Roodt et al., 2009). They also generally felt that the use of this tool helped encourage group work and assisted them in their self-development. Working in teams is once again a critical feature as discussed by (Oblinger & Oblinger, 2005:16). In terms of how they experienced the course making use of Facebook, the majority of them felt that the use of these tools in the course was highly successful (91.59%).

Figure 19 below (in the form of a heat-map) shows what all of the student responses (in percentages) were to 13 questions (out of the 14 questions in total) pertaining to the use of Facebook for group work.

Facebook	Missing	4. Never	3. Occasionally / Seldom	2. Frequently / Nearly always	1. Always / Definitely	Total
3.5. I have learnt more in the group when using Facebook than on my own	29	71	134	162	188	555
3.6. I enjoyed working in a group using Facebook	27	37	111	182	227	557
3.7. The group motivated me to do my share of the work for the Facebook component	28	39	114	184	219	556
3.8. The groupwork relating to Facebook helped me to understand the course material better	29	50	137	201	167	555
3.9. I learned to co-operate with other people using Facebook	28	43	103	194	216	556
3.11. It was fun working in a group using Facebook	18	36	106	200	224	566
3.12. In the group I got the benefit of everyone's ideas when using Facebook	19	43	112	222	188	565
3.13. When I had problems I got help from group members via Facebook	20	129	158	159	118	564
3.14. The work got done faster and more work was done using Facebook	21	63	143	184	173	563
3.15. The Facebook group work gave me an opportunity to talk and discuss the course material	22	79	151	179	153	562
3.16. The Facebook group work made the course material more interesting	21	42	122	186	213	563

Figure 19: Heat-map of Student responses to Facebook & Group work questions (Iteration 2)

As can be seen in Figure 19 above, the vast majority of students felt that for each question, with the exception of question 3.13, Facebook successfully supported the group task at hand.
When looking at Figure 19 above, it is clear that the students' perceptions of the ability of Facebook to support collaborative learning are overwhelmingly positive as evidenced by the majority of responses being '1.Always/Definitely' and '2.Frequently/Nearly always' . As mentioned, the only exception to this is question 3.13, where the most common student response was '2.Frequently/Nearly always' and '3.Occassionally/Seldom' which indicates that the students more often than not got help from their group members outside of Facebook.

Additional graphical representations (graphs and heat-maps) of the data analysis for Facebook and Group work for iteration 2 are contained in Appendix E.

5.5.2.2 Google Sites

In Table 31 below, the most frequent response to each question pertaining to the use of Google Sites for the collaborative learning component of the group work is detailed.

Question	Google Sites	Most Frequent Response	Count (%)
10.9	Do you think that learning to use Google sites as part of the INF 112 course was successful	Yes	506 (92.34%)
10.14	I have learnt more in the group when using Google Sites than on my own	Always/Definitely	186 (33.88 %)
10.15	I enjoyed working in a group using Google sites	Always/Definitely	200 (36.50%)
10.16	The group motivated me to do my share of the work for the Google sites component	Always/Definitely	197 (36.15%)
10.17	The group work relating to Google sites helped me to understand the course material better	Frequently/Nearly Always	194 (35.53%)
10.18	I learned to co-operate with other people using Google sites	Always/Definitely	196 (35.96%)
10.19	The Google sites group work caused me to be dependable and do my assignment	Always/Definitely	221 (40.48%)
10.20	It was fun working in a group using Google sites	Always/Definitely	233 (42.83%)
10.21	In the group I got the benefit of everyone's ideas when Google sites	Always/Definitely	196 (35.90%)
10.22	The work got done faster and more work was done using Google sites	Frequently/Nearly Always	204 (37.43%)
10.23	The Google sites work gave me an opportunity to talk and discuss material	Frequently/Nearly Always	192 (34.97%)
10.24	Using Google sites made the course material more interesting	Always/Definitely	217 (39.74%)

10.25	I feel that using Google sites adds value to my understanding of the course	Always/Definitely	203 (37.04%)
10.26	I experienced group learning using Google sites as successful	Always/Definitely	223 (40.69%)

Table 31: Google Sites and Group work (Iteration 2)

In Table 31 above, there are a number of noteworthy observations that can be made concerning how the student respondents experienced the use of Google Sites (social software tool) for group work (group task) on the INF112 course for iteration 2 of this PAR project. For questions 10.14 – 10.16, 10.18 – 10.21 and 10.24 – 10.26 the most frequent response was 'Always / Definitely' (1 on the Likert scale that was used). For questions 10.17, 10.22 and 10.23 the most frequent response was 'Frequently / Nearly always' (2 on the Likert scale that was used). This indicates that overall, students felt that using Google Sites to support the group work component of the course was beneficial. For Google Sites, the attitude of the students was positive, with the majority of them claiming to have enjoyed using it, possibly because they were using it mostly for socialisation (Roodt et al., 2012). This correlates with the social feature of social software for the Net Generation as mentioned by Oblinger and Oblinger (2005). Overall it appears that the students generally felt that the use of this tool had a positive effect on their learning process and experience (Roodt et al., 2009). They also generally felt that the use of this tool helped encourage group work and assisted them in their self-development. Working in teams is once again a critical feature as discussed by (Oblinger & Oblinger, 2005:16). In terms of how they experienced the course making use of Google Sites, the majority of them felt that the use of these tools in the course was highly successful (92.34%).

Figure 20 below (in the form of a heat-map) shows what all of the student responses (in percentages) were to 13 questions (out of the 14 questions in total) pertaining to the use of Google Sites for group work.

Google Sites	Missing	4. Never	3. Seldom	2. Nearly always	1. Always / Definitely	Total
10.14. I have learnt more in the group when using Google Sites than on my own	35	63	119	181	186	549
10.15. I enjoyed working in a group using Google sites	36	47	119	182	200	548
10.16. The group motivated me to do my share of the work for the Google sites component	39	41	118	189	197	545
10.17. The groupwork relating to Google sites helped me to understand the course material better	38	43	117	194	192	546
10.18. I learned to co-operate with other people using Google sites	39	43	115	191	196	545
10.19. The Google sites group work caused me to be dependable and do my assignment	38	37	105	183	221	546
10.20. It was fun working in a group using Google sites	40	36	106	169	233	544
10.21. In the group I got the benefit of everyone's ideas when Google sites	38	44	116	190	196	546
10.22. The work got done faster and more work was done using Google sites	39	39	122	204	180	545
10.23. The Google sites work gave me an opportunity to talk and discuss material	35	51	133	192	173	549
10.24. Using Google sites made the course material more interesting	38	30	103	196	217	546
10.25. I feel that using Google sites adds value to my understanding of the course	36	32	113	200	203	548
10.26. I experienced group learning using Google sites as successful	36	35	107	183	223	548

Figure 20: Heat-map of Student responses to Google Sites and Group work questions (Iteration 2)

As can be seen in Figure 20 above, the vast majority of students felt that for each question, Google Sites successfully supported the group task at hand. When looking at Figure 20 above, it is clear that the students' perceptions of the ability of Google Sites to support collaborative learning are overwhelmingly positive as evidenced by the majority of responses being '1.Always/Definitely' and '2.Frequently/Nearly always' .

Additional graphical representations (graphs and heat-maps) of the data analysis for Google Sites and Group work for iteration 2 are contained in Appendix E.

5.5.2.3 Google Groups

In Table 32 below, the most frequent response to each question pertaining to the use of Google Groups for the collaborative learning component of the group work is detailed.

Question	Google Groups	Most Frequent Response	Count (%)
11.3	Do you think that learning to use Google groups as part of the INF 112 course was successful	Yes	463 (83.88%)
11.8	I have learnt more in the group when using Google groups than on my own	Frequently/Nearly Always	184 (33.45%)
11.9	I enjoyed working in a group using Google groups	Frequently/Nearly Always	202 (36.66%)
11.10	The group motivated me to do my share of the work for the Google groups component	Frequently/Nearly Always	194 (35.34%)
11.11	The group work relating to Google groups helped me to understand the course material better	Frequently/Nearly Always	188 (34.31%)
11.12	I learned to co-operate with other people using Google groups	Frequently/Nearly Always	202 (36.79%)
11.13	The Google groups group work caused me to be dependable and do my assignment	Frequently/Nearly Always	198 (36.07%)
11.14	It was fun working in a group using Google groups	Always/Definitely	185 (34.01%)
11.15	In the group I got the benefit of everyone's ideas when using Google groups	Frequently/Nearly Always	190 (34.86%)
11.16	The work got done faster and more work was done using Google groups	Frequently/Nearly Always	195 (35.65%)
11.17	The Google groups group work gave me an opportunity to talk and discuss material	Frequently/Nearly Always	199 (36.38%)
11.18	The Google groups group work made the course material more interesting	Always/Definitely	186 (33.88%)
11.20	I experienced group learning using Google groups as successful	Always/Definitely	200 (36.83%)

Table 32: Google Groups and Group work (Iteration 2)

In Table 32 above, there are a number of noteworthy observations that can be made concerning how the student respondents experienced the use of Google Groups (social software tool) for group work (group task) on the INF112 course for iteration 2 of this PAR project. For questions 11.8 – 11.13 and 11.15 – 11.17 the most frequent response was 'Frequently/Nearly Always' (2 on the Likert scale that was used). For questions 11.14, 11.18 and 11.20 the most frequent response was 'Always/Definitely' (1 on the Likert scale that was used). This indicates that overall, students felt that using Google Groups to support the group work component of the course was beneficial. For Google Groups, the attitude of the students was positive, with the majority of them claiming to have enjoyed using it. This correlates with the social feature of social software for the Net Generation as mentioned by Oblinger and Oblinger (2005). Overall it appears that the students generally felt that the use of this tool had a positive effect on their learning process and experience (Roodt et al., 2009). They also generally felt that the use of this tool helped encourage group work and assisted them in their self-development. Working in teams is once again a critical feature as discussed by (Oblinger & Oblinger, 2005, p. 16). In terms of how they experienced the course making use of Google Groups, the majority of them felt that the use of these tools in the course was highly successful (83.88%).

Figure 21 below (in the form of a heat-map) shows what all of the student responses (in percentages) were to questions pertaining to the use of Google Groups for group work.

Google Groups	Missing	4. Never	3. Seldom	2. Nearly always	1. Always / Definitely	Total
11.8. I have learnt more in the group when using Google groups than on my own	33	52	126	202	171	551
11.9. I enjoyed working in a group using Google groups	34	61	141	184	164	550
11.10. The group motivated me to do my share of the work for the Google groups component	35	49	122	194	184	549
11.11. The groupwork relating to Google groups helped me to understand the course material better	36	60	133	188	167	548
11.12. I learned to co-operate with other people using Google groups	35	54	121	202	172	549
11.13. The Google groups group work caused me to be dependable and do my assignment	35	45	129	198	177	549
11.14. It was fun working in a group using Google groups	40	50	125	184	185	544
11.15. In the group I got the benefit of everyone's ideas when using Google groups	39	57	117	190	181	545
11.16. The work got done faster and more work was done using Google groups	37	57	130	195	165	547
11.17. The Google groups group work gave me an opportunity to talk and discuss material	37	57	136	199	155	547
11.18. The Google groups group work made the course material more interesting	35	49	131	183	186	549
11.20. I experienced group learning using Google groups as successful	41	43	115	185	200	543

Figure 21: Heat-map of Student responses to Google Groups and Group work questions (Iteration 2)

As can be seen in Figure 21 above, the vast majority of students felt that for each question, Google Groups successfully supported the group task at hand. When looking at the heat-map in Figure 21 above, it is clear that the students' perceptions of the ability of Google Groups to support collaborative learning are overwhelmingly positive as evidenced by the majority of responses being '1.Always/Definitely' and '2.Frequently/Nearly always' .

Additional graphical representations (graphs and heat-maps) of the data analysis for Google Groups and Group work for iteration 2 are contained in Appendix E.

5.5.2.4 Comparative Analysis – Facebook vs Google Sites vs Google Groups

Question	Facebook			Google Sites			Google Groups			Lowest Mean Value	
	N	Mean	Std Dev.	N	Mean	Std Dev.	N	Mean	Std Dev.	Value	Web 2.0 Technology
Q1. I have learnt more in the group when using the Web 2.0 technology than on my own,	555	2.27	1.17	549	2.21	1.13	550	2.33	1.15	2.21	**Google Sites**
Q2. I enjoyed working in a group using the Web 2.0 technology,	557	2.06	1.13	548	2.16	1.14	551	2.24	1.12	2.06	**Facebook**
Q3. The group motivated me to do my share of the work for the Web 2.0 technology component,	556	2.09	1.13	545	2.15	1.13	549	2.20	1.13	2.09	**Facebook**
Q4. The group work relating to the Web 2.0 technology helped me to understand the course material better,	555	2.28	1.14	546	2.16	1.13	548	2.29	1.14	2.16	**Google Sites**
Q5. I learned to co-operate with other people using the Web 2.0 technology,	556	2.06	1.10	545	2.14	1.12	549	2.23	1.12	2.06	**Facebook**
Q6. The Web 2.0 technology group work caused me to be dependable and do my assignment	566	1.87	0.83	546	2.05	1.11	549	2.23	1.14	1.87	**Facebook**
Q7. It was fun working in a group using the Web 2.0 technology,	566	2.04	1.10	544	2.03	1.13	544	2.21	1.14	2.03	**Google Sites**
Q8. In the group I got the benefit of everyone's ideas when using the Web 2.0 technology,	565	2.14	1.09	546	2.15	1.13	545	2.20	1.12	2.14	**Facebook**
Q9. The work got done faster and more work was done using the Web 2.0 technology,	563	2.31	1.16	545	2.19	1.12	547	2.28	1.13	2.19	**Google Sites**
Q10. The Web 2.0 technology group work gave me an opportunity to talk and discuss the course material,	562	2.41	1.15	549	2.26	1.14	547	2.32	1.13	2.26	**Google Sites**
Q11. The Web 2.0 technology group work made the course material more interesting	563	2.13	1.14	546	2.03	1.10	549	2.23	1.15	2.03	**Google Sites**
Q12. I experienced group learning using the Web 2.0 technology as successful	560	1.97	0.92	548	2.05	1.12	543	2.13	1.13	1.97	**Facebook**

Table 33: Comparative Analysis: Facebook vs Google Sites vs Google Groups (Iteration 2)

From Table 33 shown above, a couple of noteworthy observations can be made concerning how the student respondents experienced the use of Facebook, Google Sites and Google Groups (social software tools) comparatively for group work (collaborative learning) on the INF112 course for iteration 2. When looking at the column labelled 'Lowest mean value' (and in this study, the lower the mean the better the tool is at supporting the question), it is evident that students perceptions were that Facebook and Google Sites were better social software tools than Google Groups at supporting collaborative learning (group work) activities for the Net Generation (these students are categorised as the Net Generation).

For both Facebook and Google Sites, the attitude of the students was positive, with the majority of them claiming to have enjoyed using it. For the section concerning group work, the students generally felt that the use of these tools had a positive effect on their learning process and experience. They also generally felt that the use of these tools helped encourage group work and assisted them in their self-development. Another interesting point to note is that even though the students enjoyed using these tools and felt that they could assist in terms of group work, when the students needed assistance from each other they generally preferred not to use the tools provided, and most likely reverted to face-to-face discussions. Overall, students perceptions were that all three tools were successful at supporting collaborative learning for the Net Generation in Higher education.

In terms of how they experienced the course, the majority of the students felt that the use of these tools in the course was highly successful. Figure 22 below is a heat-map depicting all of the responses (not just the most frequent ones) to Facebook, Google Sites and Google Groups comparatively.

Comparison Across Tools: 2010				
Q1. I have learnt more in the group when using the Web 2.0 technology than on my own				
Facebook	13%	24%	29%	34%
Google Groups	9%	23%	37%	31%
Google Sites	11%	22%	33%	34%
Q2. I enjoyed working in a group using the Web 2.0 technology				
Facebook	7%	20%	33%	41%
Google Groups	11%	26%	33%	30%
Google Sites	9%	22%	33%	36%
Q3. The group motivated me to do my share of the work for the Web 2.0 technology component				
Facebook	7%	21%	33%	39%
Google Groups	9%	22%	35%	34%
Google Sites	8%	22%	35%	36%
Q4. The groupwork relating to the Web 2.0 technology helped me to understand the course material better				
Facebook	9%	25%	36%	30%
Google Groups	11%	24%	34%	30%
Google Sites	8%	21%	36%	35%
Q5. I learned to co-operate with other people using the Web 2.0 technology				
Facebook	8%	19%	35%	39%
Google Groups	10%	22%	37%	31%
Google Sites	8%	21%	35%	36%
Q6. The Web 2.0 technology group work caused me to be dependable				
Facebook	4%	17%	39%	37%
Google Groups	8%	23%	36%	32%
Google Sites	7%	19%	34%	40%
Q7. It was fun working in a group using the Web 2.0 technology				
Facebook	6%	19%	35%	40%
Google Groups	9%	23%	34%	34%
Google Sites	7%	19%	31%	43%
Q8. In the group I got the benefit of everyone's ideas when using the Web 2.0 technology				
Facebook	8%	20%	39%	33%
Google Groups	10%	21%	35%	33%
Google Sites	8%	21%	35%	36%
Q9. The work got done faster and more work was done using the Web 2.0 technology				
Facebook	11%	25%	33%	31%
Google Groups	10%	24%	36%	30%
Google Sites	7%	22%	37%	33%
Q10. The Web 2.0 technology group work gave me an opportunity to talk and discuss the course material				
Facebook	14%	27%	32%	27%
Google Groups	10%	25%	36%	28%
Google Sites	9%	24%	35%	32%
Q11. The Web 2.0 technology group work made the course material more interesting				
Facebook	7%	22%	33%	38%
Google Groups	9%	24%	33%	34%
Google Sites	5%	19%	36%	40%
Q.12 I experienced group learning using the Web 2.0 technology as successful				
Facebook	6%	20%	34%	36%
Google Groups	8%	21%	34%	37%
Google Sites	6%	20%	33%	41%
	Never	Occasionally / Seldom	Frequently / Nearly always	Always / Definitely

Figure 22: Heat-map of Student responses to Facebook, Google Sites and Google Groups & Group work questions (Iteration 2)

Additional graphical representations (graphs and heat-maps) of the data analysis for the comparative analysis between Facebook, Google Sites and Google Groups for group work for iteration 2 are contained in Appendix E.

5.5.3 Open-ended questions

For the open-ended part of the questionnaire, students were asked for Facebook, Google Sites and Google Groups whether they had any additional comments. As mentioned in Chapter 2, Research Methodology, coding (see Method for Analysis in Chapter 2) was done on the data that was gathered and the results can be seen (*'Any other comments about Facebook/Google Sites/Google Groups?'*) for iteration 2 below.

5.5.3.1 Facebook

Table 34 below shows the results of the coding that was done on the data collected for the question (*'Any other comments about Facebook?'*) for Facebook for iteration 2.

Facebook 2010		
Categories (not mutually exclusive)	**Freq.**	**Percent**
No comment	319	54.62%
Enjoyable	73	12.50%
Social	55	9.42%
Fun	50	8.56%
Useful	28	4.79%
Good	24	4.11%
Easy to use	17	2.91%
Interesting/Made course content more interesting	16	2.74%
Waste of time/not relevant/boring/didn't like	15	2.57%
Improves communication	10	1.71%
Other	8	1.37%
Time consuming	7	1.20%
Exciting approach to group work	6	1.03%
Innovative	5	0.86%
Difficult	5	0.86%
Recommend	5	0.86%
Relevant to course	4	0.68%
Privacy concerns	3	0.51%
Get work done faster	2	0.34%
Entertaining	1	0.17%
Better understanding of coursework	1	0.17%
Creativity	0	0.00%

Table 34: Facebook Open-ended Responses (Iteration 2)

There are some interesting observations that can be made regarding students' feedback in terms of their experience of using Facebook for the collaborative learning component of the INF112 course for iteration 2. It must be noted though that 54.62% of the students had no comments for this open-ended question. Certain students experienced using Facebook for the collaborative learning component of the course as *'Enjoyable'* (12.50%), *'Fun'* (8.56%) ,*'Social'* (9.42%) and *'Useful'* (4.79%). This is in keeping with research conducted by Prensky (2001), Oblinger and Oblinger (2005), Gruber (2008) and McLoughlin and Lee (2010) which posit that social software is well suited to collaborative learning activities for the Net Generation in higher education due to their characteristics being similar to the learning preferences of this generation, for example being based on the principle of social interaction. As discussed during the literature review, Chapter 3 of this thesis, social software provides learners with opportunities for (Chen et al., 2001) (Bryant, 2006) (Krebs et al., 2009):

- Learner participation;
- Social relevance;
- Knowledge sharing;
- Networking and collaboration.

When looking at Table 34 above, it appears that Facebook did realise all of the opportunities for these INF112 students for iteration 2. An interesting category is *'Interesting/Made course content more interesting'* (2.74%), where certain students felt that using Facebook made the course work more interesting – this may be due to the fact that can be used as a learning tool for IS education (Cloete et al., 2009). Another interesting category is *'Waste of time/not relevant/boring/didn't like'* (2.57%), where certain students felt that they did not enjoy using Facebook for the course and that it was a waste of time – this could be attributed to the fact that the Net Generation should not be considered a homogenous group (section 3.3.6).

5.5.3.2 Google Sites

Table 35 below shows the results of the coding that was done on the data collected for the question (*'Any other comments about Google Sites?'*) for Google Sites for iteration 2.

Google Sites 2010		
Categories (not mutually exclusive)	Freq.	Percent
No comment	284	71.00%
Useful	27	6.75%
Enjoyable	20	5.00%
Fun	20	5.00%

Easy to use	14	3.50%
Interesting/Made course content more interesting	11	2.75%
Good	9	2.25%
Difficult	6	1.50%
Waste of time/not relevant/boring/didn't like	5	1.25%
Time consuming	4	1.00%
Improves communication	2	0.50%
Exciting approach to group work	2	0.50%
Creativity	2	0.50%
Social	1	0.25%
Other	1	0.25%
Didn't understand	1	0.25%
Innovative	1	0.25%
Not relevant to course	1	0.25%
Get work done faster	0	0.00%
Entertaining	0	0.00%

Table 35: Google Sites Open-ended Responses (Iteration 2)

There are some interesting observations that can be made regarding students' feedback in terms of their experience of using Google Sites for the collaborative learning component of the INF112 course for iteration 2. It must be noted though that 71.00% of the students had no comments for this open-ended question. As can be seen from Table 36 above, certain students experienced using Google Sites for the collaborative learning component of the course as *'Useful'* (6.75%), *'Enjoyable'* (5.00%) and *'Fun'* (5.00%). This is in keeping with research conducted by Prensky (2001), Oblinger and Oblinger (2005), Gruber (2008) and McLoughlin and Lee (2010) which posit that social software is well suited to collaborative learning activities for the Net Generation in higher education due to their characteristics being similar to the learning preferences of this generation. As discussed during the literature review, Chapter 3 of this thesis, social software provides learners with opportunities for (Chen et al., 2001) (Bryant, 2006) (Krebs et al., 2009):

- Learner participation;
- Social relevance;
- Knowledge sharing;
- Networking and collaboration.

When looking at Table 35 above, it appears that Google Sites did realise all of the opportunities, some to a more limited degree than others, for these INF112 students for iteration 2. An interesting category is *'Interesting/Made course content more interesting'* (2.75%), where certain students felt

that using Google Sites made the course work more interesting. Another interesting category is *'Waste of time/not relevant/boring/didn't like'* (1.25%), where certain students felt that they did not enjoy using Google Sites for the course and that it was a waste of time – this could be attributed to the fact that the Net Generation should not be considered a homogenous group (section 3.3.6).

5.5.3.3 Google Groups

Table 36 below shows the results of the coding that was done on the data collected for the question (*'Any other comments about Google Groups?'*) for Google Groups for iteration 2.

Google Groups 2010		
Categories (not mutually exclusive)	**Freq.**	**Percent**
No comment	420	71.92%
Useful	29	4.97%
Enjoyable	27	4.62%
Fun	23	3.94%
Improves communication	22	3.77%
Waste of time/not relevant/boring/didn't like	16	2.74%
Easy to use	14	2.40%
Good	12	2.05%
Difficult	11	1.88%
Interesting/Made course content more interesting	9	1.54%
Social	9	1.54%
Get work done faster	5	0.86%
Exciting approach to group work	5	0.86%
Other	4	0.68%
Didn't understand	2	0.34%
Entertaining	1	0.17%
Innovative	1	0.17%
Not relevant to course	1	0.17%
Time consuming	1	0.17%
Creativity	0	0.00%

Table 36: Google Groups Open-ended Responses (Iteration 2)

There are some interesting observations that can be made regarding students' feedback in terms of their experience of using Google Groups for the collaborative learning component of the INF112 course for iteration 2. It must be noted though that 71.92% of the students had no comments for this open-ended question – this can be attributed to the fact that completion of the questionnaire was not incentivised in the form of bonus marks. Certain students experienced using Google Groups for the collaborative learning component of the course as *'Useful'* (4.97%), *'Enjoyable'* (4.62%), *'Fun'*

(3.94%) and *'Social'* (1.16%). This is in keeping with research conducted by Prensky (2001), Oblinger and Oblinger (2005), Gruber (2008) and McLoughlin and Lee (2010) which posit that social software is well suited to collaborative learning activities for the Net Generation in higher education due to their characteristics being similar to the learning preferences of this generation, for example being based on the principle of social interaction. As discussed during the literature review, Chapter 3 of this thesis, social software provides learners with opportunities for (Chen et al., 2001) (Bryant, 2006) (Krebs et al., 2009):

- Learner participation;
- Social relevance;
- Knowledge sharing;
- Networking and collaboration.

When looking at Table 36 above, an interesting category is *'Improves communication'* (3.77%) where it can be seen that certain students felt that using Google Groups for collaborative learning improved communication. An interesting category is '*Difficult*' (1.88%), where certain students felt that using Google Groups was difficult – this may be due to the fact that they are unfamiliar with Google Groups. Another interesting category is *'Waste of time/not relevant/boring/didn't like'* (2.74%), where certain students felt that they did not enjoy using Google Groups for the course and that it was a waste of time – this could be attributed to the fact that the Net Generation should not be considered a homogenous group (section 3.3.6).

5.6 PHASE 4: Reflect

5.6.1 Reflection Activities

The fourth phase of my participatory action research project's iteration 2 (cycle 2) is **reflecting**. As discussed above, the purpose of this phase is to reflect based on the findings of the previous step. For this research project, the steps of my PAR project for the reflection phase of iteration 2 were as follows in Table 37 below:

PHASE	PROPOSED STEPS	ACTUAL STEPS TAKEN
Reflect	Challenges encountered	The firewall at the university's computer labs blocked access to certain content on the social software tools websites Assessment criteria challenges – see Table 25 in section 5.4

		Privacy concerns (cultural influences – see Table 8 in section 5.4)
	Points to learn from	The Net Generation categorisation is not homogenous as pointed out in section 3.3.6 Certain students are not familiar with the Google Apps suite
	Celebrate and affirm positives	Students enjoyed it, fun – use open ended feedback
	Share findings and reflections	Change tool the social software tool that the students enjoyed the least – Google Groups to something else Published conference papers and journal article Shared findings with faculty and Education Innovation via presentations

Table 37: The Actual Reflection Phase of my PAR Iteration 2

The reflection phase of my PAR Iteration 2 produced a number of key outcomes but the main focus for my thesis is on the output from the data analysis in phase 3. That output relates specifically to the students perception of the use of Facebook, Google Sites and Google Groups as social software tools to support collaborative learning for the Net Generation in higher education.

When looking at the comparative analysis between Facebook, Google Sites and Google Groups, as well as the results of the coding of the open-ended questions, the findings are that Facebook and Google Sites appear to be better at supporting CSCL for these students. As such, I, as the participant researcher, have chosen to replace Google Groups with another social software tool(s) for iteration 3.

5.6.2 Amendments to Theoretical Framework for CSCL from Iteration 2

The findings from the data analysis of iteration 2 which is detailed during this chapter has highlighted certain items that can be amended / changes that can be made to the theoretical framework for CSCL as proposed by De Villiers (1995) as discussed in section 3.6 in Chapter 3. These changes include additions to the ***Input*** component of the framework.

These additions are listed below in the component that they correspond to:

Input

- Structural features of CSCL:

- Assessment criteria, specifically the fact that the teacher(s) / lecturer(s) needs to ensure that the criteria are robust enough to cater for exceptions (a similar point was identified in iteration 1);
- Institutional internet usage policies, specifically the blocking of content by the firewall (a similar point was identified in iteration 1);

- Internal system of group:
  - Cultural influences, specifically regarding privacy/confidentiality of the content of the learning output artefacts.

These amendments will be discussed in detail in Chapter 8.

5.7 CONCLUSION

This chapter detailed all of the activities that took place as part of iteration 2 of this PAR project. It was divided into four sections, with each section dealing with a specific phase of the PAR.
Overall the students responses were overwhelming positive towards using Facebook, Google Sites and Google Groups, especially in the context of collaborative learning activities, which implies that not only do they enjoy using it they also find it easy to use even within the context of learning new and challenging material. From the results of the data analysis, it is evident that Google Groups is less suited than Facebook and Google Sites to support CSCL for the Net Generation in higher education. These findings show that using tools that the Net Generation are familiar with allows the students to gain easier access to the actual process of learning, without needing a substantial investment of time into learning how to use a learning tool they are unfamiliar with.

These findings indicate that group work can be significantly enhanced through the use of social software tools, in particular Facebook and Google Sites and to a lesser degree Google Groups. Facebook is designed to allow group work and collaboration in an open and distributed manner, and are thus ideal for supporting group work activities (Mazer et al., 2007). Furthermore Social Networks provide an interface with which increasingly more students are familiar, especially in terms of students being classified as part of the Net Generation, and thus reduce the initial learning curve they might have within the subject (Boyd & Ellison, 2008) (Kay, 2007) . It is also interesting to note that for many students the enjoyment gained from using tools such as Facebook and Google Sites, enhances their entire learning experience. Overall, the findings from this chapter are used to refine the additions/amendments to the proposed CSCL framework which is discussed in Chapter 8.

The next chapter details the activities of iteration 3 of my PAR and follows a similar structure to this chapter.

CHAPTER 6

PARTICIPATORY ACTION RESEARCH ITERATION 3

CHAPTER 6: PARTICIPATORY ACTION RESEARCH – ITERATION 3

6.1 INTRODUCTION

This chapter details the steps of the third iteration of my participatory action research (PAR) project. It describes each phase of iteration 3 in detail, based upon the PAR model depicted in Figure 9 in Chapter 2. I will be following the PAR phases and steps as proposed by Baskerville and Wood-Harper (1996) which I discussed in Chapter 1 under the Theoretical Underpinnings section.

6.2 CONTEXT AND PURPOSE

6.2.1 Context

This iteration of my PAR project occurred during the 1st semester of 2011 on the INF112 course at the University of Pretoria. The contexts for this iteration were the university, the course and the students. The participants in this iteration were the students and the participant researcher being me.

The target population for Iteration 3 of the PAR project is 1387 students registered for the INF112 course at the University of Pretoria in the Faculty of Economic and Management Sciences.

6.2.2 Purpose of Participatory Action Research Iteration 3

The purpose of my PAR iteration 3 is to define the nature of the social software course intervention for INF112, as well as selecting specific social software tools for that intervention and conducting the intervention.

Iteration 3 also involves the gathering and analysis of data pertaining to the social software intervention (iteration 3) on the INF112 course. The findings of this data analysis, along with the analysis from iteration 1 and 2, will be used to inform the finalisation of a theoretical framework for CSCL.

6.3 PHASE 1: Plan

The first phase of my participatory action research project's iteration 3 is **planning**. As discussed above, the purpose of this phase is to determine (plan) what action I will take in phase 2 (action).

For this research project, the steps of my PAR project for the planning phase of iteration 3 were as follows in Table 38 below:

PHASE	PROPOSED STEPS	ACTUAL STEPS TAKEN
Plan	Develop a detailed plan of action	Review data analysis from iteration 2 Decide if (and how) to amend group assignment Identify the possible social software tools that will be used as part of the intervention, as well as the tools that carry over from iteration 2 Determine how and when the data will be gathered
	Decide on the time frame	The 1st semester of 2011 during which the INF112 course runs
	Select the resources you will need	The actual social software tools that will be used are Facebook, Google Sites and YouTube
	Devise strategies to carry out your plan	Action plan of course intervention

Table 38: The Actual Planning Phase of my PAR project Iteration 3

Upon reviewing the data analysis from iteration 2, feedback received from students is that they preferred using Facebook and Google Sites more than Google Groups for their group work. Based on this feedback, I as the researcher, decided to implement selected social software tools, including the replacement of Google Groups, for the collaborative learning component of the course in the form of group work for iteration 3.

In terms of my research topic at hand, I had to select which social software tools I was going to replace for iteration 3 for the collaborative learning component of the INF112 course. For this iteration of the PAR project, Facebook©, Google Sites and YouTube were selected as the social software tools that the students used for the group work component. Google Groups has been replaced with YouTube based on the data analysis from iteration 2 as Google Groups was the least supportive, compared to Facebook and Google Sites, of group work for that iteration. I nominated to use these educational tools, Facebook, Google Sites and YouTube because of their mainstream adoption both within the public and educational sectors (Roodt et al., 2009). It is argued that the

students' learning processes are inhibited if different learning styles are not considered when the learning environments, that will be used to educate students, are chosen (Huang & Behara, 2007).

The table below shows the social software tools that I nominated to use for iteration 3, based on the characteristics and learning preferences of the Net Generation:

Social computing concept	Technology chosen
Social Networking	Facebook
On-line Collaboration	Google Sites
Media Sharing (also includes social networking component)	YouTube

Table 39: Social Software Tools selected for Iteration 3

Students were given a group assignment (group work / collaborative learning) which was multi-faceted and included the following tasks:

1. Creating a closed group on Facebook which all of their team members needed to join (and needed to invite the INF112 group assignment tutor as a member so that the tutor could access these pages in order to mark the assignments);
2. Create a website for a business idea of their choosing using one of the free templates on Google Sites. This also involved posting their group website address (URL) from Google Sites onto their Facebook group page;
3. Create a video using YouTube where the groups tells the audience about their business;
4. Embedding their YouTube video onto their group website on Google Sites.

Certain factors needed to be taken into account when assigning this sort of project to students, for example some students may not have access to computer resources off campus while others may not have any experience in using technology and may perhaps find it difficult to work with the applications. Another interesting consideration that arose is religious beliefs that arose from the findings of the iterations 1 and 2 data analysis. The students were assessed on the following criteria: completeness, creativity, functional, relevance and originality.

A decision was made to gather the data via an on-line questionnaire which was available on the Learning Management System (LMS) so that it was easy for students to access as well as being visible to them. The questionnaire was made available once lectures for the course concluded, including the conclusion of all of their assignments.

6.4 PHASE 2: Act

The second phase of my participatory action research project's iteration 3 is **action**. As discussed above, the purpose of this phase is to take the action that was devised in phase 1, planning.
For this research project, the steps of my PAR project for the action phase of iteration 3 were as follows in Table 40 below:

PHASE	PROPOSED STEPS	ACTUAL STEPS TAKEN
Act	Implement your plan	INF112 course commence in January of 2011 Students were provided with course study guide and informed of both individual and group assignments
	Note any deviations from your plan (with reasons)	Because of religious reasons certain students were limited by what could be shown of them visually on a video Students complained about the cost of data required to embed the video from YouTube onto the website (Google Sites) – they asked whether they could rather just place a link to the video on YouTube. The size of the video recordings was large and could not be uploaded easily on-campus – it also influenced students' internet usage

Table 40: The Actual Action Phase of my PAR project Iteration 3

During this phase, the course commenced and students were familiarised with the course outline and expectations in terms of assignments. The students were informed of the assignments via the course LMS, the study guide and lectures dedicated to explaining the individual and group assignments.

Three unexpected events occurred during this phase. Firstly, certain students were limited by what visuals they could record for the video of themselves due to religious reasons. As such they asked

whether they could be excluded from the actual video. The second unexpected event related to the high cost of embedding the YouTube video on the student groups' websites – the students were given permission to only include a link to the YouTube video on their websites. Lastly, the size of the YouTube videos was large as the recordings were 2 minutes in length on average and this caused network difficulties when the students tried to upload it to YouTube and/or their websites on-campus.

6.5 PHASE 3: Observe / Collect

The third phase of my participatory action research project's iteration 3 is **observing/collecting**. As discussed above, the purpose of this phase is to observe/collect data (plan) based on the action(s) I took in the previous step.

For this research project, the steps of my PAR project for the observe/collect phase of iteration 3 were as follows in Table 41 below:

PHASE	PROPOSED STEPS	ACTUAL STEPS TAKEN
Observe/Collect	Using different data gathering techniques (eg: journals, student feedback, videos, questionnaires, peer observation)	On-line questionnaires
	Collect and analyse the data	On-line questionnaire conducted

Table 41: The Actual Observe/Collect Phase of my PAR project Iteration 3

During this step, I gathered data by means of an on-line questionnaire that students from the INF112 course completed. For this iteration, they were not incentivised to complete the on-line questionnaire. Upon completion of the group assignment, the students were asked to complete the on-line questionnaire which assessed the effectiveness of the teaching and learning approach with regards to the use of Facebook, Google Sites and YouTube (social software) for collaborative learning for the Net Generation in higher education. The analysis of the data was also conducted by me using data reduction techniques and coding for the open-ended questions. The result of the data analysis is discussed below.

The target population for Iteration 2 of the Participatory Action Research project is 1387 students registered for the INF112 course at the University of Pretoria in the Faculty of Economic and

Management Sciences. Of these 1387 students, 179 responded to the questionnaire, which equals a response rate of 12.8%. The relatively low response rate could be attributed to the fact that students were not incentivised to complete the on-line questionnaire in the form of bonus marks. The full questionnaire can be found in Appendix F.

6.5.1 Demographics

The gender distribution of the 179 respondents can be seen in Table 42 below:

Q1.1 Gender of Student (Multiple Choice)	Freq.	Percent	Cum.
Female	102	57.54	57.54
Male	77	42.46	100
Total	179	100	

Table 42: Gender distribution for Iteration 3 respondents

The age of the respondents is shown in Table 43 below:

Variable	N	Minimum	Maximum	Median	Mean	Std Dev.
Age	179	17	27	19	19.35	1.47

Table 43: Age Statistics for Iteration 3 Respondents

As can be seen from the table above, the average age of the respondents (students) is ~ 19, with the minimum age being 17 and the maximum age being 27. This means that most of the students can be classified as being part of the Net Generation as they were born in/after 1982 (2011 – 19 = 1992) as defined by Oblinger and Oblinger (2005). The age distribution of these respondents (students) can be depicted graphically as in Figure 23 below:

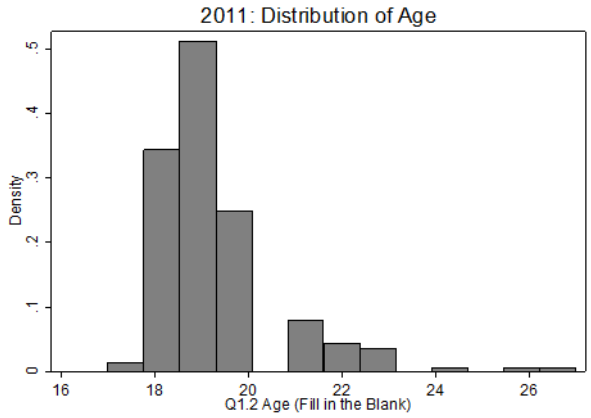

Figure 23: Age Distribution for Iteration 3 Respondents

The race of the 179 respondents can be seen in Table 44 below:

Q1.4 Race (Multiple Choice)	Freq.	Percent
Black	85	48.57
Caucasian	56	32
Other	25	14.29
Indian	7	4
Asian	2	1.14
Total	175	100

Table 44: Race for Iteration 3 Respondents

As can be seen from Table 44 above, the most represented race is Black (48.57%), followed by Caucasian (32%), Other (14.29%), Indian (4%) and Asian (1.14%). The reason for the Other category being relatively high at 14.29% could be that certain respondents have sensitivities regarding race categorisation and that the list was not comprehensive enough to depict the race they identify most with. Four students chose to not answer this question. It is interesting to note that the student demographic profiles are similar for iteration 1 – 3.

6.5.2 Closed-ended questions

For the closed-ended part of the questionnaire pertaining to the use of Facebook, Google Sites and YouTube for collaborative learning, there were 14 questions that respondents were asked to answer for each tool. These questions were exactly the same for each tool so that a comparative analysis could be done. A Likert scale was used, with the answer options being:

1. Always / Definitely;
2. Frequently / Nearly always;
3. Occasionally / Seldom;
4. Never.

6.5.2.1 Facebook

In Table 45 below, the most frequent response to each question pertaining to the use of Facebook for the collaborative learning component of the group work for Iteration 3 is detailed.

Question	Facebook	Most Frequent Response	Count (%)
3.5	I have learnt more in the group when using Facebook than on my own	Frequently/Nearly Always	52 (31.14%)

3.6	I enjoyed working in a group using Facebook	Frequently/Nearly Always	57 (34.55%)
3.7	The group motivated me to do my share of the work for the Facebook component	Frequently/Nearly Always	61 (36.75%)
3.8	The group work relating to Facebook helped me to understand the course material better	Occasionally/Seldom	55 (33.13%)
3.9	I learned to co-operate with other people using Facebook	Frequently/Nearly Always	60 (37.04%)
3.10	The Facebook group work caused me to be dependable	Always/Definitely	71 (41.28%)
3.11	It was fun working in a group using Facebook	Always/Definitely	74 (42.77%)
3.12	In the group I got the benefit of everyone's ideas when using Facebook	Always/Definitely	58 (33.72%)
3.13	When I had problems I got help from group members via Facebook	Never	53 (30.99%)
3.14	The work got done faster and more work was done using Facebook	Frequently/Nearly Always	58 (33.72%)
3.15	The Facebook group work gave me an opportunity to talk and discuss the course material	Frequently/Nearly Always	57 (33.14%)
3.16	The Facebook group work made the course material more interesting	Frequently/Nearly Always	64 (37.43%)
3.19	I experienced group learning using Facebook as successful	Always/Definitely	60 (35.50%)
3.30	Do you think that learning to use Facebook as part of the INF 112 course was successful	Yes	147 (88.02%)

Table 45: Facebook and Group work (Iteration 3)

In Table 45 above, there are a number of noteworthy observations that can be made concerning how the student respondents experienced the use of Facebook (social software tool) for group work (group task) on the INF112 course for iteration 3 of this PAR project. For questions 3.10 – 3.12 and 3.19 the most frequent response was 'Always / Definitely' (1 on the Likert scale that was used). For questions 3.5 – 3.7, 3.9, 3.14 – 3.16 the most frequent response was 'Frequently / Nearly always' (2 on the Likert scale that was used). This indicates that overall, students felt that using Facebook to support the group work component of the course was beneficial. For Facebook, the attitude of the students was positive, with the majority of them claiming to have enjoyed using it, possibly because they were using it mostly for socialisation (Roodt et al., 2012). This correlates with the social feature of social software for the Net Generation as mentioned by Oblinger and Oblinger (2005). Overall it appears that the students generally felt that the use of these tools had a positive effect on their

learning process and experience (Roodt et al., 2009). They also generally felt that the use of these tools helped encourage group work and assisted them in their self-development. Working in teams is once again a critical feature as discussed by (Oblinger & Oblinger, 2005:16). In terms of how they experienced the course making use of Facebook, the majority of them felt that the use of these tools in the course was highly successful (88.02%).

Figure 24 below (in the form of a heat-map) shows what all of the student responses (in percentages) were to 13 questions (out of the 14 questions in total) pertaining to the use of Facebook for group work.

Facebook	Missing	4. Never	3. Occasionally / Seldom	2. Frequently / Nearly always	1. Always / Definitely	Total
3.5. I have learnt more in the group when using Facebook than on my own	18	37	45	52	33	167
3.6. I enjoyed working in a group using Facebook	20	15	37	57	56	165
3.7. The group motivated me to do my share of the work for the Facebook component	19	20	31	61	54	166
3.8. The groupwork relating to Facebook helped me to understand the course material better	19	24	55	46	41	166
3.9. I learned to co-operate with other people using Facebook	23	12	40	60	50	162
3.10. The Facebook group work caused me to be dependable	13	11	21	69	71	172
3.11. It was fun working in a group using Facebook	12	16	41	42	74	173
3.12. In the group I got the benefit of everyone's ideas when using Facebook	13	19	38	57	58	172
3.13. When I had problems I got help from group members via Facebook	14	53	34	42	42	171
3.14. The work got done faster and more work was done using Facebook	13	24	43	58	47	172
3.15. The Facebook group work gave me an opportunity to talk and discuss the course material	13	35	50	57	30	172
3.16. The Facebook group work made the course material more interesting	14	19	30	64	58	171
3.19. I experienced group learning using Facebook as successful	12	10	28	60	62	172

Figure 24: Heat-map of Student responses to Facebook & Group work questions (Iteration 3)

As can be seen in Figure 24 above, the vast majority of students felt that for each question, with the exception of question 3.8, Facebook successfully supported the group task at hand.

When looking at Figure 24 above, it is clear that the students' perceptions of the ability of Facebook to support collaborative learning are overwhelmingly positive as evidenced by the majority of responses being '1.Always/Definitely' and '2.Frequently/Nearly always' . As mentioned, the only exception to this is question 3.8, where the most common student response was '2.Frequently/Nearly always' and '3.Occassionally/Seldom' which indicates that the students felt that using Facebook for the group work did not necessarily help them to understand the course material better.

Additional graphical representations (graphs and heat-maps) of the data analysis for Facebook and Group work for iteration 3 are contained in Appendix G.

6.5.2.2 Google Sites

In Table 46 below, the most frequent response to each question pertaining to the use of Google Sites for the collaborative learning component of the group work is detailed.

Question	Google Sites	Most Frequent Response	Count (%)
10.9	Do you think that learning to use Google sites as part of the INF 112 course was successful	Yes	131 (89.12%)
10.14	I have learnt more in the group when using Google Sites than on my own	Always/Definitely	51 (32.48%)
10.15	I enjoyed working in a group using Google sites	Always/Definitely	55 (34.81%)
10.16	The group motivated me to do my share of the work for the Google sites component	Always/Definitely	57 (37.01%)
10.17	The group work relating to Google sites helped me to understand the course material better	Nearly Always	55 (35.26%)
10.18	I learned to co-operate with other people using Google sites	Always/Definitely	56 (35.67%)
10.19	The Google sites group work caused me to be dependable and do my assignment	Nearly Always	63 (40.91%)
10.20	It was fun working in a group using Google sites	Always/Definitely	62 (39.74%)
10.21	In the group I got the benefit of everyone's ideas when Google sites	Nearly Always	57 (37.01%)
10.22	The work got done faster and more work was done using Google sites	Nearly Always	61 (39.10%)
10.23	The Google sites group work gave me an opportunity to talk and discuss material	Nearly Always	65 (41.94%)

10.24	The Google sites group work made the course material more interesting	Always/Definitely	58 (37.18%)
10.25	When I had problems I got help from group members via Google Sites	Never	56 (30.99%)
10.26	I experienced group learning using Google sites as successful	Always/Definitely	53 (35.10%)

Table 46: Google Sites and Group work (Iteration 3)

In Table 46 above, there are a number of noteworthy observations that can be made concerning how the student respondents experienced the use of Google Sites (social software tool) for group work (group task) on the INF112 course for iteration 3 of this PAR project. For questions 10.14 – 10.16, 10.18, 10.20, 10.24 and 10.26 the most frequent response was 'Always / Definitely' (1 on the Likert scale that was used). For questions 10.17, 10.19 and 10.21 – 10.23 the most frequent response was 'Frequently / Nearly always' (2 on the Likert scale that was used). This indicates that overall, students felt that using Google Sites to support the group work component of the course was beneficial. For Google Sites, the attitude of the students was positive, with the majority of them claiming to have enjoyed using it. This correlates with the social feature of social software for the Net Generation as mentioned by Oblinger and Oblinger (2005). Overall it appears that the students generally felt that the use of this tool had a positive effect on their learning process and experience (Roodt et al., 2009). They also generally felt that the use of this tool helped encourage group work. Working in teams is once again a critical feature as discussed by (Oblinger & Oblinger, 2005:16). In terms of how they experienced the course making use of Google Sites, the majority of them felt that the use of these tools in the course was highly successful (89.12%).

Figure 25 below (in the form of a heat-map) shows what all of the student responses (in percentages) were to 13 questions (out of the 14 questions in total) pertaining to the use of Google Sites for group work.

Google Sites	Missing	4. Never	3. Seldom	2. Nearly always	1. Always/ Definitely	Total
10.14. I have learnt more in the group when using Google Sites than on my own	28	27	29	50	51	157
10.15. I enjoyed working in a group using Google sites	27	16	33	54	55	158
10.16. The group motivated me to do my share of the work for the Google sites component	31	22	25	50	57	154
10.17. The groupwork relating to Google sites helped me to understand the course material better	29	20	36	55	45	156
10.18. I learned to co-operate with other people using Google sites	28	20	28	53	56	157
10.19. The Google sites group work caused me to be dependable and do my assignment	31	12	32	63	47	154
10.20. It was fun working in a group using Google sites	29	19	29	46	62	156
10.21. In the group I got the benefit of everyone's ideas when Google sites	31	19	25	57	53	154
10.22. The work got done faster and more work was done using Google sites	29	9	32	61	54	156
10.23. The Google sites group work gave me an opportunity to talk and discuss material	30	16	41	65	33	155
10.24. The Google sites group work made the course material more interesting	29	10	31	57	58	156
10.25. I feel that using Google Sites adds value to my understanding of the contents of the course	30	14	41	58	42	155
10.26. I experienced group learning using Google sites as successful	34	11	36	51	53	151

Figure 25: Heat-map of Student responses to Google Sites and Group work questions (Iteration 3)

As can be seen in Figure 25 above, the vast majority of students felt that for each question, Google Sites successfully supported the group task at hand. When looking at the Figure 25 above, it is clear that the students' perceptions of the ability of Google Sites to support collaborative learning are overwhelmingly positive as evidenced by the majority of responses being '1.Always/Definitely' and '2.Frequently/Nearly always' - this corresponds with the findings from iteration 2.

Additional graphical representations (graphs and heat-maps) of the data analysis for Google Sites and Group work for iteration 3 are contained in Appendix G.

6.5.2.3 YouTube

In Table 47 below, the most frequent response to each question pertaining to the use of YouTube for the collaborative learning component of the group work is detailed.

Question	YouTube	Most Frequent Response	Count (%)
5.5	I have learnt more in the group when using YouTube than I would have learnt on my own	Always/Definitely	53 (37.59%)
5.6	I enjoyed working in a group using YouTube	Always/Definitely	61 (44.20%)
5.7	The group motivated me to do my share of the work for the YouTube component	Frequently/Nearly Always	52 (37.68%)
5.8	The group work relating to YouTube helped me to understand the course material better	Frequently/Nearly Always	47 (33.33%)
5.9	I learned to co-operate with other people using YouTube	Always/Definitely	48 (33.80%)
5.10	The YouTube group work caused me to be dependable and do my assignment	Always/Definitely	53 (40.46%)
5.11	It was fun working in a group using YouTube	Always/Definitely	68 (52.31%)
5.12	In the group I got the benefit of everyone's ideas when using YouTube	Always/Definitely	51 (38.64%)
5.13	When I had problems I got help from group members via YouTube	Never	59 (44.70%)
5.14	The work got done faster and more work was done using YouTube	Frequently/Nearly Always	41 (31.54%)
5.15	The YouTube group work gave me an opportunity to talk and discuss the course material	Always/Definitely	36 (28.13%)
5.16	The YouTube group work made the course material more interesting	Always/Definitely	51 (38.06%)
5.19	I experienced group learning using	Frequently /	53 (28.65%)

	YouTube as successful	Nearly always	
5.30	Do you think that learning to use YouTube as part of the INF112 was successful	Yes	120 (86.96%)

Table 47: YouTube and Group work (Iteration 3)

In Table 47 above, there are a number of noteworthy observations that can be made concerning how the student respondents experienced the use of YouTube (social software tool) for group work (group task) on the INF112 course for iteration 3 of this PAR project. For questions 5.5 – 5.6, 5.9 – 5.12 and 5.15 – 5.16 the most frequent response was 'Always / Definitely' (1 on the Likert scale that was used). For questions 5.7 – 5.8, 5.14 and 5.19 the most frequent response was 'Frequently / Nearly always' (2 on the Likert scale that was used). This indicates that overall, students felt that using YouTube to support the group work component of the course was beneficial. For YouTube, the attitude of the students was positive, with the majority of them claiming to have enjoyed using it, possibly because they were using it mostly for socialisation (Roodt et al., 2012). This correlates with the social feature of social software for the Net Generation as mentioned by Oblinger and Oblinger (2005). Overall it appears that the students generally felt that the use of this tool had a positive effect on their learning process and experience (Roodt et al., 2009). They also generally felt that the use of this tool helped encourage group work and assisted them in their self-development. Working in teams is once again a critical feature as discussed by (Oblinger & Oblinger, 2005:16). In terms of how they experienced the course making use of YouTube, the majority of them felt that the use of these tools in the course was highly successful (86.96%).

Figure 26 below (in the form of a heat-map) shows what all of the student responses (in percentages) were to 13 questions (out of the 14 questions in total) pertaining to the use of YouTube for group work.

YouTube	Missing	4. Never	3. Occasionally/ Seldom	2. Frequently/ Nearly always	1. Always/ Definitely	Total
5.5. I have learnt more in the group when using YouTube than I would have learnt on my own	43	17	26	45	53	141
5.6. I enjoyed working in a group using YouTube	46	14	24	39	61	138
5.7. The group motivated me to do my share of the work for the YouTube component	46	16	22	52	48	138
5.8. The groupwork relating to YouTube helped me to understand the course material better	43	21	40	47	33	141
5.9. I learned to co-operate with other people using YouTube	42	17	32	45	48	142
5.10. The YouTube group work caused me to be dependable and do my assignment	53	12	26	40	53	131
5.11. It was fun working in a group using YouTube	54	9	18	35	68	130
5.12. In the group I got the benefit of everyone's ideas when using YouTube	52	14	26	41	51	132
5.13. When I had problems I got help from group members via YouTube	52	59	16	25	32	132
5.14. The work got done faster and more work was done using YouTube	54	20	37	41	32	130
5.15. The YouTube group work gave me an opportunity to talk and discuss the course material	56	25	34	33	36	128
5.16. The YouTube group work made the course material more interesting	50	18	19	46	51	134
5.19 I experienced group learning using YouTube as successful	51	14	26	53	41	185

Figure 26: Heat-map of Student responses to YouTube and Group work questions (Iteration 3)

As can be seen in Figure 26 above, the vast majority of students felt that for each question, YouTube successfully supported the group task at hand. When looking at the Figure 26 above, it is clear that the students' perceptions of the ability of YouTube to support collaborative learning are overwhelmingly positive as evidenced by the majority of responses being '1.Always/Definitely' and '2.Frequently/Nearly always' .

Additional graphical representations (graphs and heat-maps) of the data analysis for YouTube and Group work for iteration 3 are contained in Appendix G.

6.5.2.4 Comparative Analysis – Facebook vs Google Sites vs YouTube

Question	Facebook			Google Sites			YouTube			Lowest Mean Value	
	N	Mean	Std Dev.	N	Mean	Std Dev.	N	Mean	Std Dev.	Value	Web 2.0 Technology
Q1. I have learnt more in the group when using the Web 2.0 technology than on my own,	167	2.56	1.09	157	2.22	1.09	141	2.11	1.11	2.11	YouTube
Q2. I enjoyed working in a group using the Web 2.0 technology,	165	2.20	1.14	158	2.17	1.12	138	2.01	1.12	2.01	YouTube
Q3. The group motivated me to do my share of the work for the Web 2.0 technology component,	166	2.17	1.08	154	2.10	1.08	138	2.09	1.05	2.09	YouTube
Q4. The group work relating to the Web 2.0 technology helped me to understand the course material better,	166	2.56	1.19	156	2.30	1.12	141	2.48	1.14	2.30	Google Sites
Q5. I learned to co-operate with other people using the Web 2.0 technology,	162	2.26	1.15	157	2.13	1.09	142	2.23	1.15	2.13	Google Sites
Q6. The Web 2.0 technology group work caused me to be dependable,	172	1.90	0.98	154	2.19	1.09	131	2.08	1.14	1.90	Facebook
Q7. It was fun working in a group using the Web 2.0 technology,	173	2.14	1.21	156	2.10	1.12	130	1.82	1.06	1.82	YouTube
Q8. In the group I got the benefit of everyone's ideas when using the Web 2.0 technology,	172	2.22	1.14	154	2.10	1.06	132	2.11	1.13	2.10	Google Sites
Q9. The work got done faster and more work was done using the Web 2.0 technology,	172	2.37	1.13	156	2.12	1.10	130	2.48	1.15	2.12	Google Sites
Q10. The Web 2.0 technology group work gave me an opportunity to talk and discuss the course material,	172	2.61	1.08	155	2.42	1.10	128	2.45	1.16	2.42	Google Sites
Q11. The Web 2.0 technology group work made the course material more interesting	171	2.12	1.07	156	2.09	1.11	134	2.04	1.04	2.04	YouTube
Q12. I experienced group learning using the Web 2.0 technology as successful	169	2.08	0.99	151	2.03	0.94	134	2.10	0.96	2.03	Google Sites

Table 48: Comparative Analysis: Facebook vs Google Sites vs YouTube (Iteration 3)

From Table 48 shown above, a couple of noteworthy observations can be made concerning how the student respondents experienced the use of Facebook, Google Sites and YouTube(social software tools) comparatively for group work (collaborative learning) on the INF112 course for iteration 3. When looking at the column labelled 'Lowest mean value' (and in this study, the lower the mean the better the tool) Google Sites and YouTube were better social software tools than Facebook at supporting collaborative learning (group work) activities for the Net Generation.

For both Google Sites and YouTube, the attitude of the students was positive, with the majority of them claiming to have enjoyed using it. For the section concerning group work, the students generally felt that the use of these tools had a positive effect on their learning process and experience. They also generally felt that the use of these tools helped encourage group work and assisted them in their self-development. Another interesting point to note is that even though the students enjoyed using these tools and felt that they could assist in terms of group work, when the students needed assistance from each other they generally preferred not to use the tools provided, and most likely reverted to face-to-face discussions. Overall, students' perceptions were that all three tools were successful at supporting collaborative learning for the Net Generation in higher education. In terms of how they experienced the course, the majority of the students felt that the use of these tools in the course was highly successful.

Figure 27 below is a heat-map depicting all of the responses (not just the most frequent ones) to Facebook, Google Sites and YouTube comparatively.

Comparison Across Tools: 2011				
Q1. I have learnt more in the group when using the Web 2.0 technology than on my own				
Facebook	37	45	52	33
Google Sites	27	29	50	51
YouTube	17	26	45	53
Q2. I enjoyed working in a group using the Web 2.0 technology				
Facebook	15	37	57	56
Google Sites	16	33	54	55
YouTube	14	24	39	61
Q3. The group motivated me to do my share of the work for the Web 2.0 technology component				
Facebook	20	31	61	54
Google Sites	22	25	50	57
YouTube	16	22	52	48
Q4. The groupwork relating to the Web 2.0 technology helped me to understand the course material better				
Facebook	24	55	46	41
Google Sites	20	36	55	45
YouTube	21	40	47	33
Q5. I learned to co-operate with other people using the Web 2.0 technology				
Facebook	12	40	60	50
Google Sites	20	28	53	56
YouTube	17	32	45	48
Q6. The Web 2.0 technology group work caused me to be dependable				
Facebook	11	21	69	71
Google Sites	12	32	63	47
YouTube	12	26	40	53
Q7. It was fun working in a group using the Web 2.0 technology				
Facebook	16	41	42	74
Google Sites	19	29	46	62
YouTube	9	18	35	68
Q8. In the group I got the benefit of everyone's ideas when using the Web 2.0 technology				
Facebook	19	38	57	58
Google Sites	19	25	57	53
YouTube	14	26	41	51
Q9. The work got done faster and more work was done using the Web 2.0 technology				
Facebook	24	43	58	47
Google Sites	9	32	61	54
YouTube	20	37	41	32
Q10. The Web 2.0 technology group work gave me an opportunity to talk and discuss the course material				
Facebook	35	50	57	30
Google Sites	16	41	65	33
YouTube	25	34	33	36
Q11. The Web 2.0 technology group work made the course material more interesting				
Facebook	19	30	64	58
Google Sites	10	31	57	58
YouTube	18	19	46	51
Q.12 I experienced group learning using the Web 2.0 technology as successful				
Facebook	17	39	53	60
Google Sites	11	36	51	53
YouTube	14	26	53	41
	Never	Occasionally / Seldom	Frequently / Nearly always	Always / Definitely

Figure 27: Heat-map of Student responses to Facebook, Google Sites and YouTube & Group work questions (Iteration 3)

Additional graphical representations (graphs and heat-maps) of the data analysis for the comparative analysis between Facebook, Google Sites and YouTube for Group work for iteration 3 are contained in Appendix G.

6.5.3 Open-ended questions

For the open-ended part of the questionnaire, students were asked for Facebook, Google Sites and YouTube whether they had any additional comments. As mentioned in Chapter 2, Research Methodology, coding (see Method for Analysis in Chapter 2) was done on the data that was gathered and the results can be seen (*'Any other comments about Facebook/Google Sites/YouTube?'*) for iteration 3 below.

6.5.3.1 Facebook

Table 49 below shows the results of the coding that was done on the data collected for the question ('Any other comments about Facebook?') for Facebook for iteration 3.

Facebook 2011		
Categories (not mutually exclusive)	Freq.	Percent
No comment	120	64.86%
Social	14	7.57%
Waste of time/not relevant/boring/didn't like	12	6.49%
Enjoyable	10	5.41%
Fun	7	3.78%
Useful	7	3.78%
Good	5	2.70%
Interesting/Made course content more interesting	4	2.16%
Difficult	4	2.16%
Improves communication	3	1.62%
Other	3	1.62%
Better understanding of coursework	2	1.08%
Easy to use	1	0.54%
Exciting approach to group work	1	0.54%

Table 49: Facebook Open-ended Responses (Iteration 3)

There are some interesting observations that can be made regarding students' feedback in terms of their experience of using Facebook for the collaborative learning component of the INF112 course for iteration 3. It must be noted though that 64.86% of the students had no comments for this open-ended question. Certain students experienced using Facebook for the collaborative learning component of the course as *'Enjoyable'* (5.41%), *'Fun'* (3.78%) ,*'Social'* (7.57%) and *'Useful'* (3.78%).

This is in keeping with research conducted by Prensky (2001), Oblinger and Oblinger (2005), Gruber (2008) and McLoughlin and Lee (2010) which posit that social software is well suited to collaborative learning activities for the Net Generation in higher education due to their characteristics being similar to the learning preferences of this generation, for example being based on the principle of social interaction. As discussed during the literature review, Chapter 3 of this thesis, social software provides learners with opportunities for (Chen et al., 2001) (Bryant, 2006) (Krebs et al., 2009):

- Learner participation;
- Social relevance;
- Knowledge sharing;
- Networking and collaboration.

When looking at Table 49 above, it appears that Facebook did realise these opportunities for these INF112 students for iteration 3. This is similar to the findings from iteration 1 and 2 which means that the same results are achieved for different groups of students. An interesting category is *'Interesting/Made course content more interesting'* (2.16%), where certain students felt that using Facebook made the course work more interesting – this may be due to the fact that can be used as a learning tool for IS education (Cloete et al., 2009). Another interesting category is *'Waste of time/not relevant/boring/didn't like'* (6.49%), where certain students felt that they did not enjoy using Facebook for the course and that it was a waste of time – this could be attributed to the fact that the Net Generation should not be considered a homogenous group (section 3.3.6).

6.5.3.2 Google Sites

Table 50 below shows the results of the coding that was done on the data collected for the question (*'Any other comments about Google Sites?'*) for Google Sites for iteration 3.

Google Sites 2011		
Categories (not mutually exclusive)	Freq.	Percent
No comment	141	76.22%
Useful	12	6.49%
Easy to use	7	3.78%
Difficult	6	3.24%
Waste of time/not relevant/boring/didn't like	6	3.24%
Enjoyable	5	2.70%
Interesting/Made course content more interesting	4	2.16%
Fun	3	1.62%
Good	2	1.08%

Time consuming	2	1.08%

Table 50: Google Sites Open-ended Responses (Iteration 3)

There are some interesting observations that can be made regarding students' feedback in terms of their experience of using Google Sites for the collaborative learning component of the INF112 course for iteration 3. It must be noted though that 76.22% of the students had no comments for this open-ended question. As can be seen from Table 50 above, certain students experienced using Google Sites for the collaborative learning component of the course as *'Useful'* (6.49%), *'Enjoyable'* (2.70%), *'Easy to use'* (3.78%) and *'Fun'* (1.62%). This is in keeping with research conducted by Prensky (2001), Oblinger and Oblinger (2005), Gruber (2008) and McLoughlin and Lee (2010) which posit that social software is well suited to collaborative learning activities for the Net Generation in higher education due to their characteristics being similar to the learning preferences of this generation.
When looking at Table 50 above, it appears that Google Sites does realise this opportunity for these INF112 students for iteration 3 – this is similar to the findings from iteration 2 which means that the same results are achieved for different groups of students. An interesting category is *'Interesting/Made course content more interesting'* (2.16%), where certain students felt that using Google Sites made the course work more interesting. Another interesting category is *'Waste of time/not relevant/boring/didn't like'* (3.24%), as well as *'Difficult'* (3.24%), where certain students felt that they did not enjoy using Google Sites for the course and that it was a waste of time, as well as being difficult – this could be attributed to the fact that the Net Generation should not be considered a homogenous group (section 3.3.6).

6.5.3.3 YouTube

Table 51 below shows the results of the coding that was done on the data collected for the question (*'Any other comments about YouTube?'*) for YouTube for iteration 3.

YouTube 2011		
Categories (not mutually exclusive)	Freq.	Percent
No comment	154	83.24%
Fun	5	2.70%
Enjoyable	5	2.70%
Entertaining	4	2.16%
Easy to use	4	2.16%
Useful	4	2.16%
Difficult	3	1.62%
Waste of time/not relevant/boring/didn't like	2	1.08%
Other	2	1.08%

Social	1	0.54%
Not relevant to course	1	0.54%
Costly	1	0.54%

Table 51: YouTube Open-ended Responses (Iteration 3)

There are some interesting observations that can be made regarding students' feedback in terms of their experience of using YouTube for the collaborative learning component of the INF112 course for iteration 3. It must be noted though that 83.24% of the students had no comments for this open-ended question. As can be seen from Table 51 above, certain students experienced using YouTube for the collaborative learning component of the course as *'Useful'* (2.16%), *'Enjoyable'* (2.70%), *'Entertaining'* (2.16%), *'Easy to use'* (2.16%) and *'Fun'* (2.70%). This is in keeping with research conducted by Prensky (2001), Oblinger and Oblinger (2005), Gruber (2008) and McLoughlin and Lee (2010) which posit that social software is well suited to collaborative learning activities for the Net Generation in higher education due to their characteristics being similar to the learning preferences of this generation.

When looking at Table 51 above, it appears that YouTube did realise this opportunity for these INF112 students for iteration 3. Another interesting category is *'Waste of time/not relevant/boring/didn't like'* (1.08%), as well as *'Difficult'* (1.62%), where certain students felt that they did not enjoy using YouTube for the course and that it was a waste of time, as well as being difficult – this could be attributed to the fact that the Net Generation should not be considered a homogenous group (section 3.3.6). Lastly, the category referring to the cost of using YouTube for group work (*'Costly'*) (0.54%) needs to be noted as this is in contradiction with Grosseck's (2009) findings regarding the benefits of using social software in higher education as detailed in section 3.4.6.

6.6 PHASE 4: Reflect

6.6.1 Reflection Activities

The fourth phase of my participatory action research project's iteration 3 is **reflecting**. As discussed above, the purpose of this phase is to reflect based on the findings of the previous step.
For this research project, the steps of my PAR project for the reflection phase of iteration 3 were as follows in Table 52 below:

PHASE	PROPOSED STEPS	ACTUAL STEPS TAKEN
Reflect	Challenges encountered	Students complained about the bandwidth that was required to upload YouTube videos Socio-economic disparities – not all students had the financial resources to upload their YouTube video – see section 6.5.3.3 Cost to mark the assignments very high because of video streaming on Google Sites – correlates with criticisms in section 3.4.7
	Points to learn from	The Net Generation categorisation is not homogenous as pointed out in section 3.3.6 Not all social software tools deliver all of the benefits described in the literature review in section 3.4.6
	Celebrate and affirm positives	Students enjoyed it, fun – use open ended feedback
	Share findings and reflections	Socio-economic backgrounds have an impact on the group

Table 52: The Actual Reflection Phase of my PAR Iteration 3

The reflection phase of my PAR Iteration 3 produced a number of key outcomes but the main focus for my thesis is on the output from the data analysis in phase 3. That output relates specifically to the students perception of the use of Facebook, Google Sites and YouTube as social software tools to support collaborative learning for the Net Generation in higher education.

When looking at the comparative analysis between Facebook, Google Sites and YouTube, as well as the results of the coding of the open-ended questions, the findings are that Google Sites and YouTube appear to be better at supporting CSCL for these students.

6.6.2 Amendments to Theoretical Framework for CSCL from Iteration 3

The findings from the data analysis of iteration 3 which is detailed during this chapter has highlighted certain items that can be amended / changes that can be made to the theoretical framework for CSCL as proposed by De Villiers (1995) as discussed in section 3.6 in Chapter 3. These changes include additions to the ***Input*** component of the framework.

These additions/amendments are listed below in the component that they correspond to:

Input

- Structural features of CSCL:
  - Institutional internet usage policies, specifically the internal resources required to assess learning output artefacts (similar points were also identified in iteration 1 and 2)
- Other sources of structure:
  - Learning style preferences (was also identified in iteration 1 & 2)
  - Web 2.0 proficiency of students (was also identified in iteration 1 & 2)
  - Popularity of social software tools (was also identified in iteration 1 & 2)
- Internal system of group:
  - Socio-economic disparities (NEW addition)

These amendments will be discussed in detail in Chapter 8.

6.7 CONCLUSION

This chapter detailed all of the activities that took place as part of iteration 3 of this PAR project. It was divided into four sections, with each section dealing with a specific phase of the PAR.

Overall the students responses were overwhelming positive towards using Facebook, Google Sites and YouTube, especially in the context of collaborative learning activities, which implies that not only do they enjoy using it they also find it easy to use even within the context of learning new and challenging material. From the results of the data analysis, it is evident that Facebook is less suited than Google Sites and YouTube to support CSCL for the Net Generation in higher education. These findings show that using tools that the Net Generation are familiar with allows the students to gain easier access to the actual process of learning, without needing a substantial investment of time into learning how to use a learning tool they are unfamiliar with.

These findings indicate that group work can be significantly enhanced through the use of social software tools, in particular Google Sites and YouTube, and to a lesser degree Facebook. It is also interesting to note that for many students the enjoyment gained from using tools such as Google Sites and YouTube, enhances their entire learning experience. Overall, the findings from this chapter are used to refine the additions/amendments to the proposed CSCL framework which is discussed in Chapter 8.

The next chapter details the data consolidation across all three iterations of my PAR project and attempts to answer my research questions.

CHAPTER 7

PARTICIPATORY ACTION RESEARCH PROJECT DATA CONSOLIDATION

CHAPTER 7: PARTICIPATORY ACTION RESEARCH PROJECT DATA CONSOLIDATION

7.1 INTRODUCTION

This chapter details the data analysis consolidation of the three iterations of my PAR project. Also, it seeks to answer the primary and secondary research questions, based on the findings of the data analysis and consolidation. As mentioned in Chapter 1 in the research questions section, my research questions are as follows:

- Main (primary) question:

  Can social software be used to support Computer-Supported Collaborative Learning for the Net Generation in higher education?

- Secondary questions:
  - ***Are certain types of social software more conducive to providing support for Computer-Supported Collaborative Learning for the Net Generation in higher education?***
  - ***Can a Computer-Supported Collaborative Learning framework be developed that can be used to design collaborative learning activities using social software for the Net Generation in higher education?***

The first section of this chapter discusses the overall findings from the data consolidation of the three iterations of this PAR. The second section uses the output from the previous section, as well as the findings from iterations 1 -3 (Chapter 4, 5 and 6) in order to attempt to answer the research questions.

7.2 PAR PROJECT DATA CONSOLIDATION

7.2.1 Demographics

The gender distribution of the 1442 respondents can be seen in Table 53 below:

Q1.1 Gender of Student (Multiple Choice)	2009	2010	2011	Total
Female	358	331	103	792
Male	328	246	76	650
Total	686	577	179	1,442

Table 53: Gender distribution for Iteration 1 - 3 respondents

The age of the respondents is shown in Table 54 below:

Age	N	Minimum	Maximum	Median	25th Percentile	75th Percentile	Mean	Std Dev.
2009	686	17	38	19	18	19	18.94	1.50
2010	577	17	28	19	18	19	19.00	1.33
2011	179	17	27	19	18	20	19.35	1.47
Total	**1442**	**17**	**38**	**19**	**18**	**19**	**19.02**	**1.44**

Table 54: Age Statistics for Iteration 1 - 3 Respondents

As can be seen from the table above, the average age of the respondents (students) is ~ 19, with the minimum age being 17 and the maximum age being 38. This means that most of the students can be classified as being part of the Net Generation as they were born in/after 1982 (2011 – 19 = 1992) as defined by Oblinger and Oblinger (2005). It is evident from table 54 above that there is a consistency to the findings for the student groups.

The race of the 1442 respondents can be seen in Table 55 below:

Q1.4 Race (Multiple Choice)	2009	2010	2011	Total
Asian	8	9	2	19
Black	249	259	85	593
Caucasian	219	161	56	436
Coloured	13	13	0	26
Indian	42	40	7	89
Other	152	93	25	270
Total	683	575	175	1,433

Table 55: Race Statistics for Iteration 1 - 3

As can be seen from Table 55 above, the most represented race is Black (593), followed by Caucasian (436), Other (270), Indian (89), Coloured (26) and Asian (19). The reason for the Other category being relatively high at 270 respondents could be that certain respondents have sensitivities regarding race categorisation and that the list was not comprehensive enough to depict the race they identify most with. It is important to note that students did not have to answer this question and as such it can be seen in Table 55 that 9 students did not answer this question.

7.2.2 Closed-ended question comparison for Iteration 1 - 3

This section details the closed-ended question data output from the consolidation of the three iterations of my PAR. It compares statistics across the three iterations. All of the social software tools that were used throughout my PAR are included in this comparison, namely:

- pbWiki;
- Facebook
- Google Groups;
- Google Sites;
- YouTube.

Table 56 below details a summary of the mean value of the individual social software tools that were used in iteration 1, 2 and 3 as well as pointing out which ones had the lowest mean value overall comparatively.

Question	PBWiki	Google Groups	YouTube	Google Sites			Facebook				Overall Min	
				2010	2011	Min	2009	2010	2011	Min		
I have learnt more in the group when using the Web 2.0 technology than I would have learnt on my own	2.24	2.33	2.11	2.21	2.22	2.21	2.65	2.27	2.56	2.27	2.11	YouTube
I enjoyed working in a group using the Web 2.0 technology	2.41	2.24	2.01	2.16	2.17	2.16	2.35	2.06	2.20	2.06	2.01	YouTube
The group motivated me to do my share of the work for the Web 2.0 technology component	2.30	2.20	2.09	2.15	2.10	2.10	2.05	2.09	2.17	2.05	2.05	Facebook
The group work relating to the Web 2.0 technology helped me to understand the course material better	2.52	2.29	2.48	2.16	2.30	2.16	2.42	2.28	2.56	2.28	2.16	Google Sites
I learned to co-operate with other people using the Web 2.0 technology	2.35	2.23	2.23	2.14	2.13	2.13	2.06	2.06	2.26	2.06	2.06	Facebook
The Web 2.0 technology group work caused me to be dependable and do my assignment	2.27		2.08		2.19	2.19	2.09		1.90	1.90	1.90	Facebook
It was fun working in a group using the Web 2.0 technology	2.36	2.21	1.82	2.03	2.10	2.03	2.02	2.04	2.14	2.02	1.82	YouTube
In the group I got the benefit of everyone's ideas when using the Web 2.0 technology	2.30	2.20	2.11	2.15	2.10	2.10	2.09	2.14	2.22	2.09	2.09	Facebook
The work got done faster and more work was done using the web 2.0 technology	2.62	2.28	2.48	2.19	2.12	2.12	2.41	2.31	2.37	2.31	2.12	Google Sites
The Web 2.0 technology group work gave me an opportunity to	2.58	2.32	2.45	2.26	2.42	2.26	2.43	2.41	2.61	2.41	2.26	Google Sites

talk and discuss material												
The Web 2.0 technology group work made the course material more interesting	2.48	2.23	2.04	2.03	2.09	2.03	2.13	2.13	2.12	2.12	2.03	Google Sites
I experienced group learning using the Web 2.0 technology as successful	2.31	2.13	2.10	2.05	2.03	2.03	2.177	1.97	2.08	1.97	1.97	Facebook

Table 56: Iteration 1 – 3 Social Software Tools Comparison

When looking at Table 56 above it can be seen that overall, the students felt that each of the social software tools used in iteration 1 – 3 being pbWiki, Facebook, Google Groups, Google Sites and YouTube, supported group work to varying degrees. When looking at the 'Overall Min' column, it can be seen that Facebook, Google Sites and YouTube had the lowest overall minimum which in this case means that they were best able to support CSCL for this research project. It is important to note that certain social software tools were only used in one iteration, for example pbWiki in 2009 and YouTube in 2011, and as such there is only 1 iterations data for that tool. For other social software tools, such as Facebook, there are 3 iterations of data of which the minimum is then taken to represent the lowest minimum value for that tool.

When looking at the column labelled "Overall Min" (and in this study, the lower the minimum the better the social software tool is at supporting collaborative learning (group work) activities for the Net Generation), it can be seen that Facebook, Google Sites and YouTube had the lowest minimum value for certain questions relating to the tools ability to support collaborative learning. It is interesting to see that Facebook scored the lowest minimum for 5 of the 12 questions, with Google Sites for 4 questions and YouTube for 3 questions. On the other-hand, pbWiki and Google Groups between themselves scored the highest minimum value for all of the 12 questions.

For Facebook, Google Sites and YouTube, the attitude of the students was positive, with the majority of them claiming to have enjoyed using it. For the section concerning group work, the students generally felt that the use of these tools had a positive effect on their learning process and experience. They also generally felt that the use of these tools helped encourage group work and assisted them in their self-development. Overall, students' perceptions were that all three tools were successful at supporting collaborative learning for the Net Generation in higher education. It is important to note that even-though pbWiki and Google Groups scored the highest minimum values comparatively, it does **not mean** that these social software tools are **unable** to support CSCL for the Net Generation in higher education – it means that they do not support CSCL to the same extent as Facebook, Google Sites and YouTube do.

7.3 ANSWERING OF RESEARCH QUESTIONS

7.3.1 Main Research Question

Can social software be used to support Computer-Supported Collaborative Learning for the Net Generation in higher education?

In answering this question I make reference to the three iteration Chapters (4 – 6), as well as Table 56 above which provides an overall summary of the ability of the various social software tools used in this study to support CSCL for the Net Generation in higher education. As can be seen in Table 56 above, the social software tools used throughout iterations 1 -3 of this project, can be used to support CSCL for the Net Generation in higher education. The individual PAR iterations data output, sections 4.5, 5.5 and 6.5, also provide evidence in support of this.

7.3.2 Research Sub-questions

Secondary question 1:

Are certain types of social software more conducive to providing support for Computer-Supported Collaborative Learning for the Net Generation in higher education?

Based on the data analysis output from iterations 1 -3 (Chapters 4 – 6) as well as Table 56 above, it is evident that certain types of social software are more conducive to providing support for CSCL for the Net Generation in higher education.

Secondary question 2:

Can a CSCL framework be developed that can be used to design collaborative learning activities using social software for the Net Generation in higher education?

Based on the literature review detailed in Chapter 3 and the data analysis output from iterations 1 -3 (Chapters 4 – 6), I have developed a revised CSCL framework that can be used for collaborative learning activities for the Net Generation in higher education. This revised framework is called the Social Software Socio-Economic-Cultural-Technical (SECT) Framework for CSCL for the Net Generation in higher education and is explained in Chapter 8.

7.4 CONCLUSION

This chapter detailed the findings of the data consolidation for all three iterations of this PAR project. It was divided into two main sections, the first one explaining the results of the data consolidation for 2009 – 2011 in terms of a comparative analysis. The second section sought to answer the primary and secondary research questions, based on the findings of the data analysis and consolidation, as well as the findings from iterations 1 -3 (Chapters 4, 5 and 6).

For all of the social software tools that were used as part of this PAR project, being pbWiki, Facebook, Google Groups, Google Sites and YouTube, students felt that they could be used support CSCL to varying degrees. These findings show that using social software tools that the Net Generation are familiar with allows the students to gain easier access to the actual process of learning, without needing a substantial investment of time into learning how to use a learning tool they are unfamiliar with. These findings indicate that group work can be significantly enhanced through the use of social software tools. It is also interesting to note that for many students the enjoyment gained from using such social software tools enhances their entire learning experience. Overall, the findings from this chapter are used to refine the additions/amendments to the proposed CSCL framework which is discussed in Chapter 8.

The next chapter details the development of the enhanced Social Software Socio-Economic-Cultural-Technical (SECT) framework for CSCL for the Net Generation in higher education.

CHAPTER 8

REVISED CSCL FRAMEWORK FOR USING SOCIAL SOFTWARE FOR COLLABORATIVE LEARNING

CHAPTER 8: REVISED CSCL FRAMEWORK FOR USING SOCIAL SOFTWARE FOR COLLABORATIVE LEARNING

8.1 INTRODUCTION

This study not only focuses on determining whether social software tools can be used to support CSCL for the Net Generation in higher education but also aims to develop a CSCL framework that can be used to design collaborative learning activities for them. This chapter will use relevant input from all of the previous chapters, in order to produce this framework.

In this chapter, Bloom's Revised Taxonomy, Experiential Learning Theory, Participatory Action Research, the Revised Data Information Knowledge Wisdom Hierarchy, Triple-loop learning and Iterations 1 – 3 are synthesised together with De Villiers (1995) theoretical framework for CSCL in order to produce a CSCL framework specifically designed for collaborative learning activities for the Net Generation in higher education, called the Social Software Socio-Economic-Cultural-Technical (SECT) Framework for CSCL. The reason for naming it SECT is because it considers those four angles. This is summarised in Figure 28 on the following page.

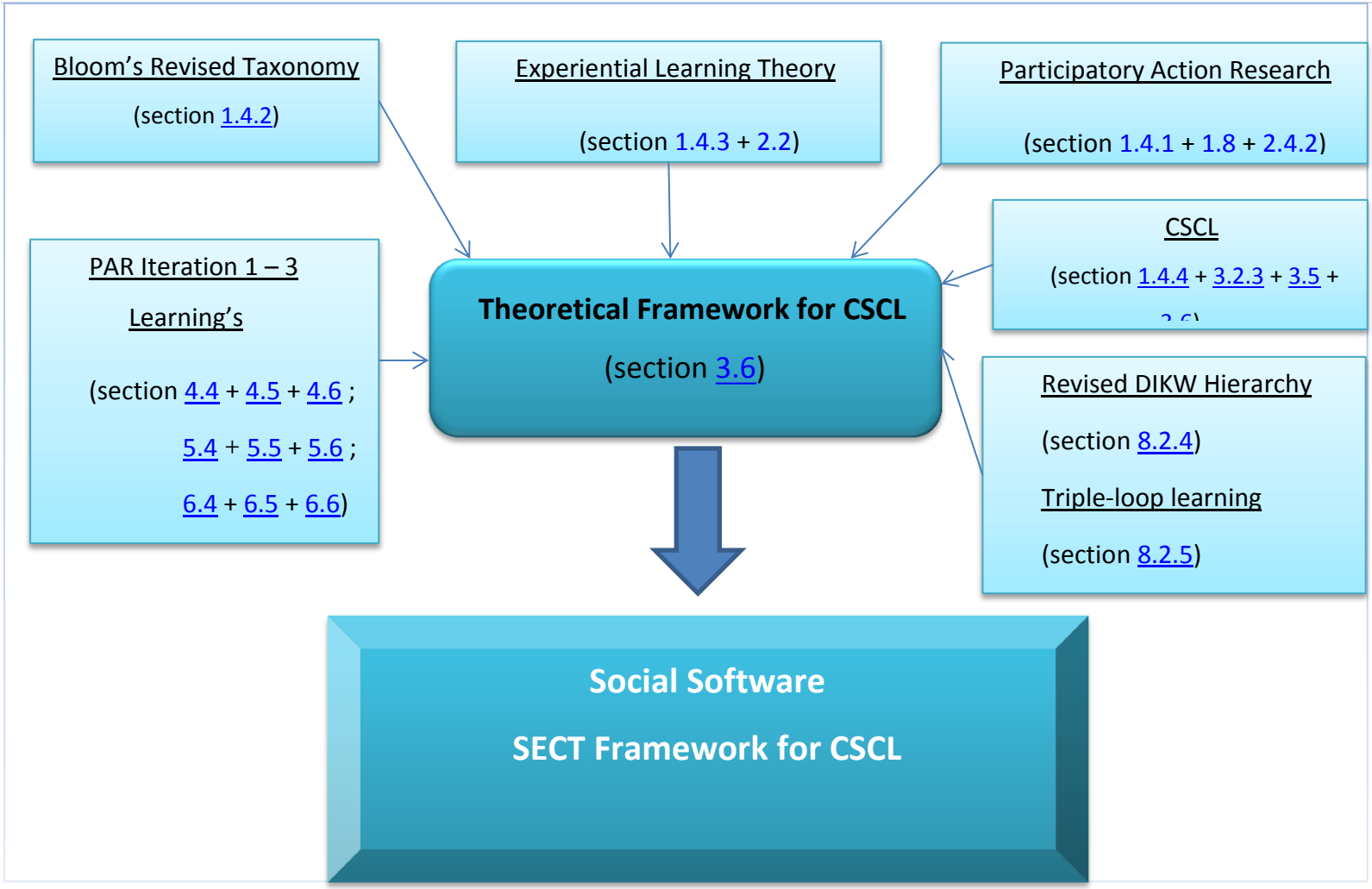

Figure 28: Approach followed to produce Social Software SECT Framework for CSCL

Each of these influences will now be discussed below.

8.2 INFLUENCES

8.2.1 Bloom's Revised Taxonomy

As mentioned in Chapter 1, section 1.4.2, Bloom's Taxonomy was revised by one of his former students, Lorin Anderson, during the 1990's, with the intention of adding relevance to the model for 21st century students and educators (Anderson & Krathwohl, 2001). The model was revised to consist of six levels according to which a learner's skill can be organized, with the sixth level being to '*create*' and the removal of *'synthesis'*.

In De Villiers (1995) framework, as discussed in chapter 3, section 3.6, Bloom's Taxonomy had not yet been revised to include *'create'* or the removal of *'synthesis'*. As such, I will amend the 'Learning Process' component of the framework to include this change as depicted in Figure 29 below:

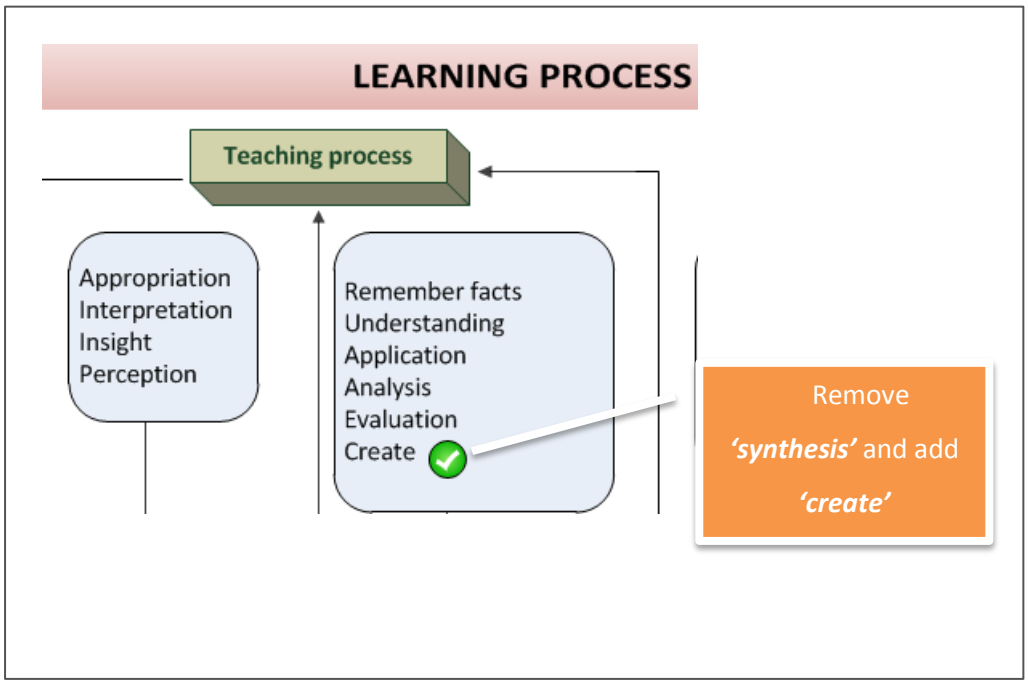

Figure 29: Influence of Bloom's Revised Taxonomy on CSCL Framework

8.2.2 Experiential Learning Theory

In Chapter 1, section 1.4.3, and Chapter 2, section 2.2, the importance of recognising that students have different learning style preferences was highlighted. Additionally, in Chapter 3, section 3.3.4,

the unique learning style preferences of the Net Generation were discussed. In De Villiers (1995) framework did not include taking into account that learners have different learning styles – it only took the level of the learners into account eg: under-graduate versus post-graduate. As such, I will be adding '***Learning style preferences'*** to ***"Other sources of structure"*** for the ***INPUT*** element as depicted in Figure 30 below:

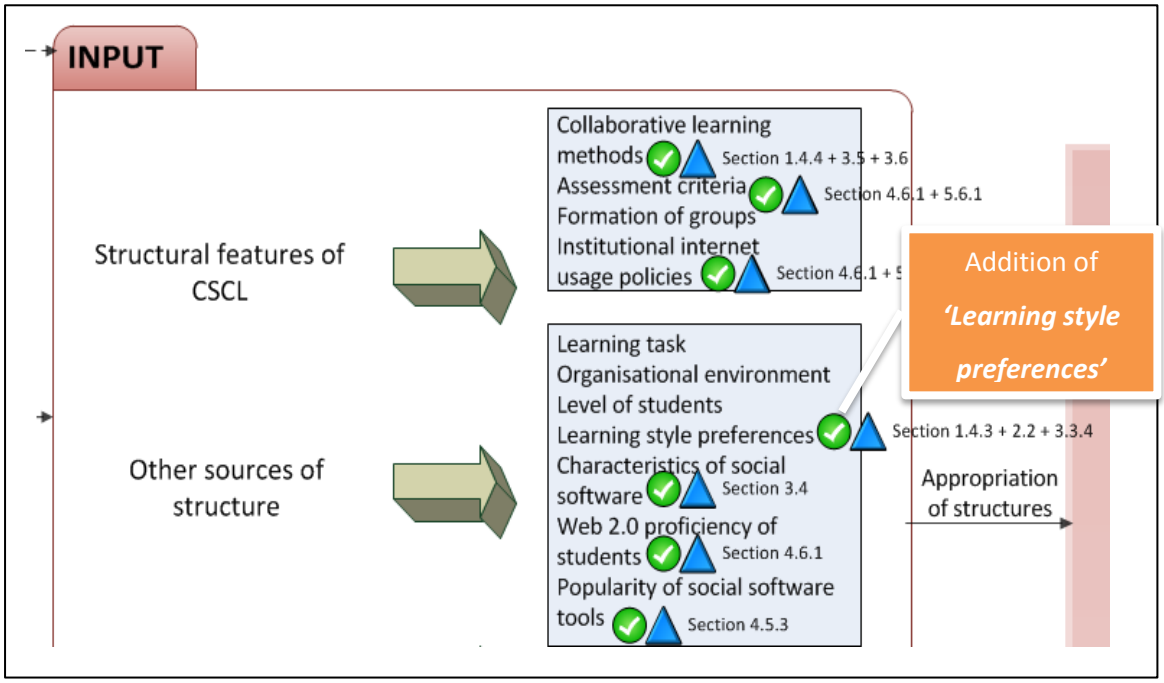

Figure 30: Influence of Experiential Learning Theory on CSCL Framework (I)

The implication of this is that educators must consider the learning style preferences (as part of the input) of their students when designing CSCL environments for the Net Generation.

A second amendment to De Villiers (1995) framework as a result of Experiential Learning Theory takes place in the ***Learning Process*** element. In De Villiers (1995) framework, as discussed in section 3.6.3.2, knowledge becomes competence (revised to wisdom) by the student applying, experiencing and judging information (De Villiers, 1995). When looking at the objectives of experiential learning to create educational environments to satisfy students needs to advance certain things, section 2.2.1, the addition of **behaviour, engagement** and **reflection** is warranted. This is supported by the research conducted by Woolfe (1992) who decsribed the four components of experiential learning as (Woolfe, 1992:2-3):

1. The student is aware of the processes which are taking place, and which are enabling learning to occur;

2. The student is involved in a **reflective** experience which enables him/ her to relate current learning to past, present and future, even if these relationships are felt rather than thought;
3. The experience and content are personally significant: what is being learned and how it is being learned have a special importance for the person, and
4. There is an **involvement of the whole self**: **body, thoughts, feelings and actions**, not just of the mind; in other words, the student is **engaged** as a whole person.

This amendment is depicted in Figure 31 below:

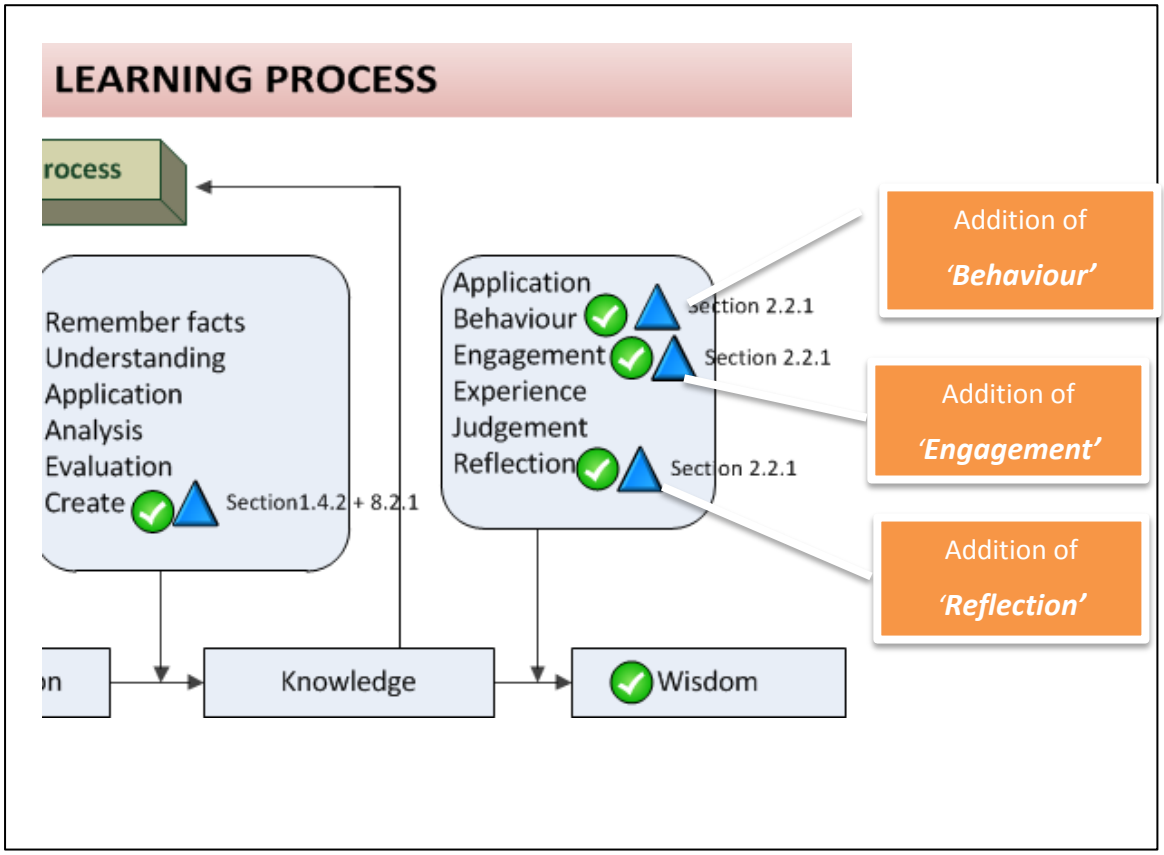

Figure 31: Influence of Experiential Learning Theory on CSCL Framework (II)

8.2.3 Participatory Action Research

PAR, as discussed in Chapter 1, section 1.4.1 & section 1.8, Chapter 2, section 2.4.2, has been used as the main research method for my thesis. As mentioned, PAR is *"…a cyclical iterative process of action and reflection on and in action. Through reflection we conceptualise and generalise what happened*

(action). We can then investigate in new situations whether our conceptions were right; that is, we try to find confirming or disconfirming evidence." (Zuber-Skerritt, 1996:20). Another definition is "*Participatory action research is a form of action research in which professional social researchers operate as full collaborators with members of organizations in studying and transforming those organizations. It is an on-going organizational learning process, a research approach that emphasizes co-learning, participation and organizational transformation.*" (Greenwood et al., 1993:177). An important point to note here is that PAR is deemed a cyclical, iterative (on-going) process, one that involves action and reflection. As such, I will be amending De Villiers (1995) framework to include the four stages of PAR, transposed on top of the existing elements, which will result in the framework being dynamic and on-going, without a definitive beginning and end point. Figure 32 below depicts this addition:

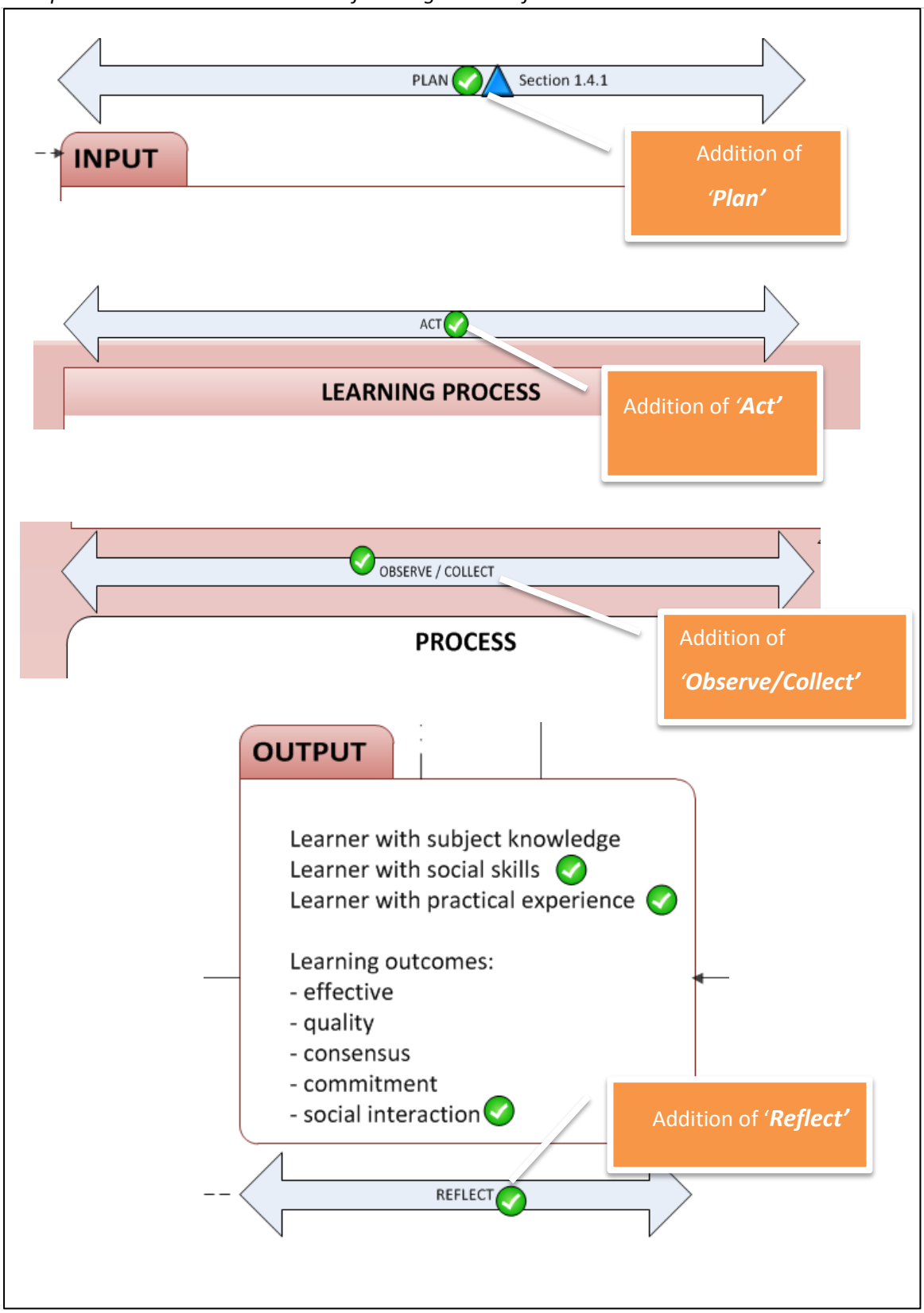

Figure 32: Influence of PAR on CSCL Framework

8.2.4 Computer-Supported Collaborative Learning

Computer-Supported Collaborative Learning (CSCL), as discussed in Chapter 1 (section 1.4.4), Chapter 3 (section 3.2.3, section 3.5 and section 3.6), is one of the key theoretical under-pinning's of this research project.

Based on the CSCL conducted in this thesis, the following amendments to the CSCL Framework can be made as depicted in Figure 33 below:

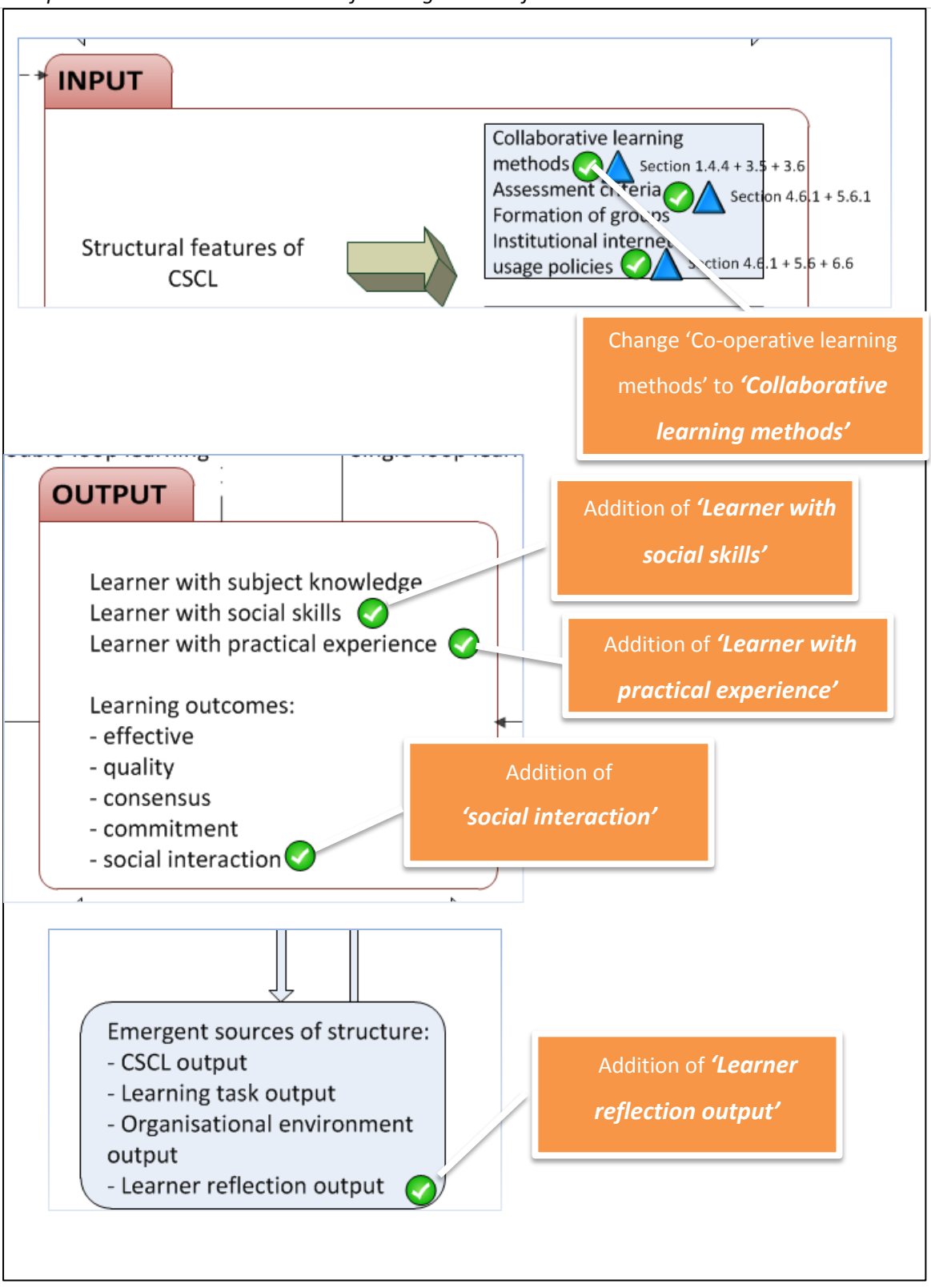

Figure 33: Influence of CSCL Theory on CSCL Framework

In De Villiers (1995) framework, 'co-operative learning methods' was the first structural feature of INPUT which has now been updated to ***'collaborative learning methods'***. As for the OUTPUT

component, ***'Learner with social skills'***, ***'Learner with practical experience'*** and ***'social interaction'*** have been added as this correlates to Kirschner (2001) in section 3.5.2, Kolodner and Guzdial (1996) and Porcaro (2011) in section 3.5.4, and Gruber (2008) in section 3.5.5. Lastly, ***'Learner reflection output'*** has been added as an Emergent source of structure because the learner's reflections may ultimately influence the structural features of the CSCL environment. This is included as PAR involves observing/collecting information on the context being studied and in this case, the feedback from the students may influence the input for the next cycle.

8.2.5 Revised Data Information Knowledge Wisdom (DIKW)

In De Villiers (1995) framework, the knowledge hierarchy is made up of:

- Data;
- Information;
- Knowledge;
- Competence.

Since then, the hierachy (pyramid) has been revised by replacing **Competence** with **Wisdom,** where Wisdom is defined as "*placing knowledge into a framework or nomological net that allows the knowledge to be applied to different and not necessarily intuitive situations.*" (Jennex, 2009:2). As such this amendment is depicted in Figure 34 below:

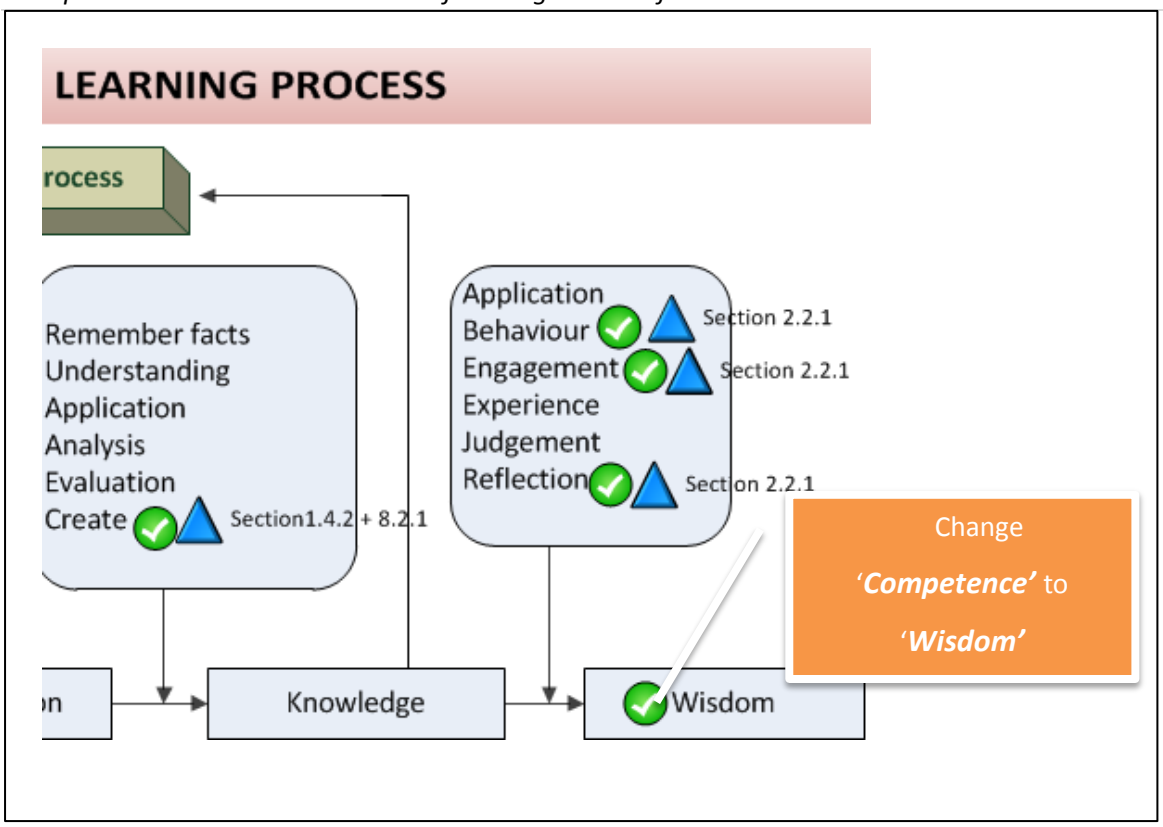

Figure 34: Influence of DIKW Hierarchy on CSCL Framework

8.2.6 Triple-loop learning

In De Villiers (1995) framework, deutero-learning as identified and described by Argyris & Schon (1978) (Argyris & Schon, 1978) is defined as "*In deutero-learning, the members of the organisation learn about organisational learning and then use their results in individual images and maps."* (De Villiers, 1995:87). According to De Villiers (1995), deutero-learning in a CSCL environment will occur if teachers (educators) involved in CSCL learn more about it and adapt their teaching methods accordingly (De Villiers, 1995). In 1998, Snell and Chak equated ***'triple-loop learning'*** with 'deutero-learning' (Tosey, Visser, & Saunders, 2012) (Snell & Chak, 1998). Snell and Chak (1998:340) define triple-loop learning as "*Co-inventing – collective mindfulness. Members discover how they and their predecessors have facilitated or inhibited learning, and produce new structures and strategies for learning.*" As such, an amendment is made to De Villiers (1995) framework in Figure 35 below:

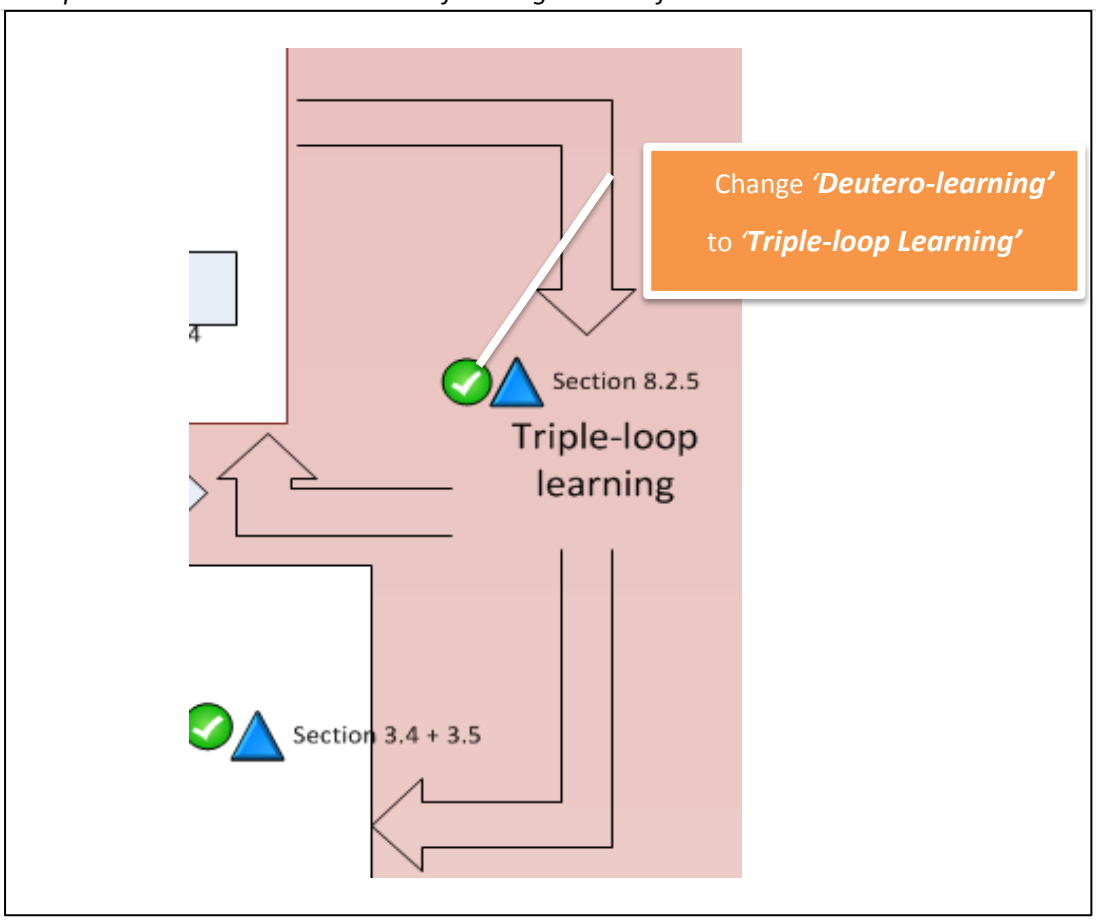

Figure 35: Influence of Triple-loop learning on CSCL Framework

8.2.7 PAR Iteration 1 – 3 Learning's

8.2.7.1 PAR Iteration 1 Learning's

As mentioned in Chapter 4, section 4.6.2, the findings from the data analysis of iteration 1 has highlighted certain items that can be amended / changes that can be made to the theoretical framework for CSCL as proposed by De Villiers (1995) as discussed in section 3.6 in Chapter 3. For iteration 1, these changes include additions to the ***Input*** and ***Process*** components of the framework as depicted in Figure 36 and Figure 37 below:

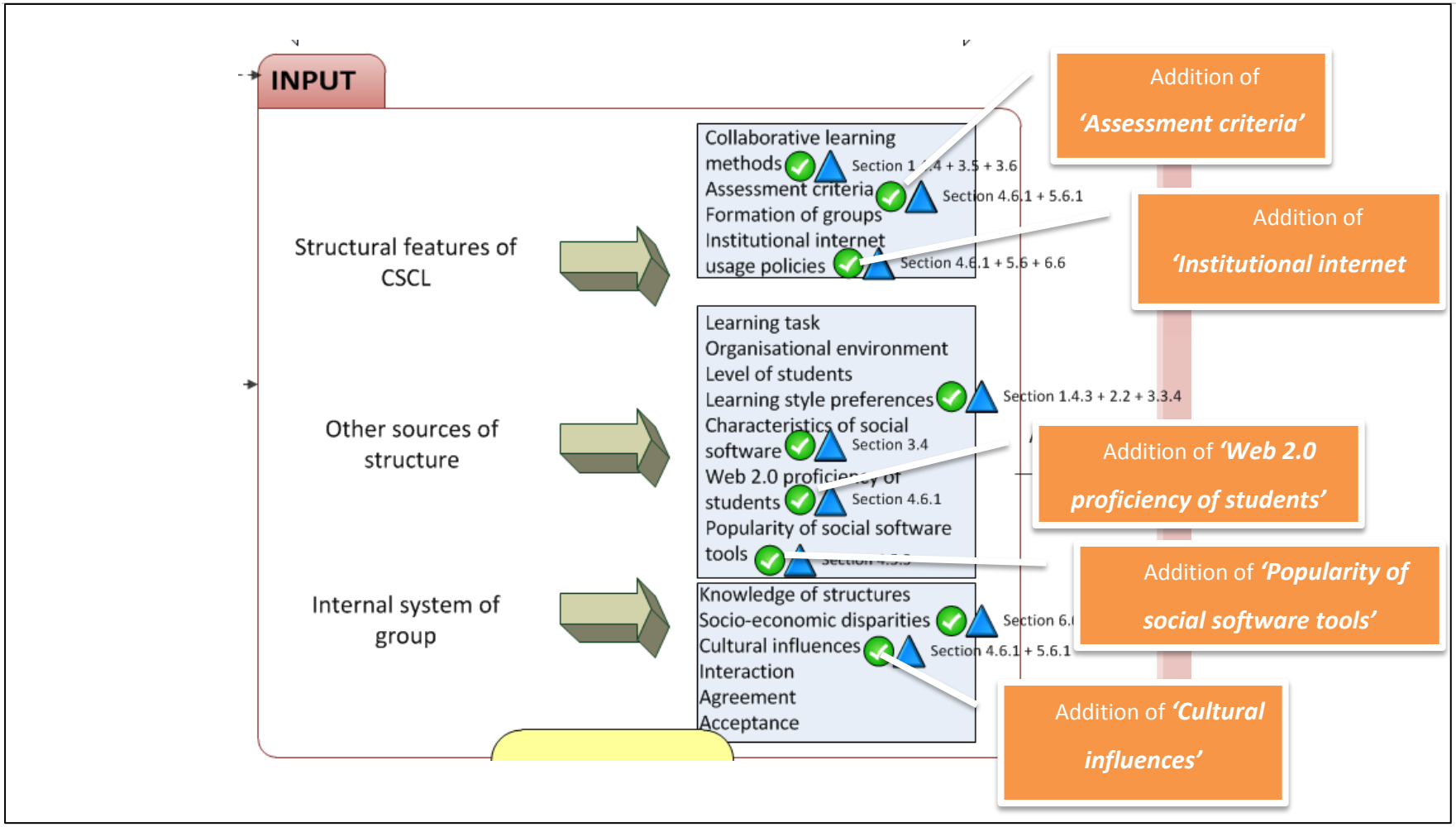

Figure 36: PAR Iteration 1 Amendments to CSCL Framework

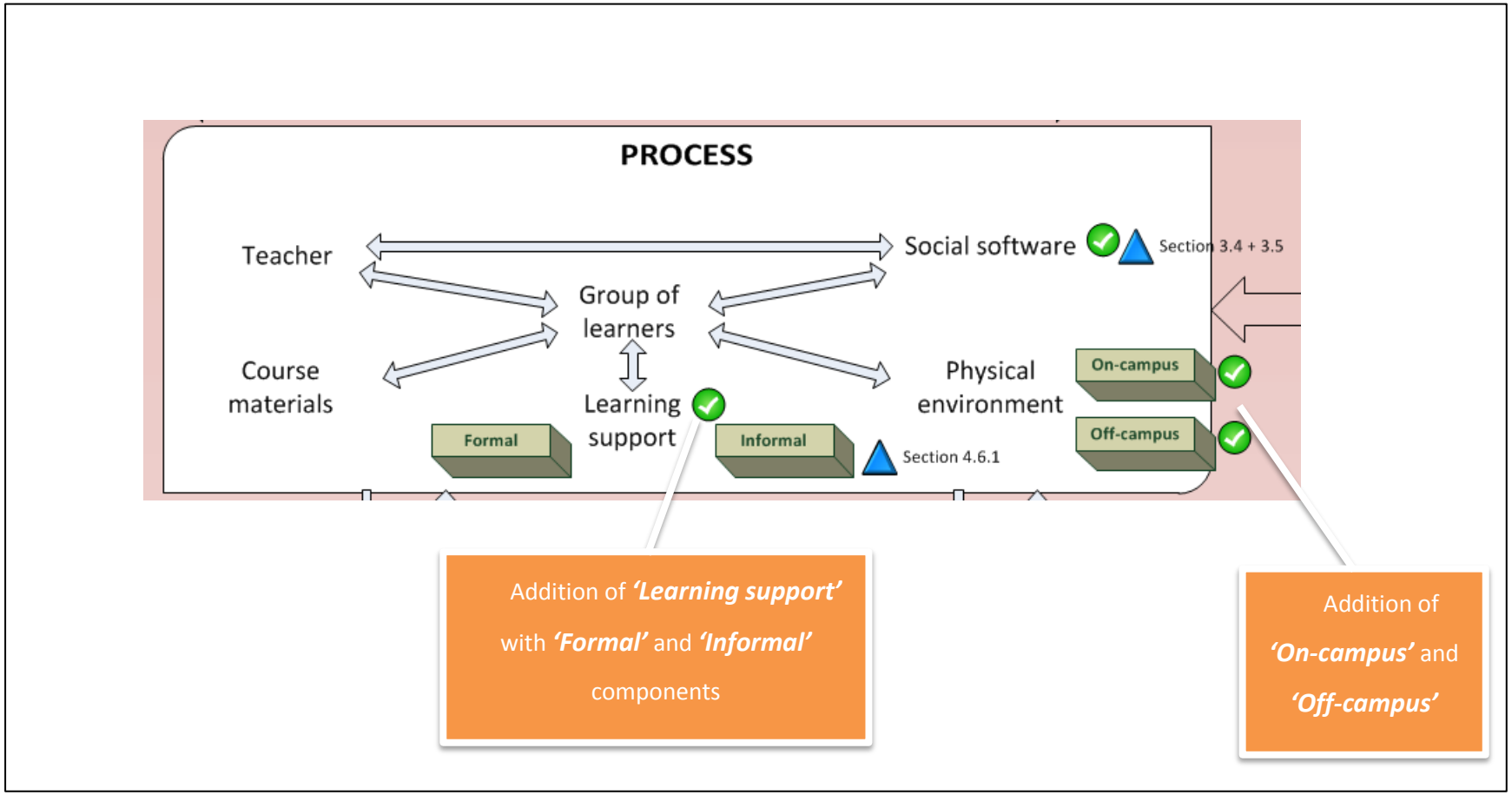

Figure 37: PAR Iteration 2 Amendments to CSCL Framework

Each of these amendments is discussed below.

Input

- Structural features of CSCL:
  - ***'Assessment criteria'*** – clear guidelines for assessment need to be established before the task(s) is given to students with explicit measurements but at the same time it must allow for flexibility (eg: students not being allowed to upload photos to Facebook for the assignment because of religious reasons);
  - ***'Institutional internet usage policies'***, specifically the internal resources required to assess learning output artefacts – consideration must be given to what the institutions internet usage rules are.
- Other sources of structure:
  - ***'Learning style preferences'*** – it is important to recognise that students may have different learning style preferences ie: that they are not homogenous;
  - ***'Web 2.0 proficiency of students'*** – not all students are web 2.0 proficient in the sense that they may not have used web 2.0 tools before.;
  - ***'Popularity of social software tools'*** – certain social software tools have a higher popularity with the students than other tools.
- Internal system of group:
  - ***'Cultural influences'*** – the religious affiliations of students may have an influence on the internal system of the groups.

Process

- Addition of ***'Learning support'*** with both ***'Formal'*** and ***'Informal'*** components – both formal (eg: course LMS) and informal (eg: Facebook course page) are necessary when designing social software CSCL environments as the informal component(s) enables teacher-student and student-student (ie: peer-to-peer) interaction;
- Creating two sub-components to ***'Physical Environment'***, being: ***'On-campus'*** and ***'Off-campus'*** – consideration must be given to the fact that students will interact with the social software tools both on-campus and off-campus as these tools are accessible anywhere where the students have access to internet-enabled devices.

8.2.7.2 PAR Iteration 2 Learning's

As mentioned in Chapter 5, section 5.6.2, the findings from the data analysis of iteration 2 has highlighted certain items that can be amended / changes that can be made to the theoretical framework for CSCL as proposed by De Villiers (1995) as discussed in section 3.6 in Chapter 3. These changes include additions to the ***Input*** component of the framework as depicted below in Figure 38:

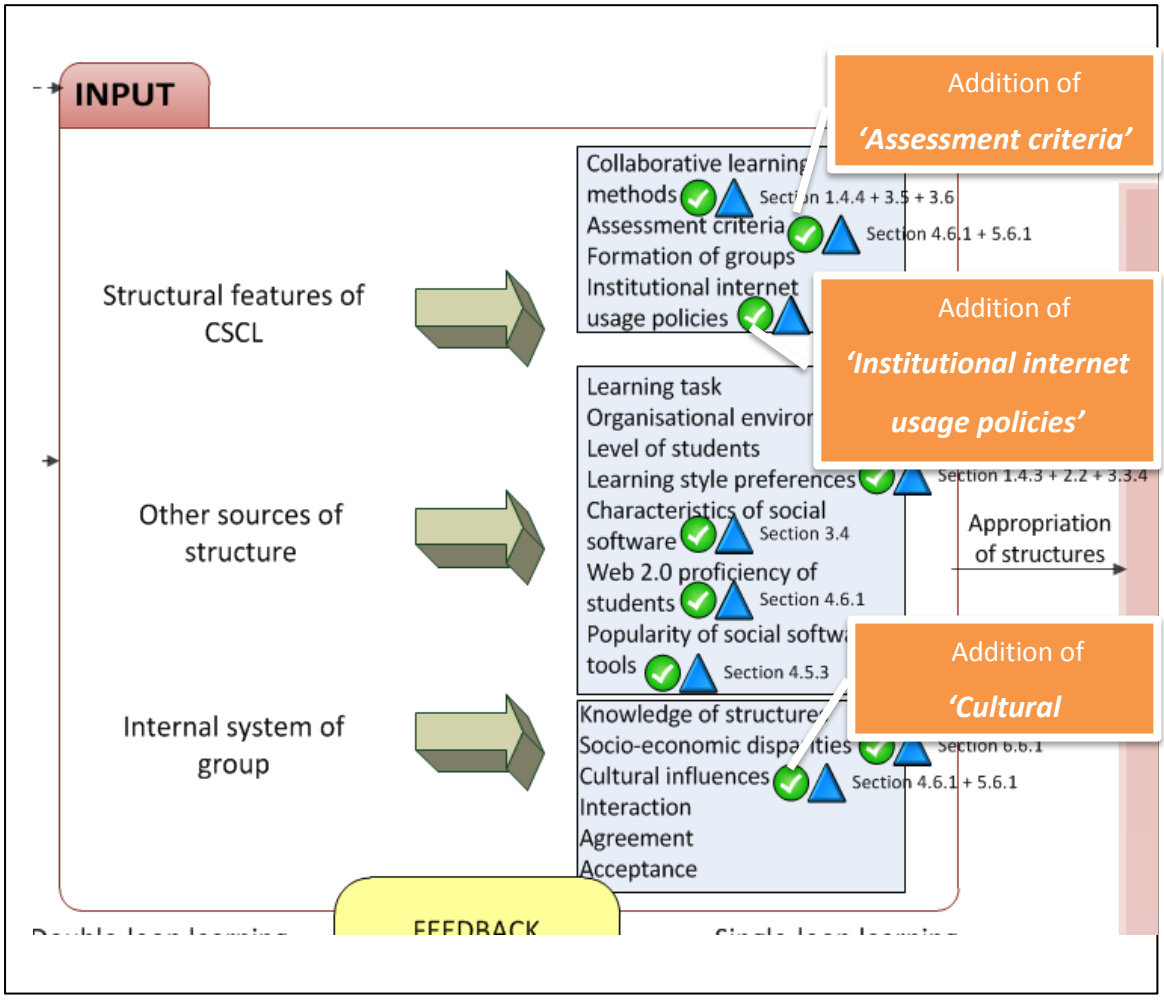

Figure 38: PAR Iteration 2 Amendments to CSCL Framework

Each of these amendments is discussed below.

Input

- Structural features of CSCL:
  - '***Assessment criteria'***, specifically the fact that the teacher(s) / lecturer(s) needs to ensure that the criteria are robust enough to cater for exceptions where students cannot complete certain pieces of the task because of religious and/or privacy/confidentiality concerns (a similar point was identified in iteration 1);

- ***'Institutional internet usage policies'***, specifically the blocking of content by the institutional firewall (a similar point was identified in iteration 1);

- Internal system of group:
  - ***'Cultural influences'***, specifically regarding privacy/confidentiality concerns of the students regarding the content of the learning output artefacts and its availability on the web.

8.2.7.3 PAR Iteration 3 Learning's

As mentioned in Chapter 6, section 6.6.2, the findings from the data analysis of iteration 3 has highlighted certain items that can be amended / changes that can be made to the theoretical framework for CSCL as proposed by De Villiers (1995) as discussed in section 3.6 in Chapter 3. These changes include additions to the ***Input*** component of the framework as depicted below in Figure 39:

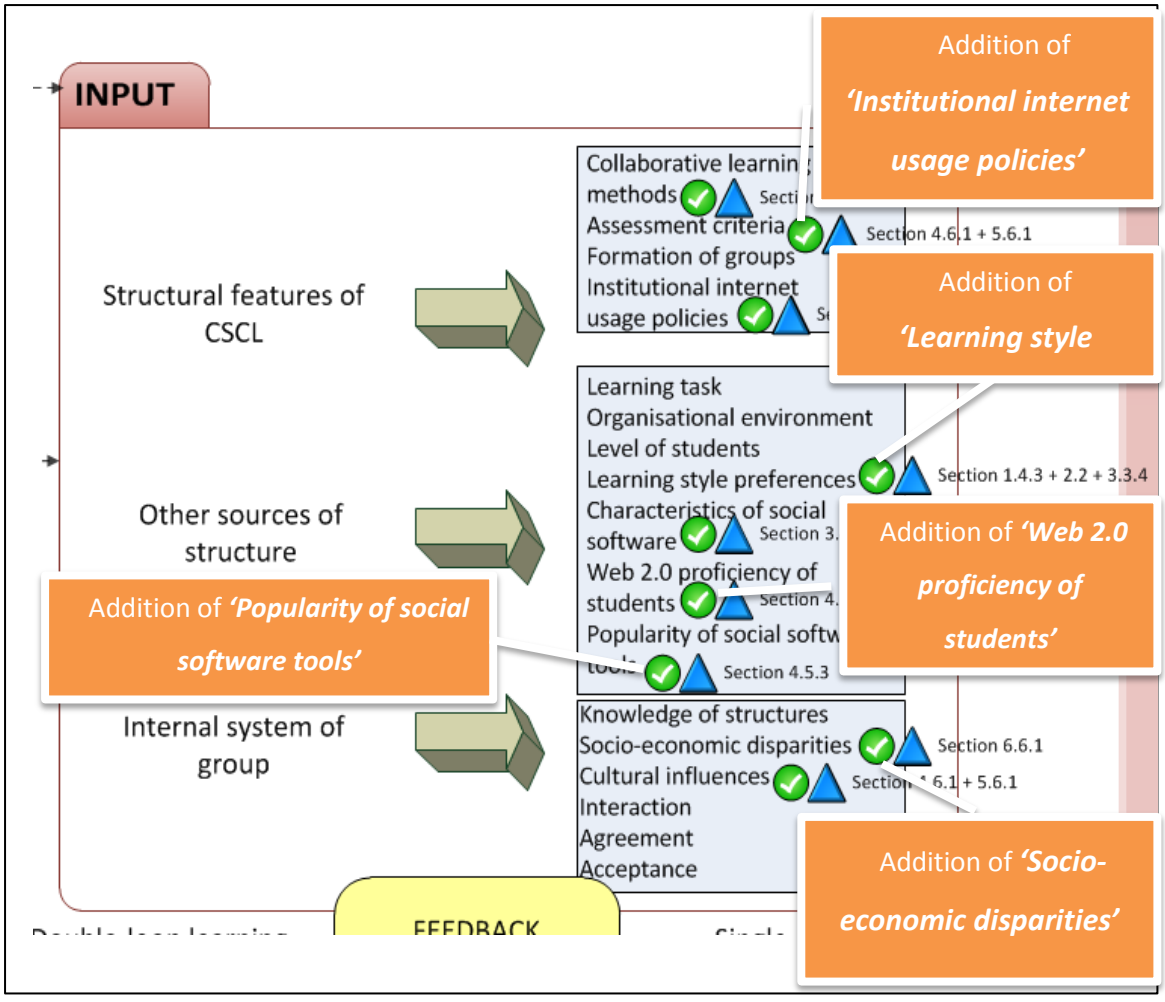

Figure 39: PAR Iteration 3 Amendments to CSCL Framework

Each of these amendments is discussed below.

Input

- Structural features of CSCL:
  - ***'Institutional internet usage policies'***, specifically the internal resources required to assess learning output artefacts (similar points were also identified in iteration 1 & 2).
- Other sources of structure:
  - ***'Learning style preferences'*** (was also identified in iteration 1 & 2);
  - ***'Web 2.0 proficiency of students'*** (was also identified in iteration 1 & 2);
  - ***'Popularity of social software tools'*** (was also identified in iteration 1 & 2).
- Internal system of group:
  - ***'Socio-economic disparities'*** (NEW addition) – consideration needs to be given to the fact that not all students have the same personal resources available to them to be able to complete the task(s).

8.2.8 Social Software

De Villiers (1995) CSCL Framework was a generic framework in the sense that it could be used to understand and design CSCL environments with any type of Information Technology. In the case of my revised framework, called the Social Software SECT Framework for CSCL, it can be used specifically for CSCL environments that are making use of social software. As such, an amendment has been made to De Villiers (1995) framework as depicted in Figure 40 below:

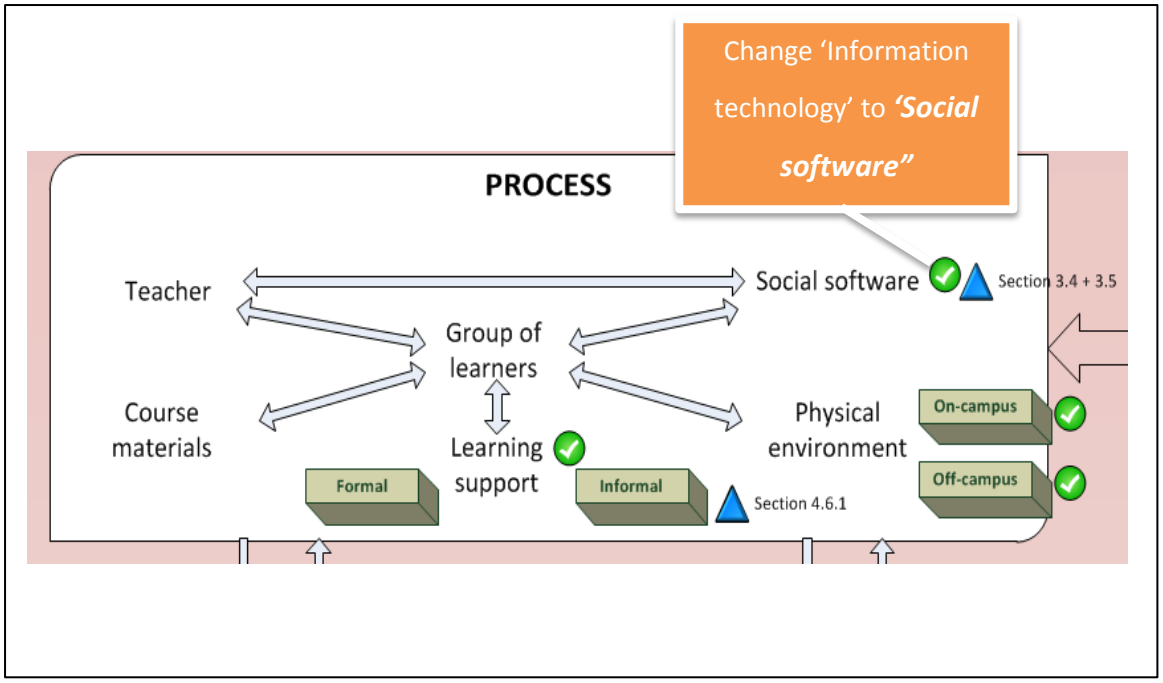

Figure 40: Social Software Amendment to the CSCL Framework (I)

Additionally, it is important that the lecturer(s) give due consideration to the characteristics of the social software tools in question as they may have a structural impact as depicted in Figure 41 below:

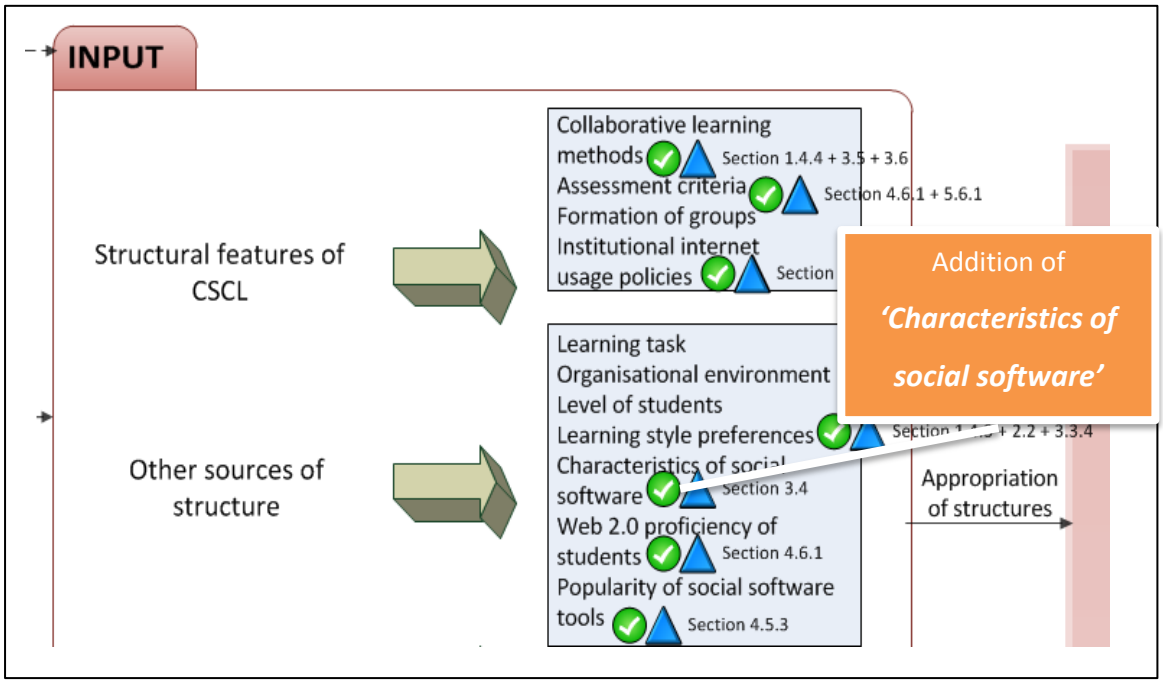

Figure 41: Social Software Amendment to the CSCL Framework (II)

8.3 REVISED CSCL FRAMEWORK

The revised CSCL Framework, called the Social Software SECT Framework for CSCL is depicted in Figure 42 below:

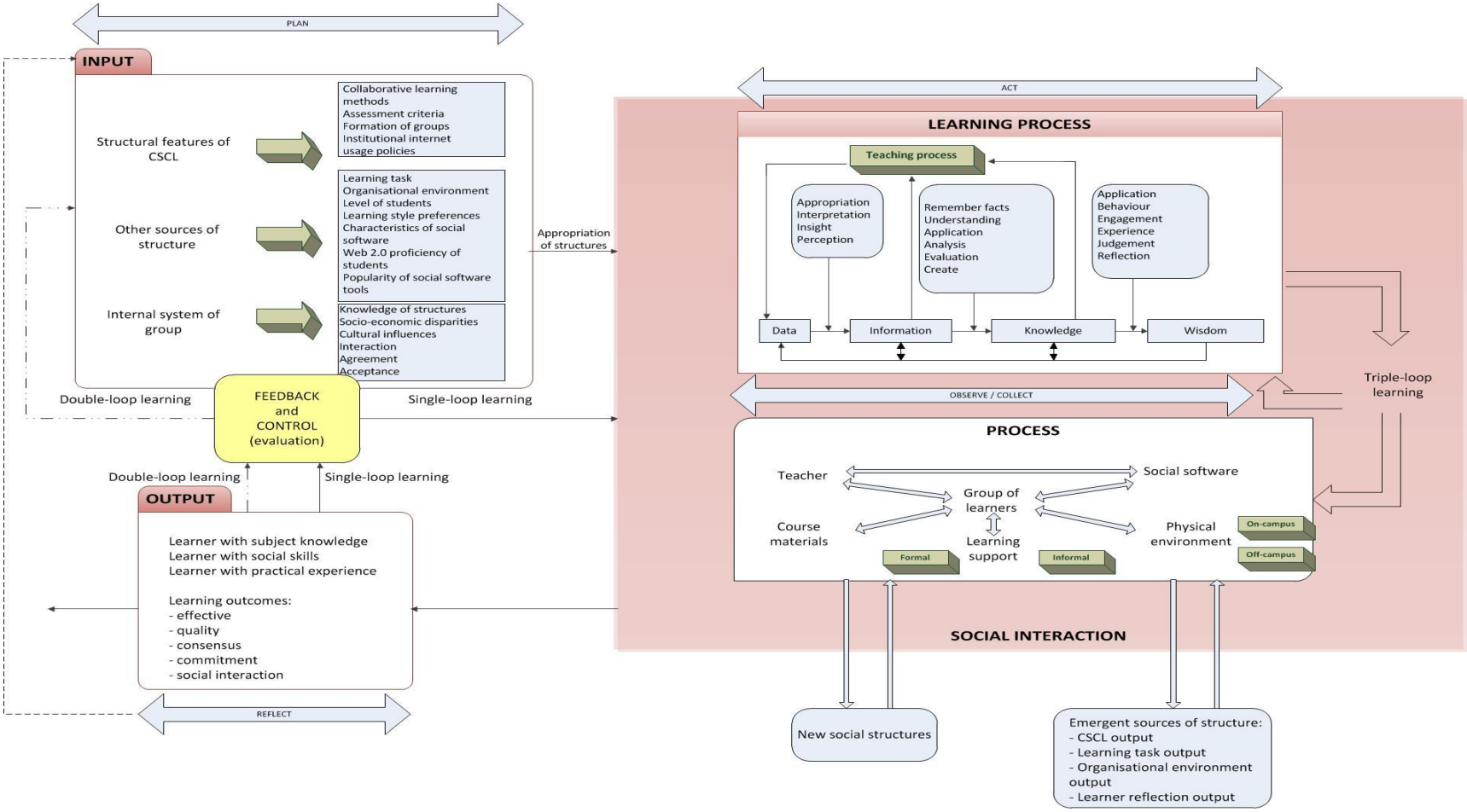

Figure 42: Social Software SECT Framework for CSCL

8.4 CONCLUSION

This chapter explains how the proposed Social Software Socio-Economic-Cultural-Technical (SECT) Framework for CSCL for the Net Generation in higher education was developed. This chapter used input from all of the previous chapters in order to produce the SECT framework.

In this chapter, Bloom's Revised Taxonomy, Experiential Learning Theory, Participatory Action Research, the Revised Data Information Knowledge Wisdom Hierarchy, Triple-loop learning and Iterations 1 – 3 were synthesised together with De Villiers (1995) theoretical framework for CSCL in order to produce a CSCL framework specifically designed for collaborative learning activities for the Net Generation in higher education.

The next chapter will conclude the research with a summary, an evaluation of the research, conclusions, as well as recommendations for further research to be done.

CHAPTER 9

CONCLUSION

CHAPTER 9: CONCLUSION

9.1 INTRODUCTION

The objective of this study was to explore whether and the extent to which social software tools can be used for CSCL for the Net Generation in higher education. In order to achieve this, a participatory action research project spanning three years was undertaken at the University of Pretoria on a 1st year under-graduate course in the Faculty of Economic and Management Studies. Additionally, a CSCL framework, called the Social Software SECT framework was developed to be used by educators wishing to understand and/or design CSCL environments using social software for the Net Generation in higher education. This chapter summarises the research that was undertaken and the findings that were derived from it. A conclusion is provided as well as recommendations for further research.

9.2 SUMMARY

This study, as explained in Chapter 1, proposes that social software can be used to support CSCL for the Net Generation in higher education. It also involves the development of a social software technology ecology in the form of the Social Software SECT framework for CSCL. The Social Software SECT framework can be used to understand and/or design collaborative learning environments using social software specifically for the Net Generation in higher education. To make a contribution to research done on the use of social software for CSCL for the Net Generation in higher education, this research study:

- Investigated the research fields of CSCL, social software, experiential learning and the Net Generation;
- Conducted social software interventions over a period of three years at the University of Pretoria on a 1st year under-graduate course;
- Reflected on the findings from each iteration in order to inform the amendments to the proposed CSCL framework for the Net Generation in higher education;
- Synthesised these findings, along with the relevant literature that was identified, into a CSCL framework that can be used when designing and using social software CSCL environments for the Net Generation in higher education.

Chapter 2 presented the research methodology that was selected for this research project. It commenced with a discussion of the context, purpose and objectives of this study, as well as introducing the theoretical framework that was used, being *Kolb's experiential learning*. The

recommended approach was an *Interpretivist Participatory Action Research* approach which makes use of iterative cycles to determine whether social software can be used to support collaborative learning for the Net Generation in higher education. I recommended this approach because interpretivism involves engaging in the social setting and learning how interactions take place from a particular perspective. Given the fact that the topic has people and learning as its cornerstones, it is imperative that the social reality of the topic be recognised and treated as such. Participatory Action Research was well suited to this topic because it was used to solve a real-world challenge which is being experienced in educational circles. The social setting within tertiary education institutions is multi-variate and the introduction of social software for learning involved a change in the social setting and as such I, as the researcher, believed that participatory action research would be most appropriate. The methodological process involved implementing a number of social software tools over three iterations on the INF112 curriculum. I recommended making use of a questionnaires as my data gathering technique, which included both quantitative and qualitative data. Ultimately I intended to introduce organisational change in the form of using social software for collaborative learning for the Net Generation at the University of Pretoria whilst at the same time studying the process.

In Chapter 3, an in-depth discussion of the relevant literature was given, commencing with a definition of the key themes being: the Net Generation, Social Software and CSCL. Each of these key themes was then explored in detail, seeking to contextualise the themes for the research study at hand. In exploring the Net Generation, attention was given not only to their general characteristics such as their lifestyle and media habits but also their learning style preferences and in particular their behaviour in a higher education context. Whilst delving into the Net Generation categorisation, it was important to discuss the criticisms of this categorisation as much research points to the fact that this categorisation cannot be considered homogenous in all instances – this points to the fact that educators should make allowances for individual learning preferences as there is risk in assuming that all students in this category has exactly the same learning preferences. In exploring social software, various types of social software were discussed, along with their advantages and disadvantages in an educational context. It was evident from the literature reviewed that whilst there is much support for the use of social software in education, there is also a body of criticism against its use which delves into the limitations and challenges. As an educator it is important to be cognisant of both the positives, negatives, opportunities and challenges that these social software tools present. In exploring CSCL, a review of the theoretical underpinnings was first conducted and then a discussion commenced on the use of CSCL in higher education. Technology's role in CSCL was

explored and then a discussion of the use of social software for CSCL for the Net Generation in higher education commenced. This discussion highlighted the growing interest that social software tools are receiving in higher education sectors across the world, due to their potential to meeting the learning needs of the Net Generation. Four themes were identified that help to define the relationship between collaborative learning environments and social software, being: *transformation of the scholarly processes*, *learner participation*, *social relevance* and *knowledge sharing*. Lastly, the CSCL theoretical framework that was used as the basis upon which to develop an enhanced CSCL framework for the use of social software for the Net Generation in higher education was discussed.

Chapter 4, Chapter 5 and Chapter 6 discussed the social software interventions that were conducted for iteration 1, iteration 2 and iteration 3 of this participatory action research project. Each of these chapters commenced with the setting of the context and purpose of each iteration and then discussed each of the four phases of PAR, being: *plan*, *act*, *observe/collect* and *reflect*. The data analysis and findings from the questionnaires for each iteration were tabularised and depicted graphically with the ultimate aim of informing the *planning* phase of the following iteration. Additionally, these findings along with the reflections from each phase were used to propose amendments to De Villiers (1995) theoretical framework for CSCL in order to develop the proposed Social Software Socio-Economic-Cultural-Technical (SECT) framework for CSCL for the Net Generation in higher education.

Chapter 7 detailed the data analysis consolidation of the three iterations of my PAR project. Also, it sought to answer the primary and secondary research questions, based on the findings of the data analysis and consolidation. The first section of this chapter discussed the overall findings from the data consolidation of the three iterations of this PAR. The second section used the output from the previous section, as well as the findings from iterations 1 -3 (chapter 4, 5 and 6) in order attempt to answer the research questions.

This study not only focused on determining whether social software tools can be used to support CSCL for the Net Generation in higher education but also aimed to develop a CSCL framework that can be used to design collaborative learning activities for them. Chapter 8 used relevant input from all of the previous chapters, in order to produce this framework. In this chapter, *Bloom's Revised Taxonomy, Experiential Learning Theory*, *Participatory Action Research*, the *Revised Data Information Knowledge Wisdom Hierarchy*, *Triple-loop learning* and *Iterations 1 – 3* were synthesised

together with De Villiers (1995) theoretical framework for CSCL in order to produce a CSCL framework specifically designed for collaborative learning activities for the Net Generation in higher education, called the Social Software Socio-Economic-Cultural-Technical (SECT) Framework for CSCL.

9.3 EVALUATION OF RESEARCH

Having conducted a PAR project and developed an enhanced CSCL framework for the use of social software for the Net Generation in higher education, it is necessary to try to evaluate the contribution objectively. In order to try to attempt evaluating this PAR project, action research evaluation criteria as developed by Piggot-Irvine & Bartlett (2008) will be used.

9.3.1 Contribution of this Study

The research done on the use of social software for CSCL for the Net Generation in higher education indicated that even-though there is much research taking place regarding this development, the use of social software to enhance learning environments is still in its early phase and needs to be explored further (Li et al., 2012). As (Clark et al., 2009:56) state, *"More needs to be understood about the transferability of Web 2.0 skill sets and ways in which these can be used to support formal learning."*

The ability of technology to support collaborative learning is becoming increasingly important as the use of social software globally becomes more pervasiveness (Suthers, 2006). As these social software tools are fundamentally social by nature, they can be used to support social acts that constitute collaborative learning activities (group work) (Porcaro, 2011). By understanding how technology can be used to support collaborative learning interactions, educators are able to identify the potential of using CSCL for teaching and learning to create a more workplace-ready student pool (Porcaro, 2011).

Piggot-Irvine & Bartlett (2008) propose a Research in Action Checklist, based on a number of evaluative schema that can be used to evaluate action research efforts.These criteria are listed and explained in Table 57 below:

Criteria	Questions
Area of focus	Does the area of focus involve teaching and learning?
Research questions	Does the researcher state questions that were answerable given the researcher's expertise, time and resources?

Locus of control	Was the area of focus within the researcher's locus of control?
Data collection	Did the researcher use appropriate data collection techniques (quantitative and/or qualitative) to answer the study's research questions?
Ethics	Did the research face any ethical challenges? If so, how were they resolved?
Reflective stance	In what ways has the action research effort contributed to the researcher's reflective stance on the ways teaching and learning are viewed?
Action	Did the outcomes of the study lead to action?
Action-data connection	How is the proposed action connected to the study's data analysis and interpretation?

Table 57: Research in Action Checklist (Piggot-Irvine & Bartlett, 2008)

I will now apply this action research evaluation criterion as listed in the checklist above to my PAR project.

- ***Area of focus*** – My area of focus does involve teaching and learning as it involves the use of social software for CSCL on the INF112 course at the University of Pretoria. The challenges encountered by lecturers and students on the INF112 course is what led me to my area of focus which is an attempt to improve students learning environments by using social software to support CSCL. My study is based on the principles of social constructivism.

- ***Researcher questions*** – According to Piggot-Irvine & Bartlett (2008:210), *"Research questions breathe life into the area of focus statement and help provide a focus for the action researcher's data collection plan. These questions should provide the researcher with a workable way to proceed with the research."* The following were listed as my research questions:
  - Can social software be used to support Computer-Supported Collaborative Learning for the Net Generation in higher education? (MAIN)

- Are certain types of social software more conducive to providing support for Computer-Supported Collaborative Learning for the Net Generation in higher education? (SECONDARY)
- Can a Computer-Supported Collaborative Learning framework be developed that can be used to design collaborative learning activities using social software for the Net Generation in higher education? (SECONDARY)

  These questions clearly link to my area of focus and suggest data sources needed to determine the effectiveness of this social software intervention.

- ***Locus of Control*** – My action research project focused on the INF112 students from 2009 – 2011 during which I was the course convenor.

- ***Data Collection*** – According to Piggot-Irvine & Bartlett (2008:210), *"When evaluating an action research project you should carefully consider the appropriateness of the sources of data the teacher researcher has identified. Will these data sources provide the teacher researcher with the information necessary to answer the research questions?"* My study involved the impact that social software tools could have on supporting CSCL for the Net Generation students on the INF112 course. As such questionnaires were used to evaluate students' perceptions regarding the use of the various social software tool interventions. An additional data source was used for the development of the revised CSCL framework, being the outcome of the reflection phase for each iteration of the PAR project.

- ***Ethics*** - According to Piggot-Irvine & Bartlett (2008:211), *"When evaluating an action research project, one should be sensitive to any possible ethical challenges faced by the researcher".* In the case of my PAR project, students were asked to sign informed consent forms that assured their confidentiality and anonymity. In no instances were student names / numbers divulged or reported on as part of my PAR project.

- ***Reflective Stance*** - According to Piggot-Irvine & Bartlett (2008:211), *"Ideally an action research study results in the researcher adopting a reflective stance on the ways teaching and learning are viewed."* Through my action research project I have become more reflective and through this project the data that I collected guided and informed

my decisions and actions – the feedback from the INF112 students combined with my own reflections from each iteration have been used to make changes to the learning environments that I design for my students.

- ***Action*** - According to Piggot-Irvine & Bartlett (2008:212), *" Ideally an action research project should lead to action by the teacher researcher."* My research study has discussed in detail the impact that the action research process has had on the learning environments of the INF112 students, based primarily on what I have learnt about how my students experience learning. This has resulted in a more learner-centered teaching approach.

- ***Action-Data Connection*** – In my research study I clearly link my data analysis sections to the social software interventions (actions) that were conducted.

Based on evaluating my action research project against the Research in Action Checklist as defined by Piggot-Irvine & Bartlett (2008), I as the participant researcher am of the opinion that the quality of my project is of an acceptable standard. In terms of the revised CSCL framework for using social software for CSCL for the Net Generation in higher education, a new theoretical framework was not produced but instead an enhanced version, both practically and theoretically, of an original generic theoretical framework by De Villiers (1995) was proposed.

9.3.2 Answering of Research Questions

In Chapter 1 of my PAR project, three research questions were asked. These research questions have been answered in Chapter 7, section 7.3. A summary of this discussion now follows.
The extent to which the research questions were answered can be summarised as follows (per question):

- ***Can social software be used to support Computer-Supported Collaborative Learning for the Net Generation in higher education?*** (MAIN) – The answer to this question is that social software **can** be used to support CSCL for the Net Generation in higher education. Based on the findings of the data analysis it appears that social software **strongly supports** CSCL for the Net Generation in higher education (i.e.: **YES**).

- ***Are certain types of social software more conducive to providing support for Computer-Supported Collaborative Learning for the Net Generation in higher education?***

(SECONDARY) – The answer to this research question is that certain types of social software **are** more conducive to providing support for CSCL for the Net Generation in higher education. Throughout the three iterations there is evidence that certain social software tools were better at supporting CSCL (i.e.:**YES**).

- ***Can a Computer-Supported Collaborative Learning framework be developed that can be used to design collaborative learning activities using social software for the Net Generation in higher education?*** (SECONDARY) – The answer to this question is a positive, i.e.: that a CSCL framework **can** be developed that can be used to support collaborative learning activities using social software for the Net Generation in higher education. This social software SECT framework for CSCL was presented in Chapter 8 (i.e.:**YES**).

9.4 CONCLUSION

In conclusion the following question can be asked: How does the Social Software SECT framework aid educators in designing CSCL environments? The Social Software SECT framework, as defined in Figure 44 (section 8.3), clearly indicates what needs to be considered by educators when designing CSCL environments using social software for the Net Generation in higher education.

9.5 FURTHER RESEARCH

A number of recommendations for further research can now be made. These recommendations can be divided into three parts, being:

- **Social Software SECT framework**

  The Social Software SECT framework as defined in Chapter 8 can be applied and tested in different learning situations, with a view to making further enhancements to the framework. Examples of possible applications include:

  - The framework can be applied at post-graduate level in higher education;
  - The framework can be applied at secondary school level;
  - The framework can be applied in corporate organisations for organisational learning activities for employees;
  - The framework can be applied to non-Net Generation students.

- **Social Software**

- Types of social software tools that were not included in this study should be examined to determine if and the extent to which they can be used to support CSCL;
- Characteristics of the social software tools that are better at supporting CSCL for the Net Generation in higher education should be studied and a subsequent matrix could be developed to explain the correct fit between learning task and social software tools;
- Social software tools should be applied to non-collaborative learning activities to determine to what extent they can be used to support other types of learning activities.

- **The Net Generation**
  - Studies could be conducted to determine the learning style preferences of a particular group of Net Generation students – this would imply not assuming that the group is homogenous and instead use Kolb & Fry's learning style matrix for learners;
  - The application of Kolb's experiential learning theory could be tested against the Net Generation categorisation to determine whether a revised categorisation could be developed which addresses unique learning style preferences.

9.6 CONCLUDING REMARKS

The positive results from this study concerning the use of social software for CSCL for the Net Generation in higher education, along with the proposed Social Software SECT framework for CSCL, will hopefully enable educators to design successful CSCL environments using social software. It is hoped that this will subsequently contribute to a change in the current learning environments in order to better meet the evolving teaching and learning needs and preferences of the Net Generation of students.

REFERENCES

REFERENCES

INF112 Course Evaluation. (2008). INF112 Course Evaluation Feedback. Pretoria, South Africa: University of Pretoria.

Abbott, A. (1990). Positivism and Interpretation in Sociology: Lessons for Sociologists from the History of Stress Research. *Sociological Forum, 5*(3), 435-458.

Abell, C. H. (2011). Using YouTube to bridge the gap between baby boomers and millennials. *Journal of Nursing Education, 50*(5), 299.

Acquisti, A., & Gross, R. (2006). Imagined Communities: Awareness, Information Sharing, and Privacy on the Facebook. *Lecture Notes in Computer Science*, 36-58.

Agazio, J., & Buckley, K. (2009). An Untapped Resource: Using YouTube in Nursing Education. *Nurse Educator, 34*(1), 23-28.

Alexander, B. (2006). Web 2.0: A new wave of innovation for teaching and learning? *Educause Review, March - April*, 33-44.

Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching and assessing: A revision of Bloom's Taxonomy of educational objectives: Complete edition.* (1st ed.). New York: Longman.

Argyris, C., & Schon, D. (1978). *Organisational learning: A theory of action perspective.* Reading: Addison Wesley.

Auchard, E. (2008). *Web Archive.* Retrieved 1 7, 2013, from http://web.archive.org/web/20080302210238/http://news.yahoo.com/s/nm/20080228/tc_nm/google_sites_dc_1

Avgerou, C. (2005). Doing critical research in information systems: some further thoughts. *Information Systems Journal , 15*, 103-109.

Baker, A., Jensen, P., & Kolb, D. (2002). *Conversational Learning, an Experiential Approach to Knowledge Creation.* Quorum Books.

Baker-Eveleth, L., Stone, R., & Pendegraft, N. (2007). Using Collaborative Software to enhance the Classroom Learning Environment. Proceedings of the AIS SIG-ED IAIM 2007 Conference.

Barr, R., & Tagg, J. (1995). From Teaching to Learning - A New Paradigm for Undergraduate Education. *Change, 26*(6), 12-25.

Baskerville, R., & Myers, M. (2004). Special Issue on Action Research in Information Systems: Making IS relevant to practice – Foreword. *MIS Quarterly, 28*(3), 329-335.

Baskerville, R., & Pries-Heje, J. (1999). Grounded Action Research: a method for understanding IT in practice. *Accounting, Management and Information Technology , 9*, 1-23.

Baskerville, R., & Wood-Harper, A. (1996). A critical perspective on action research as a method for information systems research. *Journal of Information Technology, 11*(3), 235-246.

Baskerville, R., & Wood-Harper, A. (1998). Diversity in information systems action research methods. . *European Journal of Information Systems, 7*, 90-107.

Beer, D. (2008). Social Networking Sites...Revisiting the Story So Far. *Journal of Computer-Mediated Communication, 13*, 516-529.

Bennett, S., & Maton, K. (2010). Beyond the 'digital natives' debate: Towards a more nuanced understanding of students' technology experiences. *Journal of Computer Assisted Learning, 26*(5), 321-331.

Berg, B. L. (2007). *Qualitative Research Methods for the Social Sciences* (6th ed.). Pearson Education.

Berk, R. A. (2009a). Multimedia teaching with video clips: TV, movies, YouTube, and mtvU in the college classroom. *International Journal of Technology in Teaching and Learning, 5*(1), 1-21.

Berk, R. A. (2009b). Teaching Strategies for the Net Generation. *Teaching & Learning Journal , 3*(2), 1-24.

Berk, R. A. (2009b). Teaching Strategies for the Net Generation. *Transformative Dialogues: Teaching & Learning Journal Volume, 3*(2), 1-24.

Blackey, H., & Chew, E. (2009). *Social Software Policy 2009–2012 for The University of Glamorgan.* Glamorgan: University of Glamorgan.

Boud, D., & Miller, N. (1996). *Working with Experience: Animating Learning.* London: Routledge.

Boulos, M., Maramba, I., & Wheeler, S. (2006). Wikis, blogs and podcasts: a new generation of web-based tools for virtual collaborative clinical practice and education. *BMC Medical Education, 6*(41).

Boyd, D. (2007). The significance of social software. In T. Burg, & J. Schmidt (Eds.), *BlogTalks reloaded: Social software research & cases* (pp. 15-30). Norderstedt: Books on Demand.

Boyd, D., & Ellison, N. (2008). Social Network Sites: Definition, History and Scholarship. *Journal of Computer-Mediated Communication, 13*, 210-230.

Brown, J., & Adler, R. (2008). Minds on fire: Open education, the long tail, and learning 2.0. *Educause Review*, pp. 16-32.

Bryant, T. (2006). Social Software in Academia. *Educause Quarterly, 2*, 61-64.

Burke, S., Snyder, S., & Rager, R. (2009). An assessment of faculty usage of YouTube as a teaching resource. *The Internet Journal of Allied Health SCiences and Practice, 7*(1), 1-8.

Caffarella, R., & Barnett, B. (1994). Characteristics of adult learners and foundations of experiential learning. In L. Jackson, & R. Caffarella (Eds.), *New directions for adult and continuing education* (pp. 29-42). San Francisco: Jossey-Bass.

Cain, J., & Fox, B. (2009). Web 2.0 and Pharmacy Education. *American Journal of Pharmaceutical Education, 73*(7).

Cantor, J. (1995). *Experiential Learning in Higher Education: Linking Classroom and Community* (1st ed.). Jossey-Bass.

Cavus, N., & Kanbul, S. (2010). Designation of Web 2.0 tools expected by the students on technology based learning environment. *Procedia Social and Behavioral Sciences, 2*, 5824-5829.

Chan, C., & van Aalst, J. (2004). Learning, assessment and collaboration in computer-supported environments. In J. Strijbos, P. Kirschner, & R. Martens (Eds.), *What we know about CSCL in higher education* (pp. 87-113). Dordrecht: Kluwer Academic Publishers.

Chen, G., Ou, K., Liu, C., & Liu, B. (2001). Intervention and strategy analysis for web group-learning. *Journal of Computer Assisted Learning, 17*, 58-71.

Chen, W., & Hirschheim, R. (2004). A paradigmatic and methodological examination of information systems research from 1991 to 2001. *Information Systems Journal, 14*, 194-235.

Chen, W., & Hirschheim, R. (2004). A paradigmatic and methodological examination of information systems research from 1991 to 2001. . *Information Systems Journal, 14*, 197-235.

Chester, A., & Gwynne, G. (1998). Online Teaching: Encouraging Collaboration through Anonymity. *Journal of Computer-Mediated Communication, 4*(2).

Chetty, M., Banks, R., Bernheim Brush, A., Donner, J., & Grinter, R. E. (2011). While the Meter is Running : Computing in a Capped World. *Interactions, 18*(2), 72-75.

Chickering, A. W., & Gamson, Z. (1987). Seven Principles for Good Practice in Undergraduate. *American Association for Higher Education Bulletin*, 3-7.

Cho, H., Lee, J., Stefanone, M., & & Gay, G. (2005). Development of computer-supported collaborative social networks in a distributed learning community. *Behaviour and Information Technology, 24*(6), 435-447.

Churchill, D. (2009). Educational applications of Web 2.0: Using blogs to support teaching and learning. *British Journal of Educational Technology, 40*(1), 179-183.

Clark, C., & Mayer, R. (2002). *E-Learning and the Science of Instruction: Proven Guidelines for Consumers and Designers of Multimedia Learning.* San Francisco: Jossey-Bass Pfeiffer.

Clark, W., Logan, K., Luckin, R., Mee, A., & Oliver, M. (2009). Beyond Web 2.0: mapping the technology landscapes of young learners. *Journal of Computer Assisted Learning, 25*(1), 56-69.

Clifton, A., & Mann, C. (2011). Can YouTube enhance student nurse learning? *Nurse Education Today, 31*(4), 311-313.

Cloete, S., De Villiers, C., & Roodt, S. (2009). Facebook as an Academic Tool for ICT Lecturers. Proceedings of the 2009 Annual Conference of the Southern African Computer Lecturers Association.

Cohen, I. (2000). Theories of action and praxis. In B. Turner (Ed.), *The Blackwell companion to Social Theory* (pp. 73-111). Malden: Blackwell.

Coleman, A. (1976). Is Planning really necessary? *Geographical Journal, 142*(3), 411-430.

Commission, E. (n.d.). *Web 2.0 European Resource Centre.* Retrieved 01 10, 2013, from http://www.web20erc.eu/sites/default/files/Pedagogy2.0-EN.pdf

Conole, G., & Alevizou, P. (2010). *The Open University.* Retrieved 2 3, 2012, from http://oro.open.ac.uk/23154

Corbin, J., & Strauss, A. (1990). Grounded Theory Research: Procedures, Canons and Evaluative criteria. *Qualitative Sociology, 13*(1), 3-20.

Cram, A., Kuswara, A., & Richards, D. (2008). Web 2.0 supported collaborated learning activities,towards an affordable perspective. (pp. 70-80). Sydney: Proceedings of the 3rd International LAMS and Learning Design Conference.

Cranston, P. (2006). *Understanding and Promoting Transformative Learning: A Guide for Educators of Adults.* San Francisco: Jossey-Bass.

Creswell, J. W. (2007). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (3rd ed.). Sage.

Cross, K. (1994). The Coming of Age of Experiential Education. *NSEE Quarterly, 19*(4), 22-23.

Dalsgaard, C. (n.d.). *European University of Information Systems.* Retrieved 12 28, 2012, from http://eunis.dk/papers/p41.pdf

Darke, P., Shanks, G., & Broadbent, M. (1998). Succesfully completing Case Study research: combining rigour, relevance and pragmatism . *Information Systems Journal, 8*, 273-289.

Dawson, S. (2006). Relationship between student communication interaction and sense of community in higher education. *Internet and Higher Education, 9*(3), 153-162.

De Villiers, C. (1995). The Integration of Information Technology in a Co-operative Learning Environment. DCom dissertation: University of Pretoria.

De Villiers, C., & Roode, D. (1998). The Use of CSCL To Teach Information Systems: A Theoretical Framework. *Journal of Education for MIS, 5*(1), 19-31.

DeSanctis, G., & Poole, M. (1994). Capturing the complexity in advanced technology use: Adaptive Structuration Theory. *Organization Science, 5*(2), 121-147.

Dewey, J. (1938). *Education and Experience.* New York: Simon and Schuster.

Dickens, L., & Watkins, K. (1999). Action Research: Rethinking Lewin. *Management Learning, 30*(2), 127-140.

Dillenbourg, P. (1999). *Collaborative learning: Cognitive and computational approaches.* Amsterdam: Pergamon.

Dillenbourg, P. (2002). Over-scripting CSCL: The risks of blending collaborative learning with instructional design. In P. Kirschner (Ed.), *Three worlds of CSCL. Can we support CSCL?* (pp. 61-91). Heerlen: Open Universiteit Nederland.

Dodge, J. (n.d.). Find me on Facebook. *Design News*, 9.

Dohn, N. (2009). Web 2.0: Inherent tensions and evident challenges for education. *International Journal of Computer-Supported Collaborative Learning, 4*(3), 343-363.

Donath, J. (2008). Signals in Social Supernets. *Journal of Computer-Mediated Communication, 13*, 231-251.

Doolittle, P., & Camp, W. (1999). Constructivism: The Career and Technical Education Perspective. *Journal of Vocational and Technical Education, 16*(1).

Downes, S. (2005, October). *eLearn Magazine.* Retrieved 12 30, 2012, from http://elearnmag.acm.org/featured.cfm?aid=1104968

Dron, J. (2007). *Control and constraint in e-learning: Choosing when to choose.* Hershey: Information Science Publishing.

Duffy, P. (2008). Engaging the YouTube Google-Eyed Generation: Strategies for Using Web 2.0 in Teaching and Learning. *The Electronic Journal of e-Learning, 6*(2), 119-130.

Duffy, P., & Bruns, A. (2006). The use of blogs, wikis and RSS in education: A conversation of possibilities. (pp. 31-38). Brisbane: Proceedings of the Online Learning and Teaching Conference.

Dunn, L. (2002). *Theories of learning, Learning and Teaching Briefing Paper Series.* Oxford: Oxford Brookes University .

Eberhardt, D. (2010). Facing up to Facebook. *Wiley InterScience About Campus*, 18-26.

Edirisingha, P., Salmon, G., & Fothergill, J. (2007). Podcasting - a pilot study and guidelines for integrating podcasts in a blended learning environment. . In U. Bernath, & A. Sangrà (Eds.), *Research on competence development in online distance education and e-learning: Selected papers from the 4th EDEN Research Workshop in Castelldefels/Spain, 25-28 October 2006* (pp. 127-137). Oldenberg: Universitat Oldenburg.

Eggen, P., & Kauchak, D. (2004). *Educational Psychology: Windows on Classrooms.* (6th ed.). Upper Saddle River, New Jersey: Pearson Prentice Hall.

Ehrenberg, A. (2000). Data Reduction. *Journal of Empirical Generalisations in Marketing Science, 5*, 1-391.

Eisner, E. (2002). *Benjamin Bloom 1913-1999.* International Bureau of Education, UNESCO.

Elden, M., & Chisholm, R. (1993). Emerging Varieties of Action Research: Introduction to the Special Issue. *Human Relations , 46*(2), 121-142.

Elgort, I., Smit, A., & Toland, J. (2008). Is wiki an effective platform for group course work? *Australian Journal of Educational Technology, 24*(2), 195-210.

Ellison, N. (2007). Facebook Use ositesn Campus: A Social Capital Perspective on Social Network. Boca Raton: Presentation at the ECAR Symposium.

English, R., & Duncan-Howell, J. (2008). Facebook goes to college: Using social networking tools to support students undertaking teaching practicum. *Journal of Online Learning and Teaching, 4*(4), 596-601.

Evans, V., & Larri, L. (2006). *Networks, Connections and Community: Learning with Social Software.* Canberra: Australian Flexible Learning Framework.

Facebook. (n.d.). *Facebook*. Retrieved 12 28, 2012, from http://www.facebook.com

Flyvberg, B. (2004). Five misunderstandings about case study research. In C. Seale, G. Gobo, J. Gubrium, & D. Silverman (Eds.), *Qualitative Research Practice* (pp. 420-434). London: Sage.

Francesca, D., Porcelli, R., Mebane, M., Cuddetta, M., Klobas, J., & Renzi, P. (2005). Evaluation of the efficacy of collaborative learning in face-to-face and computer-supported university contexts. *Computers in Human Behaviour, 22*, 161-176.

Franklin, T., & Van Harmelen, M. (2007). *Franklin Consulting.* Retrieved 12 30, 2012, from http://190.208.26.22/files/web2-content-learning-and-teaching.pdf

Frydenberg, M. (2006). Principles and pedagogy: The two P's of podcasting in the information technology classroom. Chicago: Proceedings of ISECON 2006 .

Gabbert, B., Johnson, D., & Johnson, R. (1986). Cooperative learning, group-to-individual transfer, process again and the acquisition of cognitive reasoning strategies. *Journal of Psychology, 120*(3), 235-278.

Galegher, J., Kraut, E., & Egido, C. (1990). *Intellectual teamwork: Social and technological foundations of cooperative work.* Hilsdale: Lawrence Erlbaum Associates.

Gao, Q., Dai, Y., Fan, Z., & Kang, R. (2010). Understanding factors affecting perceived sociability of social software. *Computers in Human Behavior, 26*(6), 1846-1861.

Garrison, D. R. (1997). Self-Directed learning: Toward a comprehensive model. *Adult Education Quarterly, 48*(1), 18-33.

Gasser, U., & Palfrey, J. (2010). *Born Digital: Understanding the First Generation of Digital Natives.* New York: Basic Books.

Getts, C. (1990). *Internship paved the way for first year positions.* Syracuse, N.Y: ERIC Clearinghouse on Information & Technology (ERIC Document Reproduction Service No. ED326523).

Gibbs, G. R. (2007). Analyzing Qualitative Data. In U. Flick (Ed.), *The Sage Qualitative Research Kit.* Sage.

Giddens, A. (1984). *The constitution of society.* Cambridge: Polity Press.

Gonczi, A. (1999). Competency-based learning: a dubious past- an assured future? In D. G. Boud (Ed.), *Understanding Learning at Work.* London: Routledge.

Good, T. L., & Brophy, J. E. (1990). *Educational psychology: A realistic approach.* (4th ed.). White Plains, New York: Longman.

Green, H., Facer, K., Rudd, T., Dillon, P., & Humphreys, P. (2005). *Futurelab.* Retrieved 05 18, 2012, from http://www2.futurelab.org.uk/resources/documents/opening_education/Personalisation_report.pdf

Greenberg, S. (1991). *Computer-supported cooperative work and Groupware.* New York: Academic Press.

Greenhow, C., Robelia, B., & Hughes, J. (2009). Web 2.0 and classroom research: What path should we take now? *Educational Researcher, 38*(4), 246-259.

Greeno, J. G., Collins, A. M., & Resnick, L. B. (1996). Cognition and learning. In D. Berliner, & R. Calfee (Eds.), *Handbook of educational psychology* (pp. 15-46). New York: MacMillian.

Greenwood, D., Whyte, W., & Harkavy, I. (1993). Participatory Action Research as a Process and as a Goal. . *Human Relations, 46*(2), 175-192.

Gros, B. (2001). Instructional Design for Computer-Supported Collaborative Learning in Primary and Secondary School. *Computers in Human Behaviour, 17*(5), 439-451.

Grosseck, G. (2009). To use or not to use web 2.0 in higher education? *Procedia - Social and Behavioral Sciences, 1*(1), 478-482.

Gruber, T. (2008). Despite our Best Efforts, Ontologies are not the Hard Part. Palo Alto: AAAI Spring Symposium.

Hakkinen, P., Arvaja, M., & Makitalo, K. (2003). Prerequisites for CSCL: Research Approaches, Methodological Challenges And Pedagogical Development. In *Learning to Collaborate and Collaborating to Learn.* Nova Science.

Hargittai, E. (2010). Digital na (t) ives? variation in internet skills and uses among members of the "Net generation". *Sociological Inquiry, 80*(1), 92-113.

Harris, A. L., & Rea, I. A. (2010). Web 2.0 and Virtual World Technologies : A Growing Impact on IS Education. *Journal of Information Systems Education, 20*(2), 137-145.

Harris, B. (2007). *The Khan Academy*. Retrieved 01 10, 2013, from http://smarthistory.khanacademy.org/blog/88/flickr-in-art-history-class-how-fun/

Harris, M. (2011). *Using YouTube to enhance student engagement. .* Retrieved 06 08, 2012, from http://www.ponce.inter.edu/html/retencion/using%20youtube.pdf

Hazari, S., North, A., & Moreland, D. (2010). Investigating Pedagogical Value of Wiki Technology. *Journal of Information Systems Education, 20*(2), 187-199.

Healey, M., & Jenkins, A. (2000). Kolb's Experiential Learning Theory and Its Application in Geography in Higher Education. *Journal of Geography, 99*, 185-195.

Helsper, E. J., & Eynon, R. (2010). Digital natives: Where is the evidence? *British Educational Research Journal, 36(3), 503-520., 36*(3), 503-520.

Henthorne, M. (2011, 10). *Oregon State University.* Retrieved 01 08, 2013, from http://oregonstate.edu/is/sites/default/files/projects/google_tf_final_report.pdf

Hewitt, A., & Forte, A. (2006). Crossing Boundaries: Identity Management and Student/Faculty Relationships on the Facebook. Banff: Proceedings of the Computer-Supported Cooperative Work Conference 2006.

Higgins, N., & Rice, E. (1991). Teachers' perspectives on competency-based testing. *Educational Technology Research and Development, 39*(3), 59-69.

Hilke, E. (1990). *Cooperative learning.* Bloomington: Phi Delta Kappa.

Howe, N., & Strauss, W. (2000). *Millennials rising: The next great generation.* New York: Vintage Books.

Hrastinski, S., & Aghaee, N. M. (2011). How are campus students using social media to support their studies? An explorative interview study. *Education and Information Technologies, 17*(4), 451-464.

Huang, C., & Behara, R. (2007). Outcome-driven experiential learning with Web 2.0. *Journal of Information Systems Education, 18*(3), 329-336.

Hughes, J., & Jones, S. (2003). Reflections on the use of grounded theory in interpretive information systems research. Naples: Proceedings of the Eleventh European Conference on Information Systems.

Iversen, J., & Matthiasen, L. (2004). Managing Risk in Software Process Improvement: An Action Research Approach . *MIS Quarterly, 28*(3), 395-433.

Jackson, L., & MacIsaac, D. (1994). Introduction to a new approach to experiential learning. In L. Jackson, & R. Caffarella (Eds.), *New directions for adult and continuing education* (pp. 17-28). San Francisco: Jossey-Bass.

Jarrett, K. (2010). YouTube: Online video and participatory culture. *Continuum, 24*(2), 327-330.

Jarvis, P. (1987). *Adult Learning in the Social Context.* London: Croom Helm.

Jennex, M. (2009). Re-Visiting the Knowledge Pyramid. (pp. 1-7). Hawaii: System Sciences.

Johnson, B. R. (1997). Examining the validity structure of qualitative research. *Education, 118*(3), 282-292.

Johnson, D., & Johnson, R. (1986). Computer-assisted cooperative learning. *Educational Technology, 26*(1), 12-18.

Johnson, S. D. (1995). Will our research hold up under scrutiny? *Journal of Industrial Teacher Education, 32*(3), 3-6.

Jonassen, D. (1991). Objectivism versus constructivism: do we need a new philosophical paradigm? *Educational Technology Research and Development, 39*(3), 5-14.

Jones, C., Ramanau, R., Cross, S., & Healing, G. (2010). Net generation or digital natives: Is there a distinct new generation entering university? . *Computers & Education, 54*(3), 722-732.

Jones, T., & Cuthrell, K. (2011). YouTube: Educational potentials and pitfalls. *Computers in the Schools, 28*(1), 75-85.

Jr., K., & Nereu, F. (1997). Myths in Organisational Action Research: Reflections on a Study of Computer-Supported Process Redesign Groups. *Organizations & Society, 4*(9), 65-91.

Karch, M. (2012). *About.Com*. Retrieved 1 07, 2013, from http://google.about.com/od/googleproducts/g/groupsdef.htm

Kay, R. (2007). Online Social Networks. *Computerworld, 1*(October), 56.

Keen, C., & Howard, A. (2002). Experiential learning in antioch college's work-based learning program as a vehicle for social and emotional development for gifted students. *The Journal of Secondary Gifted Education, 13*(3), 130-140.

Kemmis, S., & McTaggart, R. (1982). *The Action Research Planner.* (1st ed.). Victoria, Australia: Deakin University Press.

Kennedy, G., Judd, T., Dalgarno, B., & Waycott, J. (2010). Beyond natives and immigrants: exploring types of net generation students. *Journal of Computer Assisted Learning, 26*(5), 332-343.

Kennedy, G., Judd, T., Dalgarno, B., & Waycott, J. (2010). Beyond natives and immigrants: Exploring types of net generation students. . *Journal of Computer Assisted Learning, 26*(5), 332-343.

Kerka, S. (1989). *Communications technologies in adult, career, and vocational education.* Columbus, Ohio: ERIC Digest No. 81.,ERIC Doc. Repro. Service No. ED 305 494.

Kirk, J., & Miller, M. L. (1986). *Reliability and validity in qualitative research.* Beverly Hills: Sage Publications.

Kirriemuir, J., & McFarlane, A. (2003, 8). *Nesta Future Lab.* Retrieved 05 19, 2012, from http://www.nestafuturelab.org/research/reviews/08_01.htm

Kirschner, P. (2001). Using integrated electronic environments for collaborative teaching/learning. *Learning and Instruction, 10*, 1-9.

Kolb, A., & Kolb, D. (2001). *Experiential Learning Theory Bibliography.* Boston, Massachussets: McBer & Co.

Kolb, D. (1984). *Experiential Learning: Experience as the Source of Learning and Development.* (1st ed.). Englewood Cliffs, New Jersey: Prentice-Hall.

Kolb, D., & Fry, R. (1975). Toward an applied theory of experiential learning. In C. Cooper (Ed.), *Theories of Group Process.* London: John Wiley.

Kolodner, J., & Guzdial, M. (1996). Effects with and of CSCL: Tracking learning in a new paradigm. In T. Koschmann (Ed.), *CSCL: Theory and Practices of an Emerging Paradigm* (pp. 307-320). Mahwah: Lawrence Erlbaum Associates.

Koschmann, T. (1996). Paradigm Shifts and Instructional Technology: An Introduction. . In *CSCL: Theory and Practice of an Emerging Paradigm.* (pp. 1-24). New Jersey: Lawrence Erlbaum Associations.

Krathwohl, D. R. (2002). A revision of bloom's taxonomy: An overview. *Theory into Practice, 41*(4), 212-218.

Krebs, M., Ludwig, M., & Muller, W. (2009). Learning mathematics using a Wiki. *Procedia social and behavioral sciences, 2*(2), 1469-1476.

Kreijns, K., Kirschner, P., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments. *Computers in Human Behavior, 19*, 335-353.

Kuhn, T. (1962). The Structure of Scientific Revolutions. (O. Neurath, Ed.) *International Encyclopedia of Uniied Science, 2*(2), 1-174.

Kukulska-Hulme, A. (2006). Mobile language learning now and in the future. In P. Svensson (Ed.), *From vision to practice: language learning and IT* (pp. 295-310). Swedish Net University.

Kvasny, L., & Richardson, H. (2006). Critical Research in Information Systems: looking forward looking back. *Information Technology and People , 19*(3), 196-202.

Lambropoulos, N., & Romero, M. (2009). *Educational Social Software for Context-Aware Learning: Collaborative Methods and Human Interaction.* U.S.A: IGI-Global.

Lancaster, L., & Stillman, D. (2002). *When generations collide. Who they are. Why they clash. How to solve the generational puzzle at work.* New York: Collins Business.

Larusson, J., & Alterman, R. (2009). Wikis to support the "collaborative" part of collaborative learning. *Computer-Supported Collaborative Learning, 4*(4), 371-402.

Lee, A. (1999). Rigor and relevance in MIS research: beyond the approach of positivism alone. MIS Quarterly, March 1999, 23:29 - 34. . *MIS Quarterly, 23*, 29-34.

Lee, M., Chan, A., & McLoughlin, C. (2006). Students as producers: Second year students' experiences as podcasters of content for first year undergraduates. Sydney: Proceedings of the 7th Conference on Information Technology Based Higher Education and Training (ITHET 2006).

Leung, W. (2001). How to conduct a survey. *Student BMJ, 9*, 143-145.

Levy, P. (2011). Embedding inquiry and research into mainstream higher education: A U.K. perspective. *CUR Quarterly, 32*(1), 36-42.

Lewis, L., & Williams, C. (1994). Experiential learning: Past and present. *New Directions for Adult and Continuing Education, 1994*(62), 5-16.

Li, N., Ingram-El Helou, S., & Gillet, D. (2012). Using Social Media for Collaborative Learning in Higher Education: A Case Study. *International Conference on Advances in Computer-Human Interactions.* Valencia, Spain: Proceedings of the 5th International Conference on Advances in Computer-Human Interactions.

Lindoo, E. (2009). Using Google sites, Google groups and Google documents to enhance your course. *J.Comput.Small Coll.* (pp. 46-51). USA: Consortium for Computing Sciences in Colleges.

Lipponen, L. (2002). Exploring foundations for computer-supported collaborative learning. Boulder: Proceedings of CSCL 2002.

Littleton, K., & Hakkinen, P. (1999). Learning Together: Understanding the processes of Computer-Supported Collaborative Learning. In *Collaborative learning: cognitive and computational approaches* (pp. 1-20). Oxford: Pergamon.

Lui, A., Choy, S., Cheung, Y., & Li, S. (2006). A study on the perception of students towards educational weblogs. *Informatics in Education, 5*(2), 233-254.

Margaryan, A., Littlejohn, A., & Vojt, G. (2011). Are digital natives a myth or reality? University students' use of digital technologies. *Computers & Education, 56*(2), 429-440.

Marshall, E. (1995). The collaborative Workplace. *Management Review, 24*, 13-17.

Martin, C., & Tulgan, B. (2002). *Managing the generational mix.* Amherst: HRD Press.

Masterman, M. (1970). The nature of a paradigm'. In . (eds.),. In I. Lakatos, & A. Musgrave (Eds.), *Criticism and the Growth of Knowledge.*

Maxwell, J. A. (1992). Understanding and validity in qualitative research. *Harvard Educational Review, 62*(3), 279-300.

Mayer, A., & Puller, S. (2008). The old boy (and girl) network: Social network formation on university campuses. *Journal of Public Economics*(92), 329-347.

Mazer, J., Murphy, R., & Simonds, C. (2007). I'll See You on 'Facebook': The Effects of Computer-Mediated Teacher Self-Disclosure on Student Motivation, Affective Learning and Classroom Climate. *Communication Education, 56*(1), 1-17.

Maznevski, M. L., & Chudoba, K. M. (2000). Bridging Space Over Time: Global Virtual Team Dynamics and Effectiveness. *Organization Science, 11*, 473-492.

McCarty, S. (2005). Spoken Internet to Go: Popularization through podcasting. *The JALT CALL Journal, 1*(2), 67-74.

McIntyre, A. (2008). *Participatory Action Research.* (1st ed.). Los Angeles: SAGE.

McLoughlin, C., & Lee, M. (2007). Social software and participatory learning: Pedagogical choices with technology affordances in the Web 2.0 era. Singapore: Proceedings ASCILLTE.

McLoughlin, C., & Lee, M. (2010). Personalised and self-regulated learning in the Web 2.0 era: International exemplars of innovative pedagogy using social software. *Australasian Journal of Eduational Technology, 26*(1), 28-43.

Meijas, U. (2005). A nomad's guide to learning and social software. *The Knowledge tree: An e-journal of learning innovation*.

Merlino, N., & Rhodes, R. (2012). Technology in the 21 st Century Classroom : Key Pedagogical Strategies for Millennial Students in University Business Courses. *Journal of Supply Chain and Operations Management, 10*(1), 113-130.

Mezirow, J. (1991). *Transformative Dimensions of Adult Learning.* San Francisco: Jossey-Bass.

Miles, M., & Huberman, A. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks: Sage.

Miller, D. (2006). *Campus Technology*. Retrieved 01 10, 2013, from http://campustechnology.com

Miller, N. (2000). Learning from experience in adult education. In A. Wilson, & E. Hayes (Eds.), *Handbook of Adult and Continuing Education* (pp. 71-85). San Francisco: Jossey-Bass.

Minocha, S., & Thomas, P. (2007). Collaborative Learning in a Wiki Environment: Experiences from a software engineering . *New Review of Hypermedia and Multimedia, 13*(2), 187-209.

Moore, D. (2011). Experiential Education: Making the Most of Learning Outside the Classroom. *New Directions for Teaching and Learning, 128*, 3-15.

Mthembu, S. (2012). *A study on how academics use YouTube to engage the Net Generation undergraduate students of the University of Cape Town, BCom IS Honours Mini-thesis.* Cape Town: University of Cape Town.

Murugesan, S. (2007). Second-generation web technologies. *IEEE Computer Society*(July-August), 34-41.

Myers, M. (2009). *Qualitative Research in Business & Management* (1st ed.). London: SAGE Publications Ltd.

Nandhakumar, J., & Matthews, J. (1997). Too close for comfort? Distance and engagement in interpretive information systems research. *Information Systems Journal, 7*, 109-131.

Nentwich, M. (2010). Web 2.0 and Academia. Proceedings of the 9th Annual IAS-STS Conference.

Ngwenyama, O., & Lee, A. (1997). Communication Richness in Electronic Mail: Critical Social Theory and the Contextuality of Meaning. . *MIS Quarterly*, 145-167.

Oblinger, D., & Oblinger, J. (2005). *Educating the Net Generation.* Retrieved 09 07, 2009, from Educause: http://www.educause.edu/educatingthenetgen

O'Reilly, T. (2005, September 30). *O'Reilly.* Retrieved 11 20, 2012, from http://www.oreilly.com/web2/archive/what-is-web20.html

Orlikowski, W. (1992). The Duality of Technology: Rethinking the Concept of Technology in Organizations. *Organization Science, 3*(3), 398-427.

Orlikowski, W., & Baroudi, J. (1991). Studying Information Technology in Organisations: Research Approached and Assumptions. *Informations Systems Research, 2*(1), 1-28.

Parker, K., & Chao, J. (2007). Wiki as a teaching tool. *Interdisciplinary Journal of Knowledge and Learning Objects, 3*, 57-72.

Patton, M. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park: Sage Publications.

Peacock, T., Fellows, G., & Eustace, K. (2007). The quality and trust of wiki content in a learning community. Singapore: Proceedings ASCILITE Singapore 2007.

Penny, K., Frankel, E., & Mothersill, G. (2012). Curriculum, Climate and Community: A Model for Experiential Learning in Higher Education. Valencia: INTED2012 Proceedings.

Piggot-Irvine, E., & Bartlett, B. (2008). *Evaluating Action Research.* NZCER.

Porcaro, D. (2011). Reviewing the literature of computer-supported collaborative learning (CSCL) to determine its usefulness in Omani education development. *International Journal of Education and Development using ICT, 7*(3).

Pozzebon, M., & Pinsonneault, A. (2001). Structuration Theory in the IS Field: An Assessment of Research Strategies. (pp. 205-217). Bled: Proceedings of the 9th European Conference on Information Systems.

Prensky, M. (2001). Digital Natives, Digital Immigrants Part 1. *On the Horizon, 9*(5), 1-6.

Prensky, M. (2007). How to teach with technology: Keeping both teachers and students. *Emerging Technologies for Learning, 2*.

Ravenscroft, A. (2009). Social software, Web 2.0 and learning: status and implications of an evolving paradigm. *Journal of Computer Assisted Learning, 25*, 1-5.

Read, B. (2005, 03 02). Drexel U. will give free iPods to students in School of Education. *The Chronicle of Higher Education*.

Reeves, T., & Oh, E. (2008). Generation differences and educational technology research. In J. M. Spector (Ed.), *Handbook of research on educational communications and technology* (pp. 295-303). Mahwah, New Jersey: Lawrence Erlbaum Associates.

Richardson, W. (2006). *Blogs, Wikis, Podcasts, and Other Powerful Web Tools for Classrooms.* Thousand Oaks: Corwin Press.

Rollett, H., Lux, M., Strohmaier, M., Gisela Dosinger, G., & Tochtermann, K. (2007). The Web 2.0 way of learning with technologies. *International Journal of Learning Technologies, 3*(1), 87-107.

Roodt, S. (2010). Computer-supported collaborative learning environments: lecturer feedback from an undergraduate case study involving social computing technologies. *Edulearn*, (pp. 3194-3200). Barcelona.

Roodt, S. (2010). Teaching Green IT in the classroom: An undergraduate case-study. *International Conference on Information Management and Evaluation.* Cape Town, South Africa: Proceedings of the International Conference on Information Management and Evaluation 2010.

Roodt, S., & De Villiers, C. (2011). Using YouTube as an Innovative Tool for Collaborative Learning at Under-graduate level in Tertiary Education. Shanghai: Proceedings of the AIS SigED IAIM Conference 2012.

Roodt, S., De Villiers, C., & Joubert, P. (2012). Collaborative Learning for the Net Generation: Using Social Networks in an Undergraduate Course. *International Journal of Innovation in the Digital Economy, 3*(3), 10-24.

Roodt, S., De Villiers, C., Joubert, P., & Oelofse, N. (2009). Collaborative Learning in the Web 2.0 Environment: An Under-Graduate Case Study. *EDULEARN09 PROCEEDINGS* (pp. 2249-2260). Barcelona: Proceedings of EDULEARN 2009.

Roschelle, J., & Teasley, S. (1995). The construction of shared knowledge in collaborative problem solving. In C. O'Malley (Ed.), *Computer supported collaborative learning.* Heidelberg: Springer.

Rosenbaum, J. (2001). *Beyond College for All:Career Paths for the Forgotten Half.* New York: Russell Sage Foundation.

Rosenthal, D. (1999). The colors and shapes of visual experiences. In D. Fisette (Ed.), *Consciousness and Intentionality* (pp. 137-169). Dordrecht: Kluwer.

Roussinos, D., & Jimoyiannis, A. (2011). Blended collaborative learning through a wiki-based project: A case study on students' perceptions. *International Journal of Digital Literacy and Digital Competence, 2*(3), 15-30.

Ruddin, L. (2006). You can Generalize Stupid! Social Scientists, Bent Flyvberg, and Case Study methodology . *Qualitative Inquiry, 12*, 797-810.

Sandars, J. (2005). Work-based learning: a social network perspective. *Work-Based Learning in Primary Care, 3*, 4-12.

Sandars, J., & Schroter, S. (2007). Web 2.0 technologies for undergraduate and postgraduate medical education: an online survey. *Postgraduate Medical Journal*(83), 759-762.

Sarker, S., Lau, F., & Sahay, S. (2001). Using an Adapted Grounded Theory Approach for Inductive Theory Building about Virtual Team Development. . *The DATA BASE for advances in Information Systems, 32*(1), 38-56.

Savenge, W., & Robinson, R. (2005). Using Qualitative Research Methods in Higher Education. *Journal of Computing in Higher Education, 16*(2), 65-95.

Savenye, W., & Robinson, R. (1996). Qualitative research issues and methods: An introduction for educational technologists. In *Handbook of research for educational communications and technology* (pp. 1045-1071). AECT.

Seibert, J., & Sypher, B. (1989). The Importance of Internship Experiences to Undergraduate Communication Students. San Francisco: Annual Meeting of the Speech Communication Association.

Sener, J. (2007). *Sloan*. Retrieved 01 10, 2013, from http://www.sloan-c-wiki.org/wiki

Shaklee, B., Barbour, N., Ambrose, R., & Hansford, S. (1997). *Designing and using portfolios.* Boston: Allyn and Bacon.

Shanks, G., & Parr, A. (2003). Positivist single case study research in information systems: a critical analysis. Naples: Proceedings of the 11th European Conference on Information Systems.

Sherer, P., & Shea, T. (2011). Using Online Video to Support Student Learning and Engagement. *College Teaching, 59*(2), 56-59.

Shirky, C. (2003). A group is its own worst enemy: Social structure in social software. Santa Clara: Proceedings of the O'Reilly Emerging Technology conference.

Siemens, G. (2005, January). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology & Distance Learning*.

Silberman, M. (2007). *The handbook of experiential learning.* Hoboken: John Wiley & Sons.

Smorgansbord, A. (1997). University of Pretoria. *Constructivism and instructional design.* Retrieved 05 19, 2012, from http://hagar.up.ac.za/catts/learner/smorgan/cons.html

Snell, R., & Chak, A. (1998). The learning organization: Learning and empowerment for whom? *Management Learning, 29*(3), 337-364.

Snelson, C. (2011). YouTube across the Disciplines: A Review of the Literature. *MERLOT Journal of Online Learning and Teaching, 7*(1), 159-169.

Sparrowe, R., Liden, R., Wayne, S., & Kraimer, M. (2001). Social Networks and the Performance of Individuals and Groups. *The Academy of Management Journal, 44*(2), 316-325.

Stahl, B. (2005). A critical view of the ethical nature of interpretive research: Paul Ricœr and the other. Regensburg: Proceedings of European Conference on Information Systems.

Strijbos, J., Martens, R., & Jochems, W. (2004). Designing for interaction: six steps to designing computer-supported group-based learning. *Computers and Education, 42*(4), 403-424.

Su, A., Yang, S., Hwang, W., & Zhang, J. (2010). A Web 2.0-based collaborative annotation system for enhancing knowledge sharing in collaborative learning environments. *Procedia Social and Behavioral Sciences, 55*(2), 755-766.

Suthers, D. (2006). Technology affordances for intersubjective meaning-making: A research agenda for CSCL. *International Journal of Computers Supported Collaborative Learning, 1*, 315-337.

Tan, E., & Pearce, N. (2012). Open education videos in the classroom: exploring the opportunities and barriers to the use of YouTube in teaching introductory sociology. *Research In Learning Technology, 19*(1), 125-133.

Tapscott, D. (2008). *Grown Up Digital: How the Net Generation is Changing Your World.* New York: McGraw-Hill.

Tennant, M. (1997). *Psychology and Adult Learning.* (2nd ed.). London: Routledge.

Thinyane, H. (2010). Are digital natives a world-wide phenomenon? an investigation into south african first year students' use and experience with technology. *Computers & Education, 55*(1), 406-414.

Thomas, M. (2002). Learning within incoherent structures: the space of online discussion forums. *Journal of Computer Assisted Learning, 18*, 351-366.

Thompson, J. (2007). *Innovate Online.* Retrieved 05 18, 2012, from http://innovateonline.info/pdf/vol3_issue4/Is_Education_1.0_Ready_for_Web_2.0_Students_.pdf

Tosey, P., Visser, M., & Saunders, N. (2012). The origins and conceptualizations of 'triple-loop' learning: A critical review. *Management Learning, 43*, 291-307.

Trauth, E., & Jessup, L. (2000). Understanding Computer-Mediated Discussions:Positivist and Interpretive Analyses of Group Support System Use. *MIS Quarterly , 24*(1), 43-79.

UP. (2012). *Research Ethics Committee Background*. Retrieved 07 23, 2012, from http://web.up.ac.za/default.asp?ipkCategoryID=12202&sub=1&parentid=40&subid=12010&ipklookid=3

Verhagen, P. (2006, 11). Connectivism: a new learning theory? *ELearning*.

Virkus, S. (2008). Use of Web 2.0 technologies in LIS education: experiences at Tallinn University, Estonia. *Program: Electronic library and Information Systems, 42*(3), 262-274.

Walsham, G. (1995). The emergence of interpretivism in IS research. *Information Systems Research, 6*(4), 376-394.

Walsham, G. (2005). Learning about being critical. *Information Systems Journal, 15*(2), 111-117.

Waycott, J., Gray, K., Clerehan, R., Hamilton, M., Richardson, J., Sheard, J., et al. (2010). Implications for academic integrity of using Web 2.0 for teaching, learning and assessment in higher education. *International Journal for Educational Integrity, 6*(2), 8-18.

Weber, R. (2004). Editor's Comments: The Rhetoric of Positivism Versus Interpretivism: A Personal View. *MIS Quarterly, 28*(1), iii-xii.

Weil, S., & McGill, I. (1993). *Making Sense of Experiential Learning.* Buckingham: Open University Press.

Wells, P., de Lange, P., & Fieger, P. (2008). Integrating a virtual learning environment into a second year accounting course: determinants of overall student perception. *Accounting anf Finance, 48*(3), 503-518.

Wheeler, S., Yeomans, P., & Wheeler, D. (2008). The good, the bad and the wiki: Evaluating student-generated content for collaborative learning. *British Journal of Educational Technology, 39*(6), 987-995.

Williams, J., & Chinn, S. (2010). Using web 2.0 to support the active learning experience. *Journal of Information Systems Education, 20*(2), 165.

Wilson, M., & Gerber, L. E. (2008). How Generational Theory Can Improve Teaching: Strategies for Working with the "Millennials". *Currents in Teaching and Learning, 1*(1), 29-44.

Woolfe, R. (1992). Experiential learning in workshops. In T. Hobbs (Ed.), *Experiential training: practical guidelines* (pp. 1-13). London: Tavistock/ Roudledge.

Wurdinger, S., & Carlson, J. (2010). *Teaching for Experiential Learning.* Rowman & Littlefield Publishing Group.

Yew, J., Gibson, F., & Teasley, S. (2006). Learning by tagging: The role of social tagging in group knowledge formation. *Journal of Online Learning and Teaching, 2*(4), 275-285.

Zemke, R., Raines, C., & Filipczak, B. (2000). *Generations at work: Managing the class of veterans, boomers, x-ers, and nexters in your workplace.* New York: Amacon.

Zepke, N., & Leach, L. (2002). Contextualized meaning making: one way of rethinking experiential learning and self-directed learning? *Studies in Continuing Education, 24*(2), 205-217.

Zuber-Skerritt, O. (1996). *New Directions in Action Research, London; Falmer Press.* (1st ed.). London: Falmer Press.

APPENDICES

APPENDIX A – ETHICAL CLEARANCE DOCUMENTATION

Ethical Clearance Form

UNIVERSITY OF PRETORIA FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY	
APPLICATION FOR APPROVAL OF A RESEARCH PROJECT	
This application form must be read with the Regulations for Research Ethics and Integrity and completed. Important: Each item must be completed.	
Date of submission	22 September 2011
1. DETAILS OF APPLICANT	
1.1 Applicant's surname	ROODT
1.2 Applicant's initials	S
1.3 Applicant's title (prof, dr, mr, ms, other)	MS
1.4 Postal address (where approval is to be sent)	POSTNET SUITE 901 PRIVATE BAG X9 BENMORE GAUTENG 2010
1.5 E-mail address	Sumarie.roodt@gmail.com
1.6 Telephone	0833271516
1.7 School in Faculty (Engineering, Built Environment or Information Technology)	INFORMATION TECHNOLOGY
1.8 Department	INFORMATICS
1.9 Study leader/promotor (if the applicant is a student) name, address, e-mail address	PROF CARINA DE VILLIERS Carina.devilliers@up.ac.za 012-4203798
1.10 Names, addresses, e-mail addresses and capacity of co-researchers/ students/ lecturers involved with the project	NOT APPLICABLE • NO CO-RESEARCHER • STUDENTS DETAILS ANONYMOUS
2. RESEARCH PROJECT DETAILS	
2.1 Title of research project	TOWARDS A SOCIAL SOFTWARE TECHNOLOGY ECOLOGY FOR COMPUTER-SUPPORTED COLLABORATIVE LEARNING
2.2 Furnish as brief outline the following so that the relevant ethical aspects can be identified clearly: • Statement of the problem • Statement of objectives • Experimental methods/ measuring instruments • Materials/Apparatus	

• Profile of research subjects/target group/animals/environmental factors
Can social software be used to support computer-supported collaborative learning at tertiary education institutions for under-graduate students. Feedback received from numerous students is that they dislike the subject as they do not understand what it is about nor do they see the point in taking it. Lecturing staff that have been involved with the subject would generally prefer not to be involved with it anymore and it is viewed in the department negatively. The purpose of the intervention is to change the negative perception regarding the course. This can be achieved amongst others by creating a computer-supported collaborative learning (CSCL) environment for the students as well as providing them with contemporary information and tasks which will challenge them. Action research is well suited to this topic because it can be used to solve a real-world challenge which is being experienced in both corporate and educational circles: there is currently no technology framework for selecting and implementing social software within institutions. The social setting within the University of Pretoria is multi-variate and the introduction of social software will involve a change in the social setting and as such the author believes that action research will be most appropriate. The researcher will also be a participant observer and will be intervening in the process. The process itself will involve implementing a number of social software applications across the INF 112 curriculum, hence an iterative process will be undertaken during which the technology framework is refined after each iteration. Ultimately the author aims to introduce organisational change in the form of implementing social software at the university whilst at the same time studying the process in order to develop and/or refine an technology framework. The author has the support of the organisation in this endeavour which will certainly contribute to the author being able to conduct the necessary research. The author intends making use of a combination of data collection techniques such as interviews and questionnaires (surveys), and may include both quantitative and qualitative data. Research subjects include 1st year under-graduate students who are enrolled for the INF 112 course.

2.3 Is a research questionnaire/ survey/interview used? (Yes or No)	Yes
2.4 If yes, have you submitted this with your application? (Yes, No or Not Applicable)	Yes

3. RESEARCH SUBJECTS

If the project involves people, either individually or in groups, complete this section

3.1 Does the study involve people as informants, or does it involve people as research subjects? (Tick one)	Informants	☑	Research subjects	

3.2 Describe possible safety and health implications that participation in project may pose

NONE	
3.3 Expected duration of participation of subjects in the project	1 MONTH (every year for 3 years in the 1st semester)
3.4 Describe the manner in which confidential information will be handled and confidentiality assured	
No personal details are requested via the on-line survey so no data that can identify individuals is captured and/or stored, thereby ensuring confidentiality	
3.5 Remuneration offered to subjects for participation	Zero
If the project involves animals, complete this section	
3.6 Describe possible safety and health implications participation in the project may hold	
None	
3.7 Expected duration of participation by animals in the project	Not applicable
3.8 Care/housing/feeding of the animals during the project	Not applicable
4. ENVIRONMENTAL IMPACT If the project may have a potentially detrimental environmental impact, complete the following	
4.1 Potential impact on the environment	None
4.2 Expected duration of the impact	None
4.3 Locality of the project	None
4.4 Preventive measures	None
5. DISSEMINATION OF DATA	
Method of publishing/application of the results	PhD Thesis Selected conference papers and journal articles
6. SUBMISSION CHECKLIST	
6.1 Have you submitted the Declaration by the Researcher? (See the website for this form)	Yes
6.2 Have you submitted an example of the informed consent form to be completed by each participant? (See the website for an example)	Yes

Ethical Clearance Approval Letter

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Reference number: EBIT/36/2011

17 November 2011

Postnet Suite 901
Private Bag X9
Benmore
Gauteng
2010

Dear Ms S Roodt

FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

Your recent application to the EBIT Ethics Committee refers.

1 I hereby wish to inform you that the research project titled "Towards a social software technology ecology for computer-supported collaborative learning" has been approved by the Committee.

This approval does not imply that the researcher, student or lecturer is relieved of any accountability in terms of the Codes of Research Ethics of the University of Pretoria, if action is taken beyond the approved proposal.

2 According to the regulations, any relevant problem arising from the study or research methodology as well as any amendments or changes, must be brought to the attention of any member of the Faculty Committee who will deal with the matter.

3 The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.

Prof. J.J. Hanekom
Chair: Faculty Committee for Research Ethics and Integrity
FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

Title Registration Form

Our ref.: 9620203
Contact person: Ms E Mokhehle
Tel: +27 12 420 3643
E-fax: +27 86 631 8632
E-mail: emily.mokhehle@up.ac.za

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Denkleiers • Leading Minds • Dikgopolo tša Dihlalefi

FACULTY OF ECONOMIC AND MANAGEMENT SCIENCES
STUDENT ADMINISTRATION

14 September 2010

Mrs S Roodt
IT Building Room 5-98
UP

Dear Mrs Roodt,

SUBJECT: DISSERTATION/THESIS

I have pleasure in informing you that the following subject has been approved:

SUBJECT: Towards a social software technology ecology for computer-supported collaborative learning

EBW08/06 EBW11/07 Attached please find a checklist (**EBW 08/06**) and Notice to Submit (**EBW 11/07**).

Your enrolment as a student must be renewed annually until you have complied with all the requirements for the degree, preferably during the official period of enrolment but before **28 February**. You will only be entitled to the guidance of your supervisor if annual proof of registration can be submitted.

Kind regards

For Prof C Koornhof
DEAN

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EBW13(606) [illegible].doc

EBW13/606

Towards a social software technology ecology for computer-supported collaborative learning

Consent Form

Informed consent form
(Form for research subject's permission)

(Must be signed by each research subject, and must be kept on record by the researcher) STUDENT NUMBER:_____

1 Title of research project: **Towards a social software technology ecology for computer-supported collaborative learning (INF 112 research)**

2 I, _____, hereby voluntarily grant my permission for participation in the project as explained to me by **Ms Sumarie Roodt.**

3 The nature, objective, possible safety and health implications have been explained to me and I understand them.

4 I understand my right to choose whether to participate in the project and that the information furnished will be handled confidentially. I am aware that the results of the investigation may be used for the purposes of publication.

6 Upon signature of this form, you will be provided with a copy.

Signed: _____ Date: _____

Witness: _____ Date: _____

Researcher: _____ Date: _____

APPENDIX B – ITERATION 1 QUESTIONNAIRE

Please click on the following link to open up the questionnaire for iteration 1 of my PAR project:

https://dl.dropboxusercontent.com/u/99391676/INF112_2009_Survey_Questions_v5.pdf

I have selected this approach given the lengthy nature of the questionnaire, which contains 137 questions in total.

APPENDIX C – ADDITIONAL DATA ANALYSIS OUTPUT (ITERATION 1)

Facebook

Question	Facebook	Missing	4. Never	3. Occasionally / Seldom	2. Frequently / Nearly always	1. Always / Definitely	Total
3.5 Facebook and Groupwork (Multiple Choice)	I have learnt more in the group when using Facebook than on my own	6	96	251	181	155	683
3.6 Facebook and Groupwork (Multiple Choice)	I enjoyed working in a group using Facebook	7	52	199	217	214	682
3.7 Facebook and Groupwork (Multiple Choice)	The group motivated me to do my share of the work for the Facebook component	8	57	123	233	268	681
3.8 Facebook and Groupwork (Multiple Choice)	The group work relating to Facebook helped me to understand the course material better	11	67	193	252	166	678
3.9 Facebook and Groupwork (Multiple Choice)	I learned to co-operate with other people using Facebook	7	40	134	239	269	682
3.10 Facebook and Groupwork (Multiple Choice)	The Facebook group work caused me to be dependable	8	50	118	287	226	681
3.11 Facebook and Groupwork (Multiple Choice)	It was fun working in a group using Facebook	7	57	126	206	293	682
3.12 Facebook and Groupwork (Multiple Choice)	In the group I got the benefit of everyone's ideas when using Facebook	9	50	136	232	262	680
3.13 Facebook and Groupwork (Multiple Choice)	When I had problems I got help from group members via Facebook	9	146	186	188	160	680
3.14 Facebook and Groupwork (Multiple Choice)	The work got done faster and more work was done using Facebook	12	73	192	234	178	677
3.15 Facebook and Groupwork (Multiple Choice)	The Facebook group work gave me an opportunity to talk and discuss the course material	12	78	186	254	159	677
3.16 Facebook and Groupwork (Multiple Choice)	The Facebook group work made the course material more interesting	7	52	142	237	251	682
3.19 Facebook and Groupwork (Multiple Choice)	I experienced group learning using Facebook/pbWiki/Alice as successful	15	47	148	255	224	674

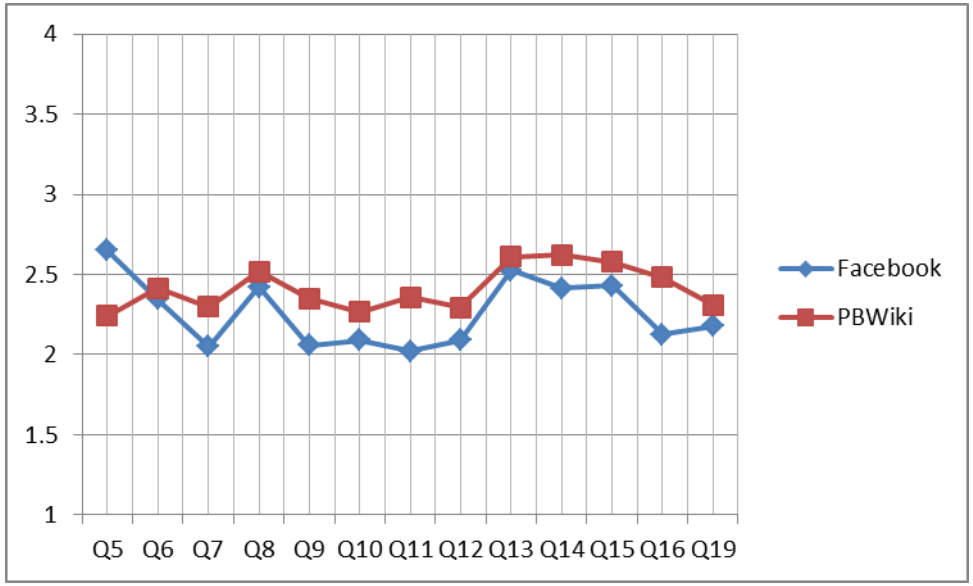
Question	Facebook	Missing	4. Never	3. Occasionally / Seldom	2. Frequently / Nearly always	1. Always / Definitely	Total
3.5 Facebook and Groupwork (Multiple Choice)	I have learnt more in the group when using Facebook than on my own	1%	14%	37%	27%	23%	100%
3.6 Facebook and Groupwork (Multiple Choice)	I enjoyed working in a group using Facebook	1%	8%	29%	32%	31%	100%
3.7 Facebook and Groupwork (Multiple Choice)	The group motivated me to do my share of the work for the Facebook component	1%	8%	18%	34%	39%	100%
3.8 Facebook and Groupwork (Multiple Choice)	The group work relating to Facebook helped me to understand the course material better	2%	10%	28%	37%	24%	100%
3.9 Facebook and Groupwork (Multiple Choice)	I learned to co-operate with other people using Facebook	1%	6%	20%	35%	39%	100%
3.10 Facebook and Groupwork (Multiple Choice)	The Facebook group work caused me to be dependable	1%	7%	17%	42%	33%	100%
3.11 Facebook and Groupwork (Multiple Choice)	It was fun working in a group using Facebook	1%	8%	18%	30%	43%	100%
3.12 Facebook and Groupwork (Multiple Choice)	In the group I got the benefit of everyone's ideas when using Facebook	1%	7%	20%	34%	39%	100%
3.13 Facebook and Groupwork (Multiple Choice)	When I had problems I got help from group members via Facebook	1%	21%	27%	28%	24%	100%
3.14 Facebook and Groupwork (Multiple Choice)	The work got done faster and more work was done using Facebook	2%	11%	28%	35%	26%	100%
3.15 Facebook and Groupwork (Multiple Choice)	The Facebook group work gave me an opportunity to talk and discuss the course material	2%	12%	27%	38%	23%	100%
3.16 Facebook and Groupwork (Multiple Choice)	The Facebook group work made the course material more interesting	1%	8%	21%	35%	37%	100%
3.19 Facebook and Groupwork (Multiple Choice)	I experienced group learning using Facebook/pbWiki/Alice as successful	2%	7%	22%	38%	33%	100%

pbWiki

Question	PBWiki	Missing	4. Never	3. Occasionally / Seldom	2. Frequently / Nearly always	1. Always / Definitely	Total
4.5 pbWiki and Groupwork (Multiple Choice)	I have learnt more in the group when using pbWiki than I would have learnt on my own	11	81	153	222	222	678
4.6 pbWiki and Groupwork (Multiple Choice)	I enjoyed working in a group using pbWiki	12	77	188	238	174	677
4.7 pbWiki and Groupwork (Multiple Choice)	The group motivated me to do my share of the work for the pbWiki component	14	63	166	252	194	675
4.8 pbWiki and Groupwork (Multiple Choice)	The group work relating to pbWiki helped me to understand the course material better	17	73	211	241	147	672
4.9 pbWiki and Groupwork (Multiple Choice)	I learned to co-operate with other people using pbWiki	16	77	172	237	187	673
4.10 pbWiki and Groupwork (Multiple Choice)	The pbWiki group work caused me to be dependable and do my assignment	18	62	161	243	205	671
4.11 pbWiki and Groupwork (Multiple Choice)	It was fun working in a group using pbWiki	13	71	182	229	194	676
4.12 pbWiki and Groupwork (Multiple Choice)	In the group I got the benefit of everyone's ideas when using pbWiki	14	60	170	244	201	675
4.13 pbWiki and Groupwork (Multiple Choice)	When I had problems I got help from group members via pbWiki	12	242	153	147	135	677
4.14 pbWiki and Groupwork (Multiple Choice)	The work got done faster and more work was done using pbWiki	15	91	230	220	133	674
4.15 pbWiki and Groupwork (Multiple Choice)	The pbWiki group work gave me an opportunity to talk and discuss material	12	113	203	234	127	677
4.16 pbWiki and Groupwork (Multiple Choice)	The pbWiki group work made the course material more interesting	16	75	203	238	157	673
4.19 pbWiki and Groupwork (Multiple Choice)	I experienced group learning using pbWiki as successful	13	57	176	243	200	676

Question	PBWiki	Missing	4. Never	3. Occasionally / Seldom	2. Frequently / Nearly always	1. Always / Definitely	Total
4.5 pbWiki and Groupwork (Multiple Choice)	I have learnt more in the group when using pbWiki than I would have learnt on my own	2%	12%	23%	33%	33%	100%
4.6 pbWiki and Groupwork (Multiple Choice)	I enjoyed working in a group using pbWiki	2%	11%	28%	35%	26%	100%
4.7 pbWiki and Groupwork (Multiple Choice)	The group motivated me to do my share of the work for the pbWiki component	2%	9%	25%	37%	29%	100%
4.8 pbWiki and Groupwork (Multiple Choice)	The group work relating to pbWiki helped me to understand the course material better	3%	11%	31%	36%	22%	100%
4.9 pbWiki and Groupwork (Multiple Choice)	I learned to co-operate with other people using pbWiki	2%	11%	26%	35%	28%	100%
4.10 pbWiki and Groupwork (Multiple Choice)	The pbWiki group work caused me to be dependable and do my assignment	3%	9%	24%	36%	31%	100%
4.11 pbWiki and Groupwork (Multiple Choice)	It was fun working in a group using pbWiki	2%	11%	27%	34%	29%	100%
4.12 pbWiki and Groupwork (Multiple Choice)	In the group I got the benefit of everyone's ideas when using pbWiki	2%	9%	25%	36%	30%	100%
4.13 pbWiki and Groupwork (Multiple Choice)	When I had problems I got help from group members via pbWiki	2%	36%	23%	22%	20%	100%
4.14 pbWiki and Groupwork (Multiple Choice)	The work got done faster and more work was done using pbWiki	2%	14%	34%	33%	20%	100%
4.15 pbWiki and Groupwork (Multiple Choice)	The pbWiki group work gave me an opportunity to talk and discuss material	2%	17%	30%	35%	19%	100%
4.16 pbWiki and Groupwork (Multiple Choice)	The pbWiki group work made the course material more interesting	2%	11%	30%	35%	23%	100%
4.19 pbWiki and Groupwork (Multiple Choice)	I experienced group learning using pbWiki as successful	2%	8%	26%	36%	30%	100%

Comparative Analysis – Facebook vs pbWiki



Question	Facebook	PBWiki
Q5. I have learnt more in the group when using the Web 2.0 technology than I would have learnt on my own	Occasionally / Seldom	Always / Definitely or Frequently / Nearly always
Q6. I enjoyed working in a group using the Web 2.0 technology	Frequently / Nearly always	Frequently / Nearly always
Q7. The group motivated me to do my share of the work for the Web 2.0 technology component	Always / Definitely	Frequently / Nearly always
Q8. The group work relating to the Web 2.0 technology helped me to understand the course material better	Frequently / Nearly always	Frequently / Nearly always
Q9. I learned to co-operate with other people using the Web 2.0 technology	Always / Definitely	Frequently / Nearly always
Q10. The the Web 2.0 technology group work caused me to be dependable and do my assignment	Frequently / Nearly always	Frequently / Nearly always
Q11. It was fun working in a group using the Web 2.0 technology	Always / Definitely	Frequently / Nearly always
Q12. In the group I got the benefit of everyone's ideas when using the Web 2.0 technology	Always / Definitely	Frequently / Nearly always
Q13. When I had problems I got help from group members via the Web 2.0 technology	Frequently / Nearly always	Never
Q14. The work got done faster and more work was done using the web 2.0 technology	Frequently / Nearly always	Occasionally / Seldom
Q15. The Web 2.0 technology group work gave me an opportunity to talk and discuss material	Frequently / Nearly always	Frequently / Nearly always
Q16. The Web 2.0 technology group work made the course material more interesting	Always / Definitely	Frequently / Nearly always
Q19. I experienced group learning using the Web 2.0 technology as successful	Frequently / Nearly always	Frequently / Nearly always

APPENDIX D – ITERATION 2 QUESTIONNAIRE

Please click on the following link to open up the questionnaire for iteration 2 of my PAR project:

https://dl.dropboxusercontent.com/u/99391676/INF112_2010_Survey_Questions_v6.pdf

I have selected this approach given the lengthy nature of the questionnaire, which contains 223 questions in total.

APPENDIX E – ADDITIONAL DATA ANALYSIS OUTPUT (ITERATION 2)

Facebook

Question	Facebook	Missing	4. Never	3. Occasionally / Seldom	2. Frequently / Nearly always	1. Always / Definitely	Total
3.5 Facebook and Groupwork (Multiple Choice)	I have learnt more in the group when using Facebook than on my own	29	71	134	162	188	555
3.6 Facebook and Groupwork (Multiple Choice)	I enjoyed working in a group using Facebook	27	37	111	182	227	557
3.7 Facebook and Groupwork (Multiple Choice)	The group motivated me to do my share of the work for the Facebook component	28	39	114	184	219	556
3.8 Facebook and Groupwork (Multiple Choice)	The groupwork relating to Facebook helped me to understand the course material better	29	50	137	201	167	555
3.9 Facebook and Groupwork (Multiple Choice)	I learned to co-operate with other people using Facebook	28	43	103	194	216	556
3.10 Facebook and Groupwork (Multiple Choice)	The Facebook group work caused me to be dependable	28	21	101	226	218	584
3.11 Facebook and Groupwork (Multiple Choice)	It was fun working in a group using Facebook	18	36	106	200	224	566
3.12 Facebook and Groupwork (Multiple Choice)	In the group I got the benefit of everyone's ideas when using Facebook	19	43	112	222	188	565
3.13 Facebook and Groupwork (Multiple Choice)	When I had problems I got help from group members via Facebook	20	129	158	159	118	564
3.14 Facebook and Groupwork (Multiple Choice)	The work got done faster and more work was done using Facebook	21	63	143	184	173	563
3.15 Facebook and Groupwork (Multiple Choice)	The Facebook group work gave me an opportunity to talk and discuss the course material	22	79	151	179	153	562
3.16 Facebook and Groupwork (Multiple Choice)	The Facebook group work made the course material more interesting	21	42	122	186	213	563
3.19 Facebook and Groupwork (Multiple Choice)	I experienced group learning using Facebook/pbWiki/Alice as successful	24	36	119	196	209	584

Question	Facebook	Missing	4. Never	3. Occasionally / Seldom	2. Frequently / Nearly always	1. Always / Definitely	Total
3.5 Facebook and Groupwork (Multiple Choice)	I have learnt more in the group when using Facebook than on my own	5%	13%	24%	29%	34%	100%
3.6 Facebook and Groupwork (Multiple Choice)	I enjoyed working in a group using Facebook	5%	7%	20%	33%	41%	100%
3.7 Facebook and Groupwork (Multiple Choice)	The group motivated me to do my share of the work for the Facebook component	5%	7%	21%	33%	39%	100%
3.8 Facebook and Groupwork (Multiple Choice)	The groupwork relating to Facebook helped me to understand the course material better	5%	9%	25%	36%	30%	100%
3.9 Facebook and Groupwork (Multiple Choice)	I learned to co-operate with other people using Facebook	5%	8%	19%	35%	39%	100%
3.10 Facebook and Groupwork (Multiple Choice)	The Facebook group work caused me to be dependable	5%	4%	17%	39%	37%	100%
3.11 Facebook and Groupwork (Multiple Choice)	It was fun working in a group using Facebook	3%	6%	19%	35%	40%	100%
3.12 Facebook and Groupwork (Multiple Choice)	In the group I got the benefit of everyone's ideas when using Facebook	3%	8%	20%	39%	33%	100%
3.13 Facebook and Groupwork (Multiple Choice)	When I had problems I got help from group members via Facebook	4%	23%	28%	28%	21%	100%
3.14 Facebook and Groupwork (Multiple Choice)	The work got done faster and more work was done using Facebook	4%	11%	25%	33%	31%	100%
3.15 Facebook and Groupwork (Multiple Choice)	The Facebook group work gave me an opportunity to talk and discuss the course material	4%	14%	27%	32%	27%	100%
3.16 Facebook and Groupwork (Multiple Choice)	The Facebook group work made the course material more interesting	4%	7%	22%	33%	38%	100%
3.19 Facebook and Groupwork (Multiple Choice)	I experienced group learning using Facebook/pbWiki/Alice as successful	4%	6%	20%	34%	36%	100%

Google Sites

Question	Google Sites	Missing	4. Never	3. Seldom	2. Nearly always	1. Always / Definitely	Total
10.14 Google sites (Multiple Choice)	I have learnt more in the group when using Google Sites than on my own	35	63	119	181	186	549
10.15 Google sites (Multiple Choice)	I enjoyed working in a group using Google sites	36	47	119	182	200	548
10.16 Google sites (Multiple Choice)	The group motivated me to do my share of the work for the Google sites component	39	41	118	189	197	545
10.17 Google sites (Multiple Choice)	The groupwork relating to Google sites helped me to understand the course material better	38	43	117	194	192	546
10.18 Google sites (Multiple Choice)	I learned to co-operate with other people using Google sites	39	43	115	191	196	545
10.19 Google sites (Multiple Choice)	The Google sites group work caused me to be dependable and do my assignment	38	37	105	183	221	546
10.20 Google sites (Multiple Choice)	It was fun working in a group using Google sites	40	36	106	169	233	544
10.21 Google sites (Multiple Choice)	In the group I got the benefit of everyone's ideas when Google sites	38	44	116	190	196	546
10.22 Google sites (Multiple Choice)	The work got done faster and more work was done using Google sites	39	39	122	204	180	545
10.23 Google sites (Multiple Choice)	The Google sites work gave me an opportunity to talk and discuss material	35	51	133	192	173	549
10.24 Google sites (Multiple Choice)	Using Google sites made the course material more interesting	38	30	103	196	217	546
10.25 Google sites (Multiple Choice)	I feel that using Google sites adds value to my understanding of the course	36	32	113	200	203	548
10.26 Google sites (Multiple Choice)	I experienced group learning using Google sites as successful	36	35	107	183	223	548

Question	Google Sites	Missing	4. Never	3. Seldom	2. Nearly always	1. Always / Definitely	Total
10.14 Google sites (Multiple Choice)	I have learnt more in the group when using Google Sites than on my own	6%	11%	22%	33%	34%	100%
10.15 Google sites (Multiple Choice)	I enjoyed working in a group using Google sites	7%	9%	22%	33%	36%	100%
10.16 Google sites (Multiple Choice)	The group motivated me to do my share of the work for the Google sites component	7%	8%	22%	35%	36%	100%
10.17 Google sites (Multiple Choice)	The groupwork relating to Google sites helped me to understand the course material better	7%	8%	21%	36%	35%	100%
10.18 Google sites (Multiple Choice)	I learned to co-operate with other people using Google sites	7%	8%	21%	35%	36%	100%
10.19 Google sites (Multiple Choice)	The Google sites group work caused me to be dependable and do my assignment	7%	7%	19%	34%	40%	100%
10.20 Google sites (Multiple Choice)	It was fun working in a group using Google sites	7%	7%	19%	31%	43%	100%
10.21 Google sites (Multiple Choice)	In the group I got the benefit of everyone's ideas when Google sites	7%	8%	21%	35%	36%	100%
10.22 Google sites (Multiple Choice)	The work got done faster and more work was done using Google sites	7%	7%	22%	37%	33%	100%
10.23 Google sites (Multiple Choice)	The Google sites work gave me an opportunity to talk and discuss material	6%	9%	24%	35%	32%	100%
10.24 Google sites (Multiple Choice)	Using Google sites made the course material more interesting	7%	5%	19%	36%	40%	100%
10.25 Google sites (Multiple Choice)	I feel that using Google sites adds value to my understanding of the course	7%	6%	21%	36%	37%	100%
10.26 Google sites (Multiple Choice)	I experienced group learning using Google sites as successful	7%	6%	20%	33%	41%	100%

Google Groups

Google Groups	Missing	4. Never	3. Seldom	2. Nearly always	1. Always / Definitely	Total
11.8. I have learnt more in the group when using Google groups than on my own	33	52	126	202	171	551
11.9. I enjoyed working in a group using Google groups	34	61	141	184	164	550
11.10. The group motivated me to do my share of the work for the Google groups component	35	49	122	194	184	549
11.11. The groupwork relating to Google groups helped me to understand the course material better	36	60	133	188	167	548
11.12. I learned to co-operate with other people using Google groups	35	54	121	202	172	549
11.13. The Google groups group work caused me to be dependable and do my assignment	35	45	129	198	177	549
11.14. It was fun working in a group using Google groups	40	50	125	184	185	544
11.15. In the group I got the benefit of everyone's ideas when using Google groups	39	57	117	190	181	545
11.16. The work got done faster and more work was done using Google groups	37	57	130	195	165	547
11.17. The Google groups group work gave me an opportunity to talk and discuss material	37	57	136	199	155	547
11.18. The Google groups group work made the course material more interesting	35	49	131	183	186	549
11.20. I experienced group learning using Google groups as successful	41	43	115	185	200	543

Google Groups	Missing	4. Never	3. Seldom	2. Nearly always	1. Always / Definitely	Total
11.8. I have learnt more in the group when using Google groups than on my own	6%	9%	23%	37%	31%	100%
11.9. I enjoyed working in a group using Google groups	6%	11%	26%	33%	30%	100%
11.10. The group motivated me to do my share of the work for the Google groups component	6%	9%	22%	35%	34%	100%
11.11. The groupwork relating to Google groups helped me to understand the course material better	7%	11%	24%	34%	30%	100%
11.12. I learned to co-operate with other people using Google groups	6%	10%	22%	37%	31%	100%
11.13. The Google groups group work caused me to be dependable and do my assignment	6%	8%	23%	36%	32%	100%
11.14. It was fun working in a group using Google groups	7%	9%	23%	34%	34%	100%
11.15. In the group I got the benefit of everyone's ideas when using Google groups	7%	10%	21%	35%	33%	100%
11.16. The work got done faster and more work was done using Google groups	7%	10%	24%	36%	30%	100%
11.17. The Google groups group work gave me an opportunity to talk and discuss material	7%	10%	25%	36%	28%	100%
11.18. The Google groups group work made the course material more interesting	6%	9%	24%	33%	34%	100%
11.20. I experienced group learning using Google groups as successful	8%	8%	21%	34%	37%	100%

Comparative Analysis – Facebook vs Google Sites vs Google Groups

Question	Facebook		Google Sites		Google Groups	
Q1. I have learnt more in the group when using the Web 2.0 technology than on my own,	Always/Definitely	188 (33.87%)	Definitely	186 (33.88 %)	Nearly Always	184 (33.45%)
Q2. I enjoyed working in a group using the Web 2.0 technology,	Always/Definitely	227 (40.75%)	Definitely	200 (36.50%)	Nearly Always	202 (36.66%)
Q3. The group motivated me to do my share of the work for the Web 2.0 technology component,	Always/Definitely	219 (39.39%)	Definitely	197 (36.15%)	Nearly Always	194 (35.34%)
Q4. The group work relating to the Web 2.0 technology helped me to understand the course material better,	Frequently/Nearly Always	201 (36.22%)	Nearly Always	194 (35.53%)	Nearly Always	188 (34.31%)
Q5. I learned to co-operate with other people	Always/Definitely	216 (38.85%)	Definitely	196 (35.96%)	Nearly	202 (36.79%)

using the Web 2.0 technology,					Always	
Q6. The Web 2.0 technology group work caused me to be dependable and do my assignment	Frequently/Nearly Always	226 (38.70%)	Definitely	221 (40.48%)	Nearly Always	198 (36.07%)
Q7. It was fun working in a group using the Web 2.0 technology,	Always/Definitely	224 (39.58%)	Definitely	233 (42.83%)	Definitely	185 (34.01%)
Q8. In the group I got the benefit of everyone's ideas when using the Web 2.0 technology,	Frequently/Nearly Always	222 (39.29 %)	Definitely	196 (35.90%)	Nearly Always	190 (34.86%)
Q9. The work got done faster and more work was done using the Web 2.0 technology,	Frequently/Nearly Always	184 (32.68%)	Nearly Always	204 (37.43%)	Nearly Always	195 (35.65%)
Q10. The Web 2.0 technology group work gave me an opportunity to talk and discuss the course material,	Frequently/Nearly Always	179 (31.85%)	Nearly Always	192 (34.97%)	Nearly Always	199 (36.38%)
Q11. The Web 2.0 technology group work made the course material more interesting	Always/Definitely	213 (37.83%)	Definitely	217 (39.74%)	Definitely	186 (33.88%)
Q12. I experienced group learning using the Web 2.0 technology as successful	Always/Definitely	209 (35.80%)	Definitely	223 (40.69%)	Definitely	200 (36.83%)

APPENDIX F – ITERATION 3 QUESTIONNAIRE

Please click on the following link to open up the questionnaire for iteration 3 of my PAR project:

https://dl.dropboxusercontent.com/u/99391676/INF_112_2011_Survey_Questions_v1.pdf

I have selected this approach given the lengthy nature of the questionnaire, which contains 170 questions in total.

APPENDIX G – ADDITIONAL DATA ANALYSIS OUTPUT (ITERATION 3)

Facebook

Question	Facebook	Missing	4. Never	3. Occasionally / Seldom	2. Frequently / Nearly always	1. Always / Definitely	Total
3.5 Facebook and Groupwork (Multiple Choice)	I have learnt more in the group when using Facebook than on my own	18	37	45	52	33	167
3.6 Facebook and Groupwork (Multiple Choice)	I enjoyed working in a group using Facebook	20	15	37	57	56	165
3.7 Facebook and Groupwork (Multiple Choice)	The group motivated me to do my share of the work for the Facebook component	19	20	31	61	54	166
3.8 Facebook and Groupwork (Multiple Choice)	The groupwork relating to Facebook helped me to understand the course material better	19	24	55	46	41	166
3.9 Facebook and Groupwork (Multiple Choice)	I learned to co-operate with other people using Facebook	23	12	40	60	50	162
3.10 Facebook and Groupwork (Multiple Choice)	The Facebook group work caused me to be dependable	13	11	21	69	71	172
3.11 Facebook and Groupwork (Multiple Choice)	It was fun working in a group using Facebook	12	16	41	42	74	173
3.12 Facebook and Groupwork (Multiple Choice)	In the group I got the benefit of everyone's ideas when using Facebook	13	19	38	57	58	172
3.13 Facebook and Groupwork (Multiple Choice)	When I had problems I got help from group members via Facebook	14	53	34	42	42	171
3.14 Facebook and Groupwork (Multiple Choice)	The work got done faster and more work was done using Facebook	13	24	43	58	47	172
3.15 Facebook and Groupwork (Multiple Choice)	The Facebook group work gave me an opportunity to talk and discuss the course material	13	35	50	57	30	172
3.16 Facebook and Groupwork (Multiple Choice)	The Facebook group work made the course material more interesting	14	19	30	64	58	171
3.19 Facebook and Groupwork (Multiple Choice)	I experienced group learning using Facebook as successful	16	17	39	53	60	185

Question	Facebook	Missing	4. Never	3. Occasionally / Seldom	2. Frequently / Nearly always	1. Always / Definitely	Total
3.5 Facebook and Groupwork (Multiple Choice)	I have learnt more in the group when using Facebook than on my own	11%	22%	27%	31%	20%	100%
3.6 Facebook and Groupwork (Multiple Choice)	I enjoyed working in a group using Facebook	12%	9%	22%	35%	34%	100%
3.7 Facebook and Groupwork (Multiple Choice)	The group motivated me to do my share of the work for the Facebook component	11%	12%	19%	37%	33%	100%
3.8 Facebook and Groupwork (Multiple Choice)	The groupwork relating to Facebook helped me to understand the course material better	11%	14%	33%	28%	25%	100%
3.9 Facebook and Groupwork (Multiple Choice)	I learned to co-operate with other people using Facebook	14%	7%	25%	37%	31%	100%
3.10 Facebook and Groupwork (Multiple Choice)	The Facebook group work caused me to be dependable	8%	6%	12%	40%	41%	100%
3.11 Facebook and Groupwork (Multiple Choice)	It was fun working in a group using Facebook	7%	9%	24%	24%	43%	100%
3.12 Facebook and Groupwork (Multiple Choice)	In the group I got the benefit of everyone's ideas when using Facebook	8%	11%	22%	33%	34%	100%
3.13 Facebook and Groupwork (Multiple Choice)	When I had problems I got help from group members via Facebook	8%	31%	20%	25%	25%	100%
3.14 Facebook and Groupwork (Multiple Choice)	The work got done faster and more work was done using Facebook	8%	14%	25%	34%	27%	100%
3.15 Facebook and Groupwork (Multiple Choice)	The Facebook group work gave me an opportunity to talk and discuss the course material	8%	20%	29%	33%	17%	100%
3.16 Facebook and Groupwork (Multiple Choice)	The Facebook group work made the course material more interesting	8%	11%	18%	37%	34%	100%
3.19 Facebook and Groupwork (Multiple Choice)	I experienced group learning using Facebook as successful	9%	9%	21%	29%	32%	100%

Google Sites

Question	Google Sites	Missing	4. Never	3. Seldom	2. Nearly always	1. Always/ Definitely	Total
10.14 Google sites (Multiple Choice)	I have learnt more in the group when using Google Sites than on my own	28	27	29	50	51	157
10.15 Google sites (Multiple Choice)	I enjoyed working in a group using Google sites	27	16	33	54	55	158
10.16 Google sites (Multiple Choice)	The group motivated me to do my share of the work for the Google sites component	31	22	25	50	57	154
10.17 Google sites (Multiple Choice)	The groupwork relating to Google sites helped me to understand the course material better	29	20	36	55	45	156
10.18 Google sites (Multiple Choice)	I learned to co-operate with other people using Google sites	28	20	28	53	56	157
10.19 Google sites (Multiple Choice)	The Google sites group work caused me to be dependable and do my assignment	31	12	32	63	47	154
10.20 Google sites (Multiple Choice)	It was fun working in a group using Google sites	29	19	29	46	62	156
10.21 Google sites (Multiple Choice)	In the group I got the benefit of everyone's ideas when Google sites	31	19	25	57	53	154
10.22 Google sites (Multiple Choice)	The work got done faster and more work was done using Google sites	29	9	32	61	54	156
10.23 Google sites (Multiple Choice)	The Google sites group work gave me an opportunity to talk and discuss material	30	16	41	65	33	155
10.24 Google sites (Multiple Choice)	The Google sites group work made the course material more interesting	29	10	31	57	58	156
10.25 Google sites (Multiple Choice)	I feel that using Google Sites adds value to my understanding of the contents of the course	30	14	41	58	42	155
10.26 Google sites (Multiple Choice)	I experienced group learning using Google sites as successful	34	11	36	51	53	151

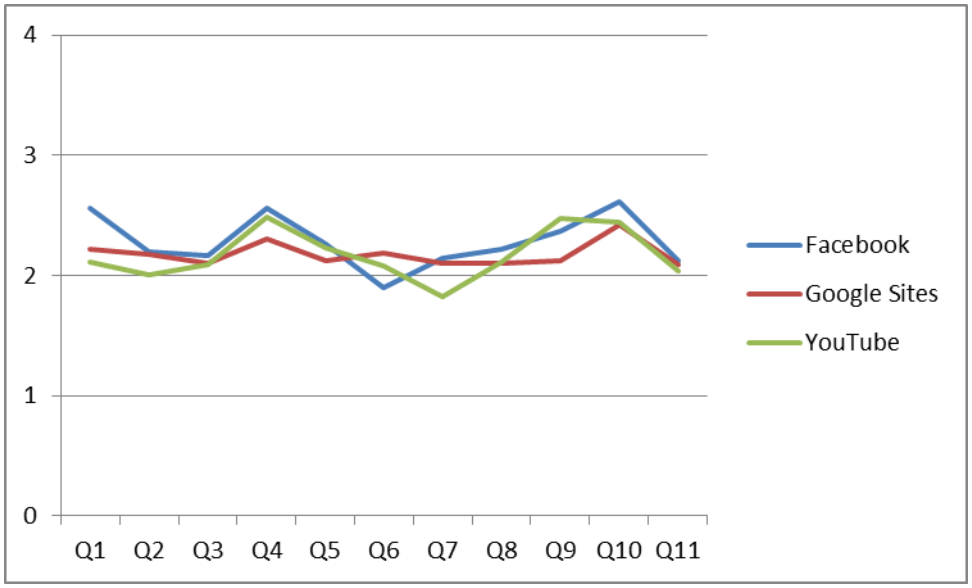
Question	Google Sites	Missing	4. Never	3. Seldom	2. Nearly always	1. Always/ Definitely	Total
10.14 Google sites (Multiple Choice)	I have learnt more in the group when using Google Sites than on my own	18%	17%	18%	32%	32%	100%
10.15 Google sites (Multiple Choice)	I enjoyed working in a group using Google sites	17%	10%	21%	34%	35%	100%
10.16 Google sites (Multiple Choice)	The group motivated me to do my share of the work for the Google sites component	20%	14%	16%	32%	37%	100%
10.17 Google sites (Multiple Choice)	The groupwork relating to Google sites helped me to understand the course material better	19%	13%	23%	35%	29%	100%
10.18 Google sites (Multiple Choice)	I learned to co-operate with other people using Google sites	18%	13%	18%	34%	36%	100%
10.19 Google sites (Multiple Choice)	The Google sites group work caused me to be dependable and do my assignment	20%	8%	21%	41%	31%	100%
10.20 Google sites (Multiple Choice)	It was fun working in a group using Google sites	19%	12%	19%	29%	40%	100%
10.21 Google sites (Multiple Choice)	In the group I got the benefit of everyone's ideas when Google sites	20%	12%	16%	37%	34%	100%
10.22 Google sites (Multiple Choice)	The work got done faster and more work was done using Google sites	19%	6%	21%	39%	35%	100%
10.23 Google sites (Multiple Choice)	The Google sites group work gave me an opportunity to talk and discuss material	19%	10%	26%	42%	21%	100%
10.24 Google sites (Multiple Choice)	The Google sites group work made the course material more interesting	19%	6%	20%	37%	37%	100%
10.25 Google sites (Multiple Choice)	I feel that using Google Sites adds value to my understanding of the contents of the course	19%	9%	26%	37%	27%	100%
10.26 Google sites (Multiple Choice)	I experienced group learning using Google sites as successful	23%	7%	24%	34%	35%	100%

YouTube

Question	YouTube	Missing	4. Never	3. Occasionally/ Seldom	2. Frequently/ Nearly always	1. Always/ Definitely	Total
5.5 YouTube and Groupwork (Multiple Choice)	I have learnt more in the group when using YouTube than I would have learnt on my own	43	17	26	45	53	141
5.6 YouTube and Groupwork (Multiple Choice)	I enjoyed working in a group using YouTube	46	14	24	39	61	138
5.7 YouTube and Groupwork (Multiple Choice)	The group motivated me to do my share of the work for the YouTube component	46	16	22	52	48	138
5.8 YouTube and Groupwork (Multiple Choice)	The groupwork relating to YouTube helped me to understand the course material better	43	21	40	47	33	141
5.9 YouTube and Groupwork (Multiple Choice)	I learned to co-operate with other people using YouTube	42	17	32	45	48	142
5.10 Youtube and Groupwork (Multiple Choice)	The YouTube group work caused me to be dependable and do my assignment	53	12	26	40	53	131
5.11 YouTube and Groupwork (Multiple Choice)	It was fun working in a group using YouTube	54	9	18	35	68	130
5.12 YouTube and Groupwork (Multiple Choice)	In the group I got the benefit of everyone's ideas when using YouTube	52	14	26	41	51	132
5.13 YouTube and Groupwork (Multiple Choice)	When I had problems I got help from group members via YouTube	52	59	16	25	32	132
5.14 YouTube and Groupwork (Multiple Choice)	The work got done faster and more work was done using YouTube	54	20	37	41	32	130
5.15 YouTube and Groupwork (Multiple Choice)	The YouTube group work gave me an opportunity to talk and discuss the course material	56	25	34	33	36	128
5.16 YouTube and Groupwork (Multiple Choice)	The YouTube group work made the course material more interesting	50	18	19	46	51	134
5.19 YouTube and Groupwork (Multiple Choice)	I experienced group learning using YouTube as successful	51	14	26	53	41	185

Question	YouTube	Missing	4. Never	3. Occasionally/ Seldom	2. Frequently/ Nearly always	1. Always/ Definitely	Total
5.5 YouTube and Groupwork (Multiple Choice)	I have learnt more in the group when using YouTube than I would have learnt on my own	30%	12%	18%	32%	38%	100%
5.6 YouTube and Groupwork (Multiple Choice)	I enjoyed working in a group using YouTube	33%	10%	17%	28%	44%	100%
5.7 YouTube and Groupwork (Multiple Choice)	The group motivated me to do my share of the work for the YouTube component	33%	12%	16%	38%	35%	100%
5.8 YouTube and Groupwork (Multiple Choice)	The groupwork relating to YouTube helped me to understand the course material better	30%	15%	28%	33%	23%	100%
5.9 YouTube and Groupwork (Multiple Choice)	I learned to co-operate with other people using YouTube	30%	12%	23%	32%	34%	100%
5.10 Youtube and Groupwork (Multiple Choice)	The YouTube group work caused me to be dependable and do my assignment	40%	9%	20%	31%	40%	100%
5.11 YouTube and Groupwork (Multiple Choice)	It was fun working in a group using YouTube	42%	7%	14%	27%	52%	100%
5.12 YouTube and Groupwork (Multiple Choice)	In the group I got the benefit of everyone's ideas when using YouTube	39%	11%	20%	31%	39%	100%
5.13 YouTube and Groupwork (Multiple Choice)	When I had problems I got help from group members via YouTube	39%	45%	12%	19%	24%	100%
5.14 YouTube and Groupwork (Multiple Choice)	The work got done faster and more work was done using YouTube	42%	15%	28%	32%	25%	100%
5.15 YouTube and Groupwork (Multiple Choice)	The YouTube group work gave me an opportunity to talk and discuss the course material	44%	20%	27%	26%	28%	100%
5.16 YouTube and Groupwork (Multiple Choice)	The YouTube group work made the course material more interesting	37%	13%	14%	34%	38%	100%
5.19 YouTube and Groupwork (Multiple Choice)	I experienced group learning using YouTube as successful	28%	8%	14%	29%	22%	100%

Comparative Analysis – Facebook vs Google Sites vs YouTube



Question	Facebook		Google Sites		YouTube	
Q1. I have learnt more in the group when using the Web 2.0 technology than on my own,	Frequently/Nearly Always	52 (31.14%)	Definitely	51 (32.48%)	Always/Definitely	53 (37.59%)
Q2. I enjoyed working in a group using the Web 2.0 technology,	Frequently/Nearly Always	57 (34.55%)	Definitely	55 (34.81%)	Always/Definitely	61 (44.20%)
Q3. The group motivated me to do my share of the work for the Web 2.0 technology component,	Frequently/Nearly Always	61 (36.75%)	Definitely	57 (37.01%)	Frequently/Nearly Always	52 (37.68%)
Q4. The group work relating to the Web 2.0 technology helped me to understand the course material better,	Occasionally/Seldom	55 (33.13%)	Nearly Always	55 (35.26%)	Frequently/Nearly Always	47 (33.33%)
Q5. I learned to co-operate with other people using the Web 2.0 technology,	Frequently/Nearly Always	60 (37.04%)	Definitely	56 (35.67%)	Always/Definitely	48 (33.80%)
Q6. The Web 2.0 technology group work caused me to be dependable,	Always/Definitely	71 (41.28%)	Nearly Always	63 (40.91%)	Always/Definitely	53 (40.46%)
Q7. It was fun working in a group using the Web 2.0 technology,	Always/Definitely	74 (42.77%)	Definitely	62 (39.74%)	Always/Definitely	68 (52.31%)
Q8. In the group I got the benefit of everyone's ideas when using the Web 2.0 technology,	Always/Definitely	58 (33.72%)	Nearly Always	57 (37.01%)	Always/Definitely	51 (38.64%)
Q9. The work got done faster and more work was done using the Web 2.0 technology,	Frequently/Nearly Always	58 (33.72%)	Nearly Always	61 (39.10%)	Frequently/Nearly Always	41 (31.54%)
Q10. The Web 2.0 technology group work gave me an opportunity to talk and discuss the course material,	Frequently/Nearly Always	57 (33.14%)	Nearly Always	65 (41.94%)	Always/Definitely	36 (28.13%)
Q11. The Web 2.0 technology group work made the course material more interesting	Frequently/Nearly Always	64 (37.43%)	Definitely	58 (37.18%)	Always/Definitely	51 (38.06%)
Q12. I experienced group learning using the Web 2.0 technology as successful	Always/Definitely	60 (32.43%)	Definitely	53 (35.10%)	Frequently / Nearly always	53 (28.65%)