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Motivated and Self-Regulated Learning of Adult Learners in a Collective Online Environment

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ACADEMIC DISSERTATION
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Everyone who's written a doctoral thesis will tell you that it takes an inordinate amount of time and cuts into your hobbies, family time and basically wreaks havoc with your dear routines. For me, the doctoral studies were an almost direct continuation of my university studies, although I switched over from an entirely different field – English Philology. This continuation might, on one hand, have made the process easier for me, but on the other hand, the switch naturally forced me to learn an entirely new field of science and a different approach to scientific analysis. Thus, I'm no stranger to feelings of frustration.

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Hämeenlinna, 22nd May 2006

Marko Susimetsä

ABSTRACT

The main goal of this research was to further understanding of the motivational and learning strategies of adult learners. This was studied in particular in an online environment of group settings in which the learners were engaged in shared learning activities and goals. Earlier research in the area has used quantitative methodology and focussed on individual learners, whereas the present research used qualitative methods to build a new, more extensive model of learning in online environments that includes the collective point of view. In addition to this main goal, the study also explored the qualitative variation of motivation and learning strategies, and the factors that best differentiate high and low achievers, and described qualitatively the cooperative performances of the five learner groups that participated in the study.

The study used both quantitative and qualitative research methods. The data included study journals, written by 25 adult learners during their one-year-long studies and totalling over 300 pages of their own notes and descriptions, and responses to the Abilities for Professional Learning Questionnaire. The study journals were analysed and categorised phenomenographically, whereas the APL questionnaire was analysed with Bayesian methods. The results were used to explore the qualitative variation of motivational and strategic capabilities and to construct a model of collective online learning.

The model of collective online learning comprises four levels of factors that affect learning achievement: individual motivation, individual learning strategies, collective motivation, and collective learning strategies. These findings greatly enhance the understanding of how learner groups work and what kinds of internal forces affect them over the course of their studies and group development. These findings will also form a fruitful basis for the further development of online learning and its support structures, especially in the case of adult learners.

Focal words: online/virtual learning environment, adult learners, motivation, learning strategies, collective motivation, cooperation, collaboration, collective online environment

CONTENTS

1 INTRODUCTION

> Progress isn't made by early risers. It's made by lazy men trying to find easier ways to do something.
>
> Robert Heinlein, Time Enough For Love (1973)

Virtual learning environments (VLE) and computer-mediated communications (CMC) systems are one of the most demanding areas of development for education today. While they seem to provide us with innovative tools and new possibilities, including a freedom of time and place for learning (e.g. Sorg and McElhinney, 2000), they also require us to reassess the way we think about education and learning. In recent years, there have been many research projects concerned with how to foster learning and collaboration online, especially focussing on CMC, professional development and reflective dialogue (Aarnio & Enqvist, 2004; Palloff & Pratt, 1999; Riel, 2000; Stacey, 1999; Lapadat, 2002).

Educational establishments around the world offer and develop distance education courses to respond to the expectations of the market for support for lifelong learning and the use of advanced technology in education. At the same time, universities have begun to research the phenomena of collaborative learning in a web environment, as well as the importance of learners' own self-regulatory skills and their development in learning. In many cases, the new tools have been employed before there is a good understanding of how they work and how they should be used to provide the desired benefits.

The possibility of interacting with peers and teachers who can be potentially separated from one another by vast distances and yet work on a shared research problem provides a fertile ground for individuals to cooperate in their studies (e.g. Borthick & Jones, 2000). Among others, Sorg and McElhinney (2000) note that CMC systems allow students to participate in cooperative group work, when their schedules permit, and reduce the

pressure to respond quickly. Expectations of CMC systems are high and research papers from this area are published at an increasing rate (Salzman et al., 1999; Schoech, 2000).

Recent studies have shown that online courses based on collaborative learning theory may actually produce better results than either traditional teaching methods (Thomas & MacGregor, 2002) or online systems in which students receive posted material and send back their individual work (Hiltz et al., 2000: 1). This finding of the superiority of collaborative learning in VLEs is consistent with earlier findings that collaborative learning produces better results in conventional classrooms than individual learning (e.g. Alexander & Dealba, 1997; Dansereau, 1983; Smith, 1987; Pintrich & McKeachie, 2000). Hakkarainen (2001) notes, that the new virtual teaching methods can enhance learning if they help learners present their viewpoints and experiences as topics of discussion.

Henri and Rigault (1996) described this medium as a scaffold for true collaborative group work in distance education. They saw CMC providing more intense communication than face-to-face groups where the lack of social pressure and the greater freedom to express their views without struggling for "the right of audience" (p. 10) enabled participants to react to the content, and not the author, with more reflective and effective communications.

1.1 Research Questions

The present research focuses on building a model of adult learning in online/virtual learning environments, focussing specifically on group learning. This model is partially based on earlier research on individual motivation and learning strategies, but the present research uses these earlier models only as a reference point and the new model is based primarily on qualitative analysis of learners' study journals. The model concentrates on the factors within a learner and within a learner group that affect learning. So-called outside factors (e.g. teacher, private life and learning environment) are only considered in terms of their effect on the learners themselves.

Another goal of this study is to explore qualitative variation in learners' motivation and learning strategies. These strategies are described in a vast body of earlier research on motivation and learning strategies, which has mainly used quantitative research methods. This exploration of the qualitative variation of the factors in these earlier models both provides support for those models and new information that will help further develop them. The primary aim of the present study, developing a model of collective online learning, is one way in which these earlier models can be developed with the help of new knowledge derived from qualitative analysis.

Accordingly, the research participants responded to a Likert-scale questionnaire, Abilities for Professional Learning, concerning their motivational and self-regulatory strategies, while their study journals were themed and categorised in a phenomenographic study. The categories revealed by the phenomenographic study and the categories proposed by the theoretical background and the questionnaire are compared to each other to see whether there are some areas of learner experiences that the Abilities for Professional Learning questionnaire does not take into account. Then, a model of learning abilities is constructed with qualitative descriptions of variations for each category as described by the learners themselves.

The present study involves adult learners as research participants and it is hoped that the study produces new information and a more complete understanding of learning, particularly as it occurs in online distance learning environments. With the discovery of the skills and abilities that adult learners need in order to succeed in reaching their learning goals, and the various affective aspects of the learning environment and model, it is believed that it will be possible to build a model of online distance learning (virtual learning). Such a model will also be helpful in the development of support structures for learning that are more beneficial to learners and more holistic in their approach than those currently used in the field. The aim of the present study is, however, primarily theoretical —to construct the above-mentioned model of successful learning with descriptions of qualitative variations—while the construction of applicable support structures is left for later projects. The research questions are as follows.

1. What are the greatest differences in the cooperative performances of the five learner groups over the course of their studies?

- The random selection of group members results in the groups presenting a very different social context for the members' learning. It is important to identify the major differences in the cooperation and interpersonal contexts of the groups in order to reveal the factors that contribute to the successes and failures of individual groups.

2. Which motivational and strategic learning abilities represent the greatest differences between high and low achievers?
    - This central question is answered through analysis of the differences and similarities between high achievers and medium and low achievers. This analysis takes advantage of both the Bayesian analysis of the APL questionnaire and the qualitative analysis of the learners' study journals.

3. What is the connection between motivational and strategic abilities and commitment to group work?
    - Earlier research has suggested that individuals with well-developed learning strategies and motivation will also be more interested in participating in group activities. One aim of the present study is to find out if this is really so by comparing a Bayesian analysis of the APLQ with a qualitative analysis of the study journals.

4. What is the model of collective online learning?
    - This question looks at all learners who succeeded in their studies from the perspective of academic achievement and identifies those motivational factors and learning strategies that were central to this success in a group context. This approach implies that it is not only individual factors that lead to successful learning, but that interpersonal and collective factors also play a major part in the final achievement. Therefore, this aspect of the research includes the following sub-questions:
        i. Which motivational and learning strategies lead to, or support, successful learning in a collective context?
        ii. Which collective aspects of motivational and learning strategies lead to, or support, successful learning in a collective context?

The answer to the first question provides a basis for understanding how the learner groups worked in the present study setting and how their group working abilities developed during the study. This basic understanding, formed in Chapter 6, is then applied to all the subsequent research questions. The second question explores the differences between high and low achievers using a combination of Bayesian and qualitative methods. The answer to this question also provides a basis for understanding the qualitative variation of the factors of motivation and learning strategies under study, which is one of the main goals of this research. The third question extends the study to the area of group working and collective motivation and learning strategies and these new concepts are then used as new building materials to construct a comprehensive model of collective online learning, specifically discussed in the analysis pertaining to research question 4. Both the second and the third questions are discussed in Chapter 7, while the model of collective online learning is presented in Chapter 8.

The research combines two analysis methods and two types of research data. The primary methodology is qualitative phenomenographic analysis of study journals that the research participants wrote during their studies. Bayesian analysis of the data provided by a questionnaire (Abilities for Professional Learning) to which the research participants responded is a complementary methodology. When searching for answers to the research questions, both of these methods are used to examine the qualitative variation of the motivation and learning strategies. The use of multiple methods is one way to ensure the reliability of the analysis and the results. It also increases the richness of the data and provides more holistic results than either qualitative or quantitative research methods could produce alone. Cooperative learning and the realisation of self-regulatory learning strategies are psychological and social phenomena and require empathic understanding. These factors lead the choice of methodology away from purely quantitative research methods (see Seidel & Kelle, 1995: 55). By combining these two approaches, both the validity and trustworthiness of the research is enhanced.

The research participants were 25 adult learners, all of them engaged in working life, who took part in a study module organised by a research, development and training programme (TUKEVA), funded by ESF. The study module consisted of 15 study weeks (approx. 20 credits) and the five courses, almost all of which included both face-to-face meetings and online work, were arranged over the period of one full year. The target group for the

project are people who work in the area of adult education. In order to meet the requirements of the adult learners, and foster their lifelong learning and professional growth, the face-to-face meetings were kept to a minimum (3 days per course) and arranged on Friday evenings and Saturdays, where they clashed as little as possible with the learners' day jobs.

The research participants wrote study journals, used as the data in the present study, in the online learning environment that was used for the study modules and they responded to the APLQ during one of their contact days at the start of their second course. Chapter 5 will introduce the research participants, data and the learning environment in more detail.

1.2 Central Concepts of the Research

The present research focuses on exploring qualitative variation in motivation and learning strategies, and constructing a model of collective online learning. Both these goals necessitate a short introduction to the basic terminology and concepts that will be used in the following pages, including terms that describe online learning environments and terms that describe learning in general, and the research methods used. Many of these terms have variants, but the author has attempted to use only one meaning for each term, except where such use would lead to unnecessary repetition or undermine the readability of the text.

Adult learner is, in the present research, determined to be a learner who has some working life experience after having gained his/her education, or who studies alongside his/her normal work life. However, it must be said that the results of the present research should not be incompatible with young adults studying at a university.

Bayesian analysis includes nonlinear modelling methods that are more suited to research using small data sets and linear and non-linear relationships between variables than traditional quantitative research methods. When studying human factors,

where the data is often skewed (data points do not spread evenly on the scale), this method is more suitable than most linear analysis methods.

Cognitive learning strategies: Cognition refers to the internal processes of the human brain, which may not always be consciously determined, or even recognized. Cognitive learning strategies thus refer to the basic strategies that humans tend to use in order to learn something; for example, rehearsal, elaboration or mnemonics.

Collective motivation includes characteristics that arise in learner groups that work in cooperation or collaboration in order to perform their learning tasks and learn. The term 'collective' refers the social foundation that is required for the shared motivation of group members.

Collective online environment, or collective online learning environment, is a novel term used in the present study to specify a kind of an approach to virtual learning environments that takes into account both the learning strategies used by the individuals and those used by the group, but also focuses on the social aspects of working in such an environment, which include both the collective motivation of learners and their individual motivation.

Cooperation and collaboration are terms that refer to joint work within learner groups. This work can be conducted either by sharing responsibilities (cooperation) or shared knowledge creation (collaboration), or, as in most cases, as a combination of these two.

Learning strategies, or strategic capabilities, refer to the cognitive, metacognitive and resource management strategies that the learners use in order to learn. The present study refers to these both as individual capabilities and as collective capabilities, although, in the case of collective learning strategies, cognitive strategies are not included in the consideration.

Metacognitive learning strategies: Metacognition is an individual's knowledge about his/her own cognition and its regulation. Metacognitive learning strategies therefore refer to individuals' knowledge of what they know and what they do not

know, as well as their ability to plan, monitor and evaluate their own behaviour and learning.

Motivational capabilities, or motivation, is used to refer to the learners' goal orientation, efficacy beliefs and attributions, which guide the learners and motivate them to use learning strategies in order to learn. The present study refers to these both as individual capabilities and as collective capabilities.

Online learning refers to learning that takes place within the learner, but while taking part in group work in an online learning environment. The term is often used in the present research to refer to the type of learning that the research participants experienced during the studies that were the object of the research.

Online learning environment—or virtual learning environment—refers to a type of learning environment that is located on a network server and accessed by the learners from their own computers over the Internet. In the present research the term more commonly used is *online* learning environment, which is used to differentiate the presently used learning environment from a generic virtual learning environment, which may, in some cases, be used in a classroom with all the learners present. Therefore, for the purposes of the present study, the use of the term online learning environment always specifies the fact that the learning environment is accessed at a distance over the Internet.

Phenomenographic analysis is a method used in qualitative research to identify themes in written documents and categorise the variation in the ways that individuals describe their experience or understanding of certain phenomena. Thus, this research method concentrates on the thoughts and beliefs of the research participants. Such a method is ideal for the creation and exploration of new phenomena and can be used as a basis for more detailed quantitative analysis.

Resource management strategies refer to people's ability to manage their external resources, such as time, money and environment, and their internal resources, such as their attentional capacity, mental energy, processing speed and working memory.

Social cognitive constructivism is a term that is used by the author to describe how learning takes place. In short, and very much simplified, learning is seen as an internal process (cognition) of knowledge creation (constructivism) that takes place in a social environment and often socially (social).

Virtual learning (see online learning).

Virtual learning environment refers to a type of learning environment that is located on a network server and accessed by the learners from their own computers over the Internet. This term is rather generic and may, in some cases, be used of learning environments in a classroom with all the learners present and, in other cases of learning environments that are accessed by learners from their own homes and locations. Therefore, for the purposes of the present study, the use of the term online learning environment always specifies the fact that the learning environment is accessed at a distance over the Internet.

The following chapters also include many other terms and concepts, but the ones introduced above are the central concepts through which the study is conducted. It is advisable to refer back to this listing when they are used to in the following pages, although the terms will be further explained in the main body of this research.

2 INFORMATION SOCIETY AND NETWORKING

> I've come up with a set of rules that describe our reactions to technologies:
>
> 1. Anything that is in the world when you're born is normal and ordinary and is just a natural part of the way world works.
> 2. Anything that's invented between when you're fifteen and thirty-five is new and exciting and revolutionary and you can probably get a career in it.
> 3. Anything invented after you're thirty-five is against the natural order of things.
>
> Douglas Adams, the Salmon of Doubt (2002: 95)

2.1 Dawn of the New Age

> We, the representatives of the peoples of the world, assembled in Geneva from 10-12 December 2003 for the first phase of the World Summit on the Information Society, declare our common desire and commitment to build a people-centred, inclusive and development-oriented Information Society, where everyone can create, access, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life, premised on the purposes and principles of the Charter of the United Nations and respecting fully and upholding the Universal Declaration of Human Rights. (World Summit on the Information Society, 2003.)

These are the first words of the Declaration of Principles for the building of the information society, as stated at the first world summit in Geneva in 2003. They concisely summarize the whole document in a few key phrases. It is recognised that information technologies, e.g. computer networks, have become the basis of the daily functions of modern society. It is therefore deemed necessary to provide access to this technology and its promised benefits to everyone all around the world. A society in which everyone can create, access, utilise and share information so that they can all achieve their full potential

and improve their quality of life sounds like a chimera with no basis in today's reality. The declaration itself is phrased so that it sounds like just another lofty political speech and, as a declaration of principles, it provides no real tools to achieve the goals that it advocates.

It is, however, important to notice what the declaration encompasses. It is clear that information and communication technologies (ICT) are deemed to be a factor that affects virtually all aspects of human life and that it is necessary to control the development and application of these technologies in order to obtain full benefits from them. These benefits include, as stated in the declaration,

> …the eradication of extreme poverty and hunger; achievement of universal primary education; promotion of gender equality and empowerment of women; reduction of child mortality; improvement of maternal health; to combat HIV/AIDS, malaria and other diseases; ensuring environmental sustainability; and development of global partnerships for development for the attainment of a more peaceful, just and prosperous world. (World Summit on the Information Society, 2003.)

In essence, these above-mentioned social and economic problems have been the main impetus for the interest in ICT shown by various governments from the early 1980s, and especially during the recession in the 1990s. Development projects during the early 1980s included, for example, broadband networks and HDTV. The building of the so-called "information highway" on a governmental level started in the early 1990s when the USA, during the presidency of Bill Clinton, officially launched it. Europe followed suit quickly afterwards, under the label of 'trans-European networks,' in the so-called Delors White Paper (Commission of the European Communities, 1993), and later more centrally in the Bangemann Report (Commission of the European Communities, 1994).

According to Servaes (2002), there were two waves of information society policies in the EU during the 1990s. The first, which emphasised the liberalization of telecommunications and information technology, included various privatization movements and free competition. The second wave came in the latter part of the 1990s and the focus was then on social aspects of information society developments. The political rhetoric of these development projects promised solutions to many of the social and economical problems stated in the above-mentioned declaration of principles. However, opposing viewpoints

and doubts have been voiced about the all-encompassing power of ICT to solve these problems.

Garnham (1997), in his critical account of such technical policies, notes that they meet the needs of politicians because they promise "a technological fix to deep seated social and economic problems, but as a 'new' initiative it distracts attention away from the failure of previous similar initiatives to solve these problems" (ibid.: 327). Indeed, Ducatel, Webster and Herrmann (2001) point out that the relationship between technological innovations and social transformation is complex and the simple notion of technological solutions to social problems has been shown to be false. They continue that if we want the information society to be more than a rhetorical device, we have to develop a more sophisticated appreciation of these social issues: "To this end, while acknowledging the compelling rapidity of change in ICTs and their remarkable rates of diffusion in the past few years, we still have much to learn from consolidating the experience with previous attempts to introduce new ICTs" (Ducatel, Webster and Herrmann, 2001: 7).

Despite the ongoing discussion of the effectiveness of information and communication technologies in solving sociological and economical problems, development in this area has been extensive. The effects of technology are already extensive and highly visible in the everyday lives of individual people and communities, as well as in the service industry. The following two subsections delve into the changes that technology has brought to people's everyday lives and the nature of work.

2.2 Changes to Everyday Life

In those countries that have effectively incorporated ICTs, its effect on the daily lives of people has been significant. Internet services, such as online shopping, learning and other services, have decreased the need for people to visit and experience many social environments and situations that they had to participate in only ten or fifteen years ago. Many grocery stores offer the option of ordering food online, to be delivered where and

when the customer requests. Similar services have existed even longer for bookstores and many other stores that previously operated on a mail-order basis. Information searches no longer draw people to the libraries, since they can access everything virtually online, or can at least find out which library carries the book that they are looking for. People can also do most of the necessary paperwork with their municipality, district and government officials online, through e-mail or World Wide Web. All in all, the need to physically interact with other human beings has decreased drastically over the past decade.

The social and cultural implications of these changes are only beginning to show. Hesketh and Bochner (1994) argue that the adoption of new technology in organizations is producing a new type of employees; employees who must be flexible and adaptive. According to Sennett (1998), modern industry emphasizes the importance of flexibility and implements change in a way that often causes a profound sense of discontinuity to the workers. Changes, such as the increased incidence of remote working (or teleworking), blur the line between work and home. More radically, Collin (2000) states that the modern work environment may greatly affect the way individuals come to understand themselves and their place in space and time. Sennett (1998) adds that the infiltration of technology into working life has resulted in increasing feelings of isolation and that people are starting to seek out communities and interpersonal connections (see also Collin & Young, 2000).

On the other hand, the Internet and the possibilities that ICTs offer can also have positive effects. The ability of the Internet to access all kinds of information globally exceeds the possibilities offered by traditional mass media. Coleman (2001) notes that this gives people the opportunity to keep up to date with relevant issues and to access a diverse supply of information. In addition, the Internet gives people the chance to interact through e-mail, newsgroups, discussion forums and other services. Newsgroups and discussion forums allow people to form tight communities between widely dispersed people who may be interested in a very particular topic and who would otherwise have no opportunity to share their passion and develop their interests. Servaes (2002) notes that the formation of these new communities and groups demands time from the participants and that this time is taken away from other areas of people's lives, including traditional direct-contact social groups. He adds that this may "lead to a complete restructuring of social groups as we know them" (ibid.: 445) and that it is an area that therefore requires extensive research.

According to those who hold a utopian point of view towards The Internet, the online communities that people are now able to form are to be considered a new public realm in which people can re-create the sense of community that is currently missing from the offline society (e.g. Jones, 1998; Schuler, 1996). The Internet is seen as an empowering environment where anonymity provides a unique chance to form communities on the basis of people's interests and behaviour, where acceptance is not dependent on personal or social characteristics, such as gender, race or colour (e.g. Smith & Kollock, 1999).

There is another side to this, of course. The utopian viewpoints that often go hand-in-hand with new technological advances frequently turn out to be short-sighted and incomplete. Jones (1998) comments that online communities can be criticized for the fact that they lack certain characteristics of conventional offline communities, such as stability and commitment and loyalty to the community. They are also criticized as not being fully-fledged communities at all, since they are solely based on information exchange and specific interests. It is also a widely held view that it is easier to join online communities, and to leave them, because they do not require the same level of loyalty and commitment as traditional communities. This is a problem that often also occurs in distance learning situations, where some learners just 'disappear' from the learning environment. (For more discussion of this issue, see Chapter 4.)

Despite the point of view that online communities may be short-lived and limited in terms of a traditional view of community, they do exist. They do offer their members social resources, such as information, social support, friendship, and the possibility to grow as a human being (e.g. Wellman & Gullia, 1999). According to Wellman and Gullia (1999), online communities can also support the offline communities that individual may belong to and that belonging to one type of community does not necessarily eliminate the possibility of belonging to the other kind.

All these changes in the environment in which today's people live in are putting enormous demands on their abilities and their willingness to use those abilities to take part in the modern world. These changes and new requirements are especially important in modern work life, which is the topic of the next subsection.

2.3 Changes to Work

With the above-described changes to the lives of modern people come also new demands on the skills and knowledge that people possess, as well as new expectations of what people, as workers, are capable of doing and willing to do. With the new possibilities to study new information not only at educational establishments and libraries but also over the Internet from many different sources, it is those people who are willing to continue learning all through their lives, to continuously improve themselves, who posses the latest skills and knowledge that modern companies seek. Employers also expect their workers to continuously improve themselves, and be interested in improving themselves, through the courses that the company offers, often in conjunction with traditional educational establishments.

Bandura (2001: 10) notes that with quickly advancing technologies, knowledge and technical skills are soon outmoded unless one keeps up with them by continuously renewing one's skills and knowledge. This implies that people have to be able to take charge of their own renewal and learning if they want to keep up with the changes taking place in their environment. This continuous learning, or lifelong learning, requires that people possess strong self-regulatory skills that they use to learn new information and to change their attitudes towards new things, if necessary.

Not only are society and people's expectations changing, but the new technologies, including global near-instant communication technologies, have had drastic effects on the very nature of modern work, including the facts that: 1) many low-level work functions are now performed by computerised systems—the worker becomes an observer and controller, 2) global competition puts more pressure on the companies' ability to react quickly to possible changes in client's local issues, such as legislation of work safety and international trade, 3) companies now often compete on the global market and they have to be able to react to customer contacts when the customer is awake, not necessarily when it is daytime, or work hours, at the location of the company itself.

Thus, with technological advancements, and the highly developed skills that are required in order to use them, the criteria that companies use for finding new employees have changed. Companies now seek workers who are self-directed, motivated and have strong self-discipline (Ruohotie 2002b, 30). Ruohotie (ibid.) also notes that modern companies require both deeply skilled and multi-talented workers, since the deeply skilled individuals have extensive skills and knowledge pertaining to certain necessary areas, whereas multi-talented individuals, with education in multiple fields, are more able to adapt quickly to new situations and new demands and to move more easily between work teams and different responsibility areas.

Because of the highly specialised skills and the variety of their areas of implementation, it is often necessary to have relatively autonomous work teams that concentrate on specific areas of the company's functions. Ruohotie (ibid.) notes that whereas traditional work teams formed around various technical and functional skills and skilful workers, the modern teams are formed in order to perform a certain process (e.g. product development). Multi-talented process teams require the mastery of a wide variety of skills and knowledge, many of which are common knowledge to all team members, so that the work functions are not endangered by one missing team member. This also means that team leadership is a shared responsibility and the teams are, in fact, self-managed. In modern work environments, teamwork is often also performed in online environments, where it may be that the various team members have never even seen each other face-to-face, or only see each other periodically.

Gibson and Kirkman (1998: 7) note that this change in the way people work requires them to also change their assumptions and expectations about work and responsibilities. It is necessary, for example, to make a transition from individual motivation and individualistic, competitive values to collective motivation and collectivistic, collaborative values. Similarly, they (ibid.) add that there has to be a change from independent work and specific work specifications to interdependence and multiple skills, as well as from individual responsibility to mutual responsibility and a command and control attitude to self-management.

All in all, the trend in working life is away from an individualistic approach and towards a collective approach to work and duties. The same trend is apparent in both

individualistically oriented cultures and in collectivistic cultures, but the transition is, naturally, harder to make for those who have been raised in individualistic cultures. Bandura (2001: 14) notes that generally "[p]eople from individualistic cultures feel most efficacious and perform best under an individually oriented system, whereas those form collectivistic cultures judge themselves most efficacious and work most productively under a group-oriented system." Kirkman and Shapiro (1997), refer to a study by Kirkman, in which it was found that the cultural orientation of employees affected their resistance to working in teams in the U.S., Finland, Belgium, and the Philippines. The employees with individualistic values (found in the U.S. and Finland) resisted working in teams more than respondents with collectivistic values (found in the Philippines and Belgium). Kirkman and Shapiro (ibid.) also note that the respondents who valued power distance (in the Philippines and Finland) reported higher levels of resistance to self-management than did those low in power distance (in the U.S. and Belgium). The fact that technological advances and global economy is bringing group-oriented structures also to cultures that are traditionally individualistically oriented, places even more demands on people from such culture groups.

All these changes in the environment in which people live are putting enormous demands on their abilities and their willingness to use and develop those abilities to take part in the modern world. There are, however, additional aspects to information society and its online communities that may make them inaccessible to a large part of the world's population.

2.4 Outside the Society

Despite the political agenda to introduce ICTs in Europe, it is now clear that an information society cannot be built without public support. In order for the EU to reap benefits from such technologies and use them to bring equal opportunities for all, ICT should be employed equally in all of Europe. As it is, there are marked differences between north and south Europe, as presented in the following figure (Figure 2.1).

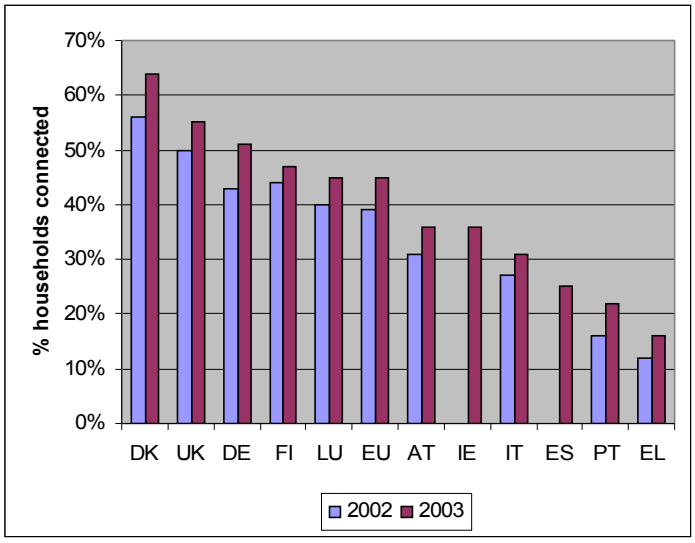

Figure 2.1: Internet Penetration in some European Countries
(adapted from Servaes, 2004)

As can be seen in the table above, countries in northern Europe have achieved a clear advantage in Internet penetration over some southern European countries. Servaes (2002) lists some possible reasons for this. He notes (2002: 437-438) that over half of the Europeans who are not interested in online services state that they have no need for them in their private lives. This is also true, he continues, for a large proportion of people in the heavy use countries.

Other reasons for people to be left outside the information society include price and the perceived complexity of the tools needed to access online services. Complexity is a factor that seems to affect women more than it does men, but more discriminating factors are age, income and education—the same factors that have been identified as affecting technology adoption in general. Younger and better educated people are more likely to adopt new technologies, while older people have difficulties in adapting their lifestyles and habits to incorporate and master learning technologies. (Servaes, 2002; see also Ducatel, Webster & Herrmann, 2000.) Accordingly, Augiri and Graham (1998) point out that the majority of Internet users are white, middle-class males and/or academics and professionals. Additionally, Everard (2000) notes that since almost all the information on the Internet is in English, language is yet another barrier for the effective adoption of the technology and its possibilities. It should be noted that these factors affect all the countries in Europe and cannot thus completely explain the differences between northern and southern areas.

In a recent study in Sweden it was discovered that men were more likely to have an Internet connection than women (65 vs. 56 percent), and university graduates had a connection more often than those with only comprehensive school education (75 vs. 48 percent). The same division existed between the young and the old (71 percent for 25 – 34 year-olds and 51 percent for 55 – 65 year-olds). Also, large households had a connection more often than small ones (81 vs. 34 percent). (Nordicom, 2002.)

These kinds of factors are the strongest argument against the utopian view of the information society and its ability to solve social and economical problems. Despite the fact that governments are working hard, at least in political speeches, to bring these new opportunities within everybody's reach, they cannot easily accelerate the slow social process that actually make it a reality. Not everyone, especially the older, the less educated, and people with restricted financial means, see themselves as needing online services at the present time. Thus, they are denied the benefits that information society could provide to them. This so-called digital divide exists not only between rich and poor countries, but also within the rich countries. The road to a true information society is only beginning, and all education providers, politicians and researchers in the field have to keep this in mind when they design and assess their work, and plan for the future.

3 LEARNING

> We may use similar terms to describe a sunset. Our subjective worlds often correspond, correlate, and map onto each other. That makes cooperation and relationships possible, even complex civilization. Yet a person's actual sensations and feelings remain forever unique. Because a brain isn't a computer and neurons aren't transistors.
>
> David Brin, Kiln People (2002: 58)

This chapter introduces the view of learning that has been adopted for this research. In the present study, learning is understood as acquiring skills, knowledge or attitudes through various cognitive processes triggered by internal or external stimuli. These stimuli may be intentional (e.g. studying) or unintentional (e.g. life events). One of the most important cognitive processes is self-reflection, through which a learner transfers his/her experiences into new knowledge. Learning is a complicated process and several factors have to be taken into account when trying to describe or explain any single learning event. Because of this, it is necessary to take a holistic view of the experiences that learners have during their learning process in order to understand which factors explain or support their learning.

This chapter will examine and critique those aspects of modern learning theories that are most relevant from the point of view of the present study, mainly concentrating on the constructivist approach to learning. Next, to bring light to the issue of individual learning, the issues of motivation and the development of goal-orientation theory are explored. These background discussions lead to one of the most important parts of the present study, namely the theoretical structure of individual learners' self-regulation and cognitive and metacognitive processes that are deemed important for successful learning. This categorisation, described in subsection 3.4, is also the present researcher's understanding of the theoretical basis for the Abilities for Professional learning questionnaire, which has been used in this research. After the individual-centred view of learning, the following sections will investigate the social, or collective, aspect of learning. This subsection also

introduces the concept of social motivation and completes the picture of a learner as both an individual being and as a part of the social community to which he/she belongs. Although the social aspects of learning receive relatively minor attention in the aforementioned questionnaire, they are believed to be of great import for successful learning in online learning environments.

3.1 Modern Learning Theories

Mayer (1996b) has argued that the theories of learning developed over the last hundred years have been based on three metaphors: learning as response strengthening (behaviourism), learning as information processing (cognitivist) and learning as knowledge construction (constructivist). In other categorisations, not based on metaphorical analysis, the division is usually made either between behaviourism and cognitivism or between behaviourism and constructivism (e.g. Bruner, 1990; Forrester & Jantzie, 1998). In the present study the latter view is adopted and constructivism is seen as involving the learning theorems derived from cognitive psychology, because it is focussed on mental processes that construct meaning. Cognitive learning theory is, therefore, seen as an aspect of constructivist learning theories, rather than as a separate learning theory. The following short introductions to behaviourism, information processing theory, social learning and constructivism will explain the nature of these learning theories and their interconnections.

Behaviourism views learning as response-strengthening or conditioning, achieved through stimulus-response associations. This point of view is nowadays mostly associated with Skinner's tests on animals and deemed incomplete, because it largely ignores what happens inside the human mind. Skinner himself, however, believed that "any mental event which is unconscious is necessarily inferential" and any such explanation "is therefore not based upon independent observations of a valid cause" (Skinner 1953: 30). Thus mental processes are not scientifically suitable explanations of behaviour. Behaviourists identify two types of conditioning as learning processes: classic conditioning and behavioural (or operant) conditioning. The first refers to natural reflexes towards

various stimuli and the second refers to the reinforcement of these responses with the help of (extrinsic) rewards so that they become more probable in the future. However, it became evident that all learning could not be explained by such simplified processes and thus the development of cognitive psychology brought about more elaborate learning theories.

Cognitive psychology started to develop in the 1950s with the emergence of the 4 C's of intrinsic motivation: challenge, curiosity, control and context (motivation will be handled more thoroughly in a later chapter). Unlike behaviourists, cognitivists recognised that mental processes cannot be discounted from any explanation of human (or even animal) behaviour. Cognitive psychology is associated with various learning theories, including information-processing theory and constructivism. In information-processing theory, which Mayer (1996b) calls a cognitivist learning theory, the human mind is compared to a computer. According to this analogy, both humans and computers accept input (information), and process that input to produce output. The processing of input is performed in so-called working memory, which draws resources (previous knowledge) from long-term memory. Input can be either internal or external (sensory input), while long-term memory stores all the pieces of information that a human being has gathered during his/her lifetime. (See Chapter 3.4.1, Resource Management.) The information processing theory, like other learning theories based on cognitive psychology, therefore focuses on the internal mental processes of an individual and sees the purpose of education as developing the capacity and skills of an individual person to learn.

Another modern approach to learning is social learning theory, which sees the learning process as observation of and interaction with social and cultural contexts (Ruohotie 2000b). Social learning theories can be seen as an opposite response to behaviourism, as learning is seen to take place through the observation of the behaviour of others, rather than by learning from one own actions and the responses of the environment to them. Thus, in social learning theory learners are seen as intelligent enough to learn from the behaviour of others and not only through their own successes and mistakes. Since social learning theories admit the existence of individual intelligence and abilities for reasoning, it is also related to cognitive psychology. This relationship is strengthened by the fact that social learning approach sees that individuals are different and that they can behave differently in similar situations, because of their unique characteristics. Social learning theory deems modelling and mentoring to be the most important tools for teaching and

education. This approach therefore combines the individual cognition and the social aspects of learning, such as socialization.

Ruohotie (2000b) notes that the information processing theory (or cognitivism) has been criticised for the fact that it proclaims that all learning takes place within the learner, whereas the proponents of the social learning theory see that learning involves "both the learner and his/her interaction with the social environment" (p. 13). Education based on such a social cognitive framework may, for example, use a teaching method known as cognitive apprenticeship, in which the learners take part in authentic situations involving social interaction and aims to learn "the cognitive processes that experts apply to complex problems" (ibid. p. 13). Ruohotie (ibid.) notes that another social cognitive teaching strategy would be so-called anchored instruction, which replaces authentic situations at a workplace by bringing authentic examples or problems into a normal educational setting, where the learners can observe and analyse, for example with the help of video recordings, an experts' work from several perspectives over a long time period.

Following Mayer's (1996b) categorisation, constructivism is deemed separate from information processing theory (Mayer's cognitivism) and social learning theory. However, it should be noted that many writers, including the present author, see the above-described cognitive information-processing theory as merely one aspect of constructivism, although, in the case of constructivism, the pieces of information discussed in information processing theory are usually replaced by knowledge constructs. Also, as is explained later in this section, constructivism has assimilated most of the principles of the other learning theories based on cognitive psychology, so much so that one can no longer draw a clear line where constructivism ends and, for example, social learning theory begins.

Since constructivism envelops most of the ideals of cognitive psychology, which, in itself, was an opposite reaction to behaviourism, it is useful to take a look at the differences between the behaviouristic approach and the constructivist approach to learning. The fundamental differences between behaviourism and constructivism can be visualised, for example, by thinking of them as opposite ends on a spectrum of learning theories, as in Figure 3.1 below.

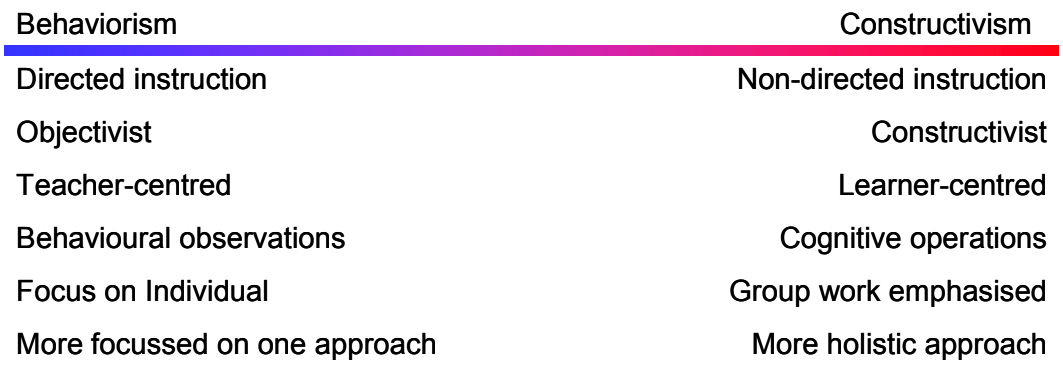

Figure 3.1: Behaviourism and constructivism as opposite ends of a spectrum (adapted from Forrester & Jantzie, 1998)

Forrester and Jantzie (1998) state that "[c]onstructivists believe that all humans have the ability to construct knowledge in their own minds through a process of discovery and problem-solving" (p. 5) Thus, learning is no longer seen as teacher-centred, objectivist and directed, but learner-centred construction of one's own knowledge. Learning becomes a life-long process and teachers are merely the facilitators of learning. Also, as was stated above, constructivism focuses on cognitive operations rather than on observed behavioural patterns in order to explain learning. This cognition is learners' own interpretation of their experiences and events that they witness, and consolidation of these new constructs of knowledge with what is already known.

Constructivism can be divided into various sub-categories, depending on which areas or means of knowledge construction are considered the most important (e.g. the above-mentioned information-processing and social learning theories). These sub-categories range from more individual-centric cognitive constructivism to more socially oriented social constructivism.

The central concepts in cognitive constructivism, which can be traced back to the foundational work of researchers such as Piaget (1985), include assimilation, accommodation and schema. According to Piaget (ibid.) every human act is intellectually organised and adaptation provides the means for a change in intellectual organization. Explained in short, Wadsworth (1989: 10) states that "[s]chemata . . . are the cognitive or mental structures by which individuals intellectually adapt to and organise the environment" whereas assimilation involves the addition of new information into an existing schema and accommodation is the formation of a new schemata or the change of

an old one. In essence, "[a]ccommodation accounts for development (a qualitative change), and assimilation accounts for growth (a quantitative change)" in schemata (Wadsworth, 1989: 15). An important concept in cognitive constructivism is self-regulation, since self-regulatory skills are used by individuals to control and direct their cognition. We will come back to this topic in a later section (Section 3.3).

Although the cognitive approach to constructivism alludes to the social context of individuals as part of an environment that they attempt to make sense out of, the theory does not go very deeply into the explanation of social groups and interactions. The socio-cultural approaches to constructivism are based on the idea that knowledge construction takes place in a socially constructed reality and that it is thus a social process. Therefore, knowledge construction and learning cannot be considered without taking into account the social and the cultural framework (social learning theory). This approach makes clear sense when one considers that the basis of constructivism is in a philosophical movement (also called constructionism) that strives to critically deconstruct socially reified concepts of reality, such as race and social roles (Coulter, 2001). It is widely accepted that much of human thinking and concepts are social creations, rather than actual entities. Every text that we read has been constructed through a social process in which the authors interact with their social and cultural environment. Therefore, all of our thinking and cognition is influenced by these socially constructed beliefs and ideas.

In the field of learning theories, Vygotsky (e.g. 1978) based his theory on the hypothesis that our cognitive development is directly related to our social development. He also developed the concept of a zone of proximal development, which refers to the leading edge of a child's emerging cognitive ability, and scaffolding, which is a means of helping a child expand the boundaries of the zone outwards towards the adult level of cognition. More culturally oriented views of constructivism have also been proposed (Lave & Wenger, 1991; Wenger, 1998; see also Allee, 2000), in which a learner progressively constructs the culture of a community and simultaneously learns what it means to be a member of the community.

Constructivist approaches to learning, unlike behaviouristic, demand a great deal from an educator. Whereas behaviourism is more focussed on one approach, constructivism is a holistic approach, which demands the educator to be very flexible and possess an ability to

take into account the learners and groups of learners as individuals, with their own unique characteristics and prior knowledge. It is also important to be aware of this multidimensionality of learning when trying to understand how environmental factors and teaching methods support learning—not all individuals benefit from the same methods or environments.

From the above description, one might assume that the constructivist approach is the one approach that envelops everything that affects learning, but there are areas that even this approach does not take into account. The constructivist theory sees human beings as logical and analytic animals, who construct new knowledge upon the old logically as long as the information is presented to them in a way that takes into account their individual differences and developmental stages (e.g. scaffolding). This approach omits consideration of human emotions, our affective characteristics. Strong emotions, and the life situations and experiences that cause them, may have a significant influence on an individual's ability to process and construct new knowledge.

In the present study, despite its weaknesses, the adopted view on constructivism falls between cognitive and social constructivism, with a slight preference for cognitive constructivism which shows in the applied research methods. It is believed that individual learning skills and cognition, as well as social knowledge construction are important in learning, especially in a situation in which various learning tasks are carried out in cooperative learning contexts in online learning environments. In addition, a social approach to cognitivism introduces those theoretical constructs that are useful in the context of the present study (e.g. collective self-efficacy beliefs). The next few sub-sections will delve into individual learning capabilities, but we will come back to the social aspects of learning in sub-section 3.5.

3.2 Development of the Goal Orientation Theory

Until interest in self-regulatory skills arose in the mid 1980's, most of the research on motivation concentrated on the prediction of achievement and short-term changes in individuals' motivation. These phenomena were viewed through a haphazard collection of motivational constructs that had little to do with each other. (Eccles, 1991.) During the latter part of the 1980's research in motivation turned to a new approach, the so-called goal orientation theory, which views motivation in terms of qualitatively different motivational goals or reasons for a certain activity (Nicholls, 1989, quoted in MacCallum 2001). Later, many proponents of reward-based motivation research changed over to goal-oriented motivation (Shah & Kruglanski, 2000: 106).

Because the terms intrinsic and extrinsic motivation are still widely used also by those researchers who are proponents of the goal orientation theory, it is important to briefly review the research on intrinsic and extrinsic motivation before moving onto the goal orientation theory.

3.2.1 Intrinsic and Extrinsic Motivation

Lepper and Henderlong (2000) review the early history and modern state of the research of intrinsic and extrinsic motivation. They note that the early history of motivation research was solely focused on extrinsic motivation, i.e. Skinnerian psychology, in which extrinsic rewards (treats, money, and praise) affect one's motivation to engage in an activity, and that intrinsic motivation was not considered until the latter half of the 20th century. The 1950s saw the emergence of the so-called 4 C's of intrinsic motivation: challenge, curiosity, control and context. As early as in 1959, White (1959, referred to in Lepper & Henderlong, 2000) discovered the mastery motive, indicating that people might intentionally seek out new challenges and train new skills for the pleasure of such achievement itself. Berlyne (1960, referred to in Lepper & Henderlong, 2000), on the other hand, studied individual curiosity as a form of motivation and noted that people try to

make sense of the world around them, notwithstanding the possible extrinsic rewards. Hunt (1961, referred to in Lepper & Henderlong, 2000) described how people try to spontaneously exercise control over their environment without thinking about the possible rewards or punishments that might follow. Bruner (1961, referred to in Lepper & Henderlong, 2000) studied the importance of context in learning, noting that students need to see the relevance of the skills that they are taught for such objectives as they may find inherently interesting outside the classroom.

After the Skinnerian model of extrinsic rewards and extrinsic motivation was joined by this new idea of intrinsic motivation and intrinsic rewards, it did not take long for researchers to study the effects of extrinsic rewards on intrinsic motivation. The general finding was that extrinsic rewards may be detrimental to the level of intrinsic motivation that an individual has for a certain task, if the level of motivation has been high at the start. If the possibility of an extrinsic reward is taken away after it has been first introduced, someone with an initially high intrinsic motivation can lose his/her interest in the task. On the other hand, if the task is not initially interesting to an individual, the possible extrinsic rewards may enhance motivation to perform that task. On a more specific level, in his study of the types of extrinsic rewards, Deci (1971) noted that the detrimental effect was typical of physical rewards, rather than rewards that were purely verbal. Lepper and Henderlong (2000) encapsulate the main findings of the past few decades on extrinsic rewards and their effects on intrinsic motivation and note that these initial findings still hold true, with one clarification: It has been noted that random, unexpected extrinsic rewards are less likely to be detrimental to intrinsic motivation and are, in fact, possibly an enhancing force to one's inherent interest.

Later research has also shown that these affects on intrinsic motivation by extrinsic rewards may result from the individual perceptions of the continued instrumental value of the task, personal competence and of external control (Lepper & Henderlong, 2000). Even if extrinsic rewards become unavailable, one's perception of the task's possible instrumental value in the future may enhance one's motivation to practise that particular skill. Additionally, if one feels that what one is doing is enhancing one's competence and is personally salient, it is likely to enhance motivation for a task. Further, the sense of inherent control is important for continued intrinsic motivation. If one feels like a pawn

after receiving an external reward for a completed task, it is unlikely to enhance intrinsic motivation to continue performing that task.

With respect to the research on how extrinsic rewards affect intrinsic motivation (e.g. Harackiewicz & Sansone, 2000), it is important to note that intrinsic/extrinsic motivation is not an either-or question. In fact, it is quite the opposite. Many times people engage in activities towards which they feel both intrinsically and extrinsically motivated and thus both forms of motivation can easily coexist (e.g. Hidi, 2000; Sansone & Harackiewicz, 2000; Linnenbrink & Pintrich, 2000; Lepper & Henderlong, 2000; Lepper, Sethi, Dialdin & Drake, 1997). One example could be a sports hobby, which may be motivated both by a desire for personal health, as well as by the extrinsic reward of the pleasure expressed by one's spouse for the fact that one leaves one's computer alone for a little while. It can, therefore, be argued that intrinsic motivation of a learner is not necessarily undermined by the extrinsic rewards that a teacher may offer (grades, praise or mere approval) (e.g. Lepper & Henderlong, 2000).

Shah and Kruglanski (2000) criticize reward motivation theories on the basis that although they pay proper respect to old Skinnerian psychology by still focusing on rewards and their effects, they have run into trouble trying to explain the variety of human behaviour. Shah and Kruglanski (ibid.) also note the increasing differentiation between different types of rewards and their effects (verbal and tangible, salient and non-salient, rewards based on contingencies, multiple and single rewards) as clear proof of this trouble. They continue that what one person considers a reward may be a punishment for another. Additionally, even modern researchers disagree on the actual effects of different kinds of rewards on extrinsic and intrinsic motivation (Sansone & Harackiewicz, 2000).

Intrinsic motivation is seen by some researcher as engaging in activities that satisfy one's basic need for competence and control (e.g. Lepper & Henderlong, 2000; Ryan & Deci, 2000). In this way, the task that a person engages in is seen as interesting and motivating in its own right. For example, one may merely enjoy the act of studying a certain topic without any expectations of its usefulness in the future. Other researchers, however, divide intrinsic motivation into two distinct categories, depending on the structure and substance of the motivation (Shah & Kruglanski, 2000). The first category refers to a situation in which the activity is related to a single goal, and the second category when it is the content

of these goals that matters. Still other researchers point out that intrinsic motivation is closely related to interest and differentiate between situational interest and individual interest (Hidi, 2000; Renninger, 2000; see also Sansone & Smith, 2000).

Extrinsic motivation is often connected with extrinsic rewards, but the specific definition of these rewards may be very different from one definition of extrinsic motivation to the next. Sansone and Harackiewicz (2000) note that there seem to be two basic definitions of extrinsic motivation. According to the first, motivation is extrinsic when it is motivated by something extrinsic to the activity, and according to the second, motivation is extrinsic when it is motivated by something extrinsic to the person (ibid. p. 445); for example, by situational interest (Hidi, 2000).

As a result of discrepancies that have arisen in motivation research based on intrinsic and extrinsic motivation, and despite its positive aspects and a certain clarity it has brought to understanding of reward-based intrinsic and extrinsic motivation, a different approach is needed; one that, from the start, takes into account the cognitive aspects of motivation.

3.2.2 Early Goal Theory

From its start, goal theory has taken a cognitive approach to motivation and has considered goals as motives that each student composes (Ames, 1992). Conti (2001: 144, see also Latham & Locke, 1991) states that research has repeatedly proven that a learner with a clear, set goal performs better than a learner without a goal. Gollwitzer (1996) also notes that purposeful reflection on a goal will enhance learner's performance. The study of goal orientations is a new line of research that has added also to the understanding of self-regulated learning (Pintrich, 2000a).

According to Pintrich (ibid.), goals "refer to potentially accessible, conscious cognitive representations . . . that show stability, as well as contextual sensitivity". Also,

> They represent a unit of structured knowledge or personal, subjective conception or "theory" . . . about the purposes of an achievement task, as well as other elements referring to how success and competence are defined, the role of effort

> and errors and evaluation norms. These elements are activated jointly – the schema and the theory – or individually, by seeking relevant information in the context . . . or my means of conscious explicit thought and knowledge about the achievement task. (Pintrich, 2000a)

Early models of goal theory can be called normative in the sense that they presume that learners can be classified according to the type of academic goal that they assume. Subsequently, learners' cognitive processing and regulation of learning will also show differences; highly self-regulated learners are more highly committed to their learning (Pintrich, 1999). The types of goals that these models propose are academic goals and social goals.

According to goal theory, academic goals can be divided into two main categories: 1) a **mastery goal** or a learning goal (I want to be good at this), 2) a **performance goal** or an ability goal (I want to be seen as good at this, grades define me in my own and other's eyes) (Ames, 1992; Archer, 1994; see also Molden & Dweck, 2000; Butler, 2000). An optional third goal in this theory would be 3) an academic alienation goal (just as long as I pass, I don't care about the grades I receive). The third goal was not included in the original achievement goal theory by Ames (ibid.), but is an addition by Archer (1994) and is often omitted because motivation research has been more interested in studying those require motivation to participate. The third category is, however, always present in real learning situations with any group of learners. The author encountered this goal on numerous occasions as he was gathering the data for the present study and has observed it in the past amongst his fellow learners. Consequently, when analysing data derived from any group of learners, it is necessary also to reflect on the effect of the various learning goals of the members of the work groups.

Those who adopt a mastery goal are interested in learning and developing themselves and thus they will use deep study methods and multiple learning strategies to understand the subject of study (Archer, 2001). Pintrich (2000c) notes that learners with a mastery goal are characterised with satisfaction upon mastery or achievement of a task, greater persistence, efficacy, interest and task value. They will also use more self-regulatory strategies than those learners who do not adopt a mastery goal.

Archer (2001) adds that, on the other hand, those who merely have performance-based goals are not as interested in the material that they study, as long as they receive good grades in tests. They will use only surface, or less adaptive, study strategies and may retreat in the face of difficulties, afraid that they will lead to an unfavourable evaluation. Where performance-oriented learners are likely to see failure as a setback, mastery-oriented learners may see it more as a natural part of learning and as a clue about how to modify their performance for better outcomes (e.g. Ames, 1992; Molden & Dweck, 2000; Pintrich, 2000a; Archer, 2001). This can be seen well in a real-life example in which a performance-oriented computer user may make a tentative attempt to fix the computer or re-install some software when the system shows signs of an imminent crash. If the first small attempts fail, the user may interpret them as a sign that he/she is not good enough at the tasks that he/she attempted and give up. On the other hand, someone who desires to understand computers (mastery goal) sees the crashing computer as an opportunity to learn, and will immediately attempt another strategy to find out if the problem was caused by a fault in the software at all, or if the hardware should be checked. Giving up might not be seen as an option and the mastery motivated individual may even find it hard to set the project aside until the problem is fixed.

Research has shown that learners with mastery goals are more likely to self-regulate their learning (Ames, 1992), they use more summary and paraphrasing strategies for learning (Archer, 1994), they try to understand their failures and they get more satisfaction from success (Ames, 1992). On the other hand, those who adopt a performance goal use more surface learning strategies and gain less satisfaction from success. Furthermore, Zimmerman and Martinez-Pons (1990) have found out that learners with mastery goals are more likely to use self-regulatory strategies to maintain their interest and motivation in the learning task. Research also shows that learners with mastery goals are more accepting of a conceptual change (Pintrich, 2000a).

The second type of goals under consideration in goal theory is so-called social goals. As of yet, understanding of the social goals that learners may have (e.g. gaining others' acceptance, cf. Schneider, Ackerman & Kanfer, 1996) is limited, but the area is becoming increasingly important in goal-orientation studies.

However, in this skeleton form, goal theory leaves much to be desired. For one, it gives too black-and-white a picture of what may be happening inside the mind of a learner, proposing that those who approach a task with a performance goal may not use methods of study that are as sophisticated as those who approach it with a mastery goal. Too often researchers view these two forms of goal approach as distinct possibilities (Molden & Dweck, 2000) and fail to consider the intricacies of human psychology. Recent modifications to achievement motivation theory have attempted to rectify this problem.

3.2.3 MULTIPLE GOALS THEORY

This recent reformulation of goal theory has been called the theory of multiple goals, or the multiple goal theory, because it takes into account the fact that the choice between performance and mastery goals is not mutually exclusive. In their extensive literature review, Molden and Dweck (2000) noticed that recent research has tried to find out why, in some situations, performance goals do not turn out to be as detrimental to intrinsic motivation as is often expected. Several studies have shown that performance goals may lead to good performance, if they occur together with mastery goals (Elliot, 1997; Elliot & Church 1997; Elliot & Harackievicz 1996). Furthermore, according to Hidi and Harackiewicz (2000)—who call for understanding of the "multidimensional nature of motivational forces"—goals that learners adopt may be manifold and flexible in real learning situations, as opposed to the settings in experimental studies. Pintrich (2000a) has also noted that mastery and performance goals have shown positive relationships. He (2000c) has used the metaphor of journey to describe how learners may adopt different goals for different moments in the journey and thus reach good results.

In light of this realisation that learners may adopt many coexistent motives or goals, researchers have turned to the work of earlier researchers for answers. Molden and Dweck (2000) draw on earlier research by Elliot and others (Elliot, 1997; Elliot & Church 1997; Elliot & Harackievicz 1996), who pointed out that modern goal theory has forgotten the early theories of Atkinson (1957) and McClelland (1951), in which achievement motivation was seen to revolve around two motives: 1) approach-oriented need to achieve and 2) avoidance-oriented fear of failure.

Based on this "rediscovery", Elliot and Church (1997) have modified the two basic goals of goal achievement theory to incorporate these older motives for behaviour. They ended up with three basic goals: 1) mastery goals, that stem from pure motive to approach success; 2) performance avoidance goals, that stem from the desire to avoid failure; and, 3) performance approach goals, that stem from both the desire to approach a goal and to avoid failure. According to Elliot and Church (1997) the mastery goal should be wholly supportive of intrinsic motivation to perform, whereas the performance avoidance goal poses a great risk to intrinsic motivation. The third goal is one that joins these two effects and the possible danger or benefit to intrinsic motivation is determined by the dominating motive.

In effect, Elliot and Church (ibid.) divided the performance goal in two and introduced grey logic into the interpretation of goal-oriented motivation. In practice, the author proposes that most performance goals include both approach- and avoidance-oriented motives and thus Elliot and Church have merely introduced a categorisation in which performance avoidance is practically never used, and the category of performance approach, which includes both the fear of failure and desire for accomplishment, incorporates most human goal-oriented behaviour. A clearer division between performance avoidance and approach motivations would be in order, with the understanding that most human behaviour combines these two types of motivation to various extents.

Pintrich and McKeachie (2000) note that according to recent cognitive reformulations of the achievement goal theory, goals are seen as cognitive representations of the different purposes learners may adopt in different situations. Linnenbrink and Pintrich (2000) pick up Elliot and Church's (1997) model and clarify the distinctions between mastery and performance orientation, and approach and avoidance states. Basing their work on Elliot (1999), they propose for further research a schema that introduces four different categories of goal orientations and approach and avoidance states (Table 1). In mastery orientation, the approach state is the above-described state in which the learner is interested in mastering, learning and understanding a task, as well as self-improvement. In contrast, the avoidance state of the mastery orientation would be demonstrated by people who avoid misunderstanding and not learning a task because of their own self-set standards of achievement, and their strive for perfection. On the other hand, individuals with approach

performance orientation would focus on besting others and receiving the highest grades, and those with avoidance performance orientation would try to avoid being inferior to others, mostly by avoiding tasks at which they do not excel. (Linnenbrink & Pintrich, 2000: 196-202.)

TABLE 3.1: Two Goal Orientations and Their Approach and Avoidance States (Linnenbrink & Pintrich 2000)

	Approach state (promotion focus)	Avoidance state (prevention focus)
Mastery Orientation	**Focus** for mastering task, learning, understanding	**Focus** on avoiding misunderstanding, not learning, not mastering task
	Use of standards of self-improvement, progress, deep understanding of task	**Use** of standards of not being wrong, not doing it incorrectly relative to task
Performance Orientation	**Focus** on being superior, besting others, being the smartest, best at task in comparison to others	**Focus** on avoiding inrefiority, not lookin stupid or dumb in comparison to others
	Use of normative standards such as getting best or highest grades, being top or best performer in class	**Use** of normative standards of not getting the worst grades, not being lowest performer in class

There is now also a more widespread understanding that "different goals can give rise to multiple pathways or trajectories for achievement" (the journey metaphor by Linnenbrink & Pintrich, 2000). In practice, this adds to the consideration of the learner's cognition in the consideration of achievement goals. Linnenbrink and Pintrich (2000) note that both approach mastery and approach performance orientations increase learner's interest in an activity if they are successful at the task, although the research findings in case of approach performance orientation are not as strong as in the case of approach mastery orientation. On the other hand, they point out that both avoidance mastery and avoidance performance orientations are likely to decrease further interest in the task, possibly more so in the case of avoid performance orientation. In the present research, however, it would be hard to gather enough valid information about the approach and avoidance states of the individual learners from their learning journals, so it is necessary to omit them from consideration.

The theory of multiple goals was developed concurrently with a rising interest in social goals, and thus the theory considers them more deeply than the earlier stages of goal theory. Wentzel (1999) theorised that social motivation may lead to increased effort on the part of learners and proposes that social goals should be considered in a complementary role to mastery and performance goals. She proposes two different social goals: self-assertive social relationship goals, which refer to the attainment of individuality and social resources; and integrating, relationship goals, which refer to the attainment of common relationships and social commitments. We will return to these social aspects of learning in later sections.

In support of the multiple goals theory, Pintrich (2000c) found that there were no differences between learners with high mastery goals and low performance goals versus those who had high learning goals and high performance goals as far as self-efficacy, cognitive and metacognitive strategies, but slight differences in the preference of the latter group for task value. There is also evidence that learners use different strategies to adapt to difference challenges and situations. It is thus probable, and the position of the multiple goal theory, that good learning and best results require that the learners adopt both mastery and performance goals (e.g. Hidi & Harackiewicz, 2000).

From the perspective of the present research, it is important to realise that all learners have several concurrent goals that they pursue, some of which may support their performance in the studies, and others that may not. From the evidence provided by earlier research, it is apparent that those with both short and long term goals, and mastery goals, will be likely to perform better than those with only performance goals, or with fewer mastery goals.

3.3 Self-Regulation

This subsection focuses on explaining various theories of self-regulated learning and their relevance to the present research. The purpose is to describe the way self-regulation is viewed in this research and how the qualitative and quantitative research methods used in

the research are connected with each other. Later chapters will further explore the complexities of combining different theoretical viewpoints into a coherent whole, as is necessary when combining qualitative and quantitative research methodologies.

Self-regulated learning is defined by Corno (2001) as the "internalization of learning and task management strategies, coupled with the ability to mobilize and maintain them when situations demand." In essence, this means that the learners are aware of the success of their own learning and the learning strategies that they use. They are also able to regulate their own behaviour, and, in the event of learning failure, are capable of using optional learning strategies and/or try again.

Researchers' interest in self-regulated academic learning emerged as late as in the 1980s. A lot of the research prior to this time concentrated on educational quality and learners' mental abilities, and various education reforms, especially in multicultural counties like the U.S.A., focused on taking into account the handicaps that learners experienced as a result of their early intellectual development because of their ethnic or class background. (Zimmerman 2001.) Learners were thus seen mostly as reactive individuals, rather than proactive learners who could take charge of their own learning and employ various motivational strategies, modify their learning environments and seek suitable education for themselves. However, especially in adult education it is the learners who seek out education for which they feel the need. Whereas children in most societies face compulsory education from a very young age, adult learners seek education in order to, for example, satisfy their own inner desire for knowledge (intrinsic goal orientation) or to respond to the rapid growth the competencies that one needs in order to function in modern societies (extrinsic goal orientation).

McCombs (2001) notes that while self-regulatory skills have received more attention since the 1980s, they are often still not taken into account in practical education. She (ibid.) also notes that despite extensive research on perceptual psychology since as early as the 1940s, it is still often mechanistic models and behaviourism focused on external factors that are used in the practical field of education. She (ibid.) asserts that the change from the old methods of educational thinking is very slow in practice, and even when such change takes place it often remains on the level of using the 'hype' words of self-regulation and student-

centred learning in development plans and curricula, but does not carry over into everyday practice.

Many researchers hold the view that learners' perceptions of themselves as learners and their use of various processes to regulate their learning are important in the analysis of learning achievement (Zimmerman 2001:2). Salili et al. (2001) showed that self-regulation is an important factor, and is independent of the learners' cultural background, in predicting the effort invested in learning, sense of self-efficacy and the adoption of a learning goal. Matambo (2001) reported a study of high school students in Zimbabwe which showed that self-regulated learning strategies are positively related to academic performance. He also reports that there were no significant differences in the effects of the use of self-regulatory learning strategies between sexes. In their research, Zimmerman and Martinez-Pons (1986, 1988, 1990) have also come to the conclusion that learners' gender and socioeconomic status are lesser predictors of achievement than the use of self-regulatory strategies. On the other hand they (1990) discovered that girls use their strategies more widely than boys, but they are also less self-efficacious. Thus, girls did not trust their abilities as much as boys did, but compensated for this by employing more self-regulatory strategies.

At a general level, Zimmerman (1986) notes that students are self-regulated to the extent that they are metacognitively, motivationally and behaviourally active in their own processes of learning. Carr (1996), who defined self-regulatory learning as learning that takes place without a teacher, observed that in order for self-regulatory learning to take place, the learners need to have some knowledge of the content area, learning skills and motivation to learn. Conti (2001) found that those college freshmen who contemplate their reasons for going to college have a clearer sense of direction and higher academic achievement than those who do not. She also noted that students who are merely trying to perform (see chapter 2.1) tend to have more problems adjusting emotionally to the new context that a college poses.

One of the most important factors of self-regulation is **volition**. According to Corno (1994: 229), it is "the tendency to maintain focus and effort towards goals despite potential distractions." It is volition that helps some learners overcome barriers and difficulties while others do not. According to the action-control information processing theory of

Heckhausen and Kuhl (1985), intentional states should be considered distinct from motivational states. Thus, the pre-decisional state is called motivation and the post-decisional state is called volition. When an individual makes a decision, the motivational state is terminated and he/she enters the volitional state. They argue that this distinction is necessary to account for non-rational behaviour, such as failing to switch television channels from a boring programme to a more interesting one.

This split between pre- and post-decisional states is undoubtedly important, but it ignores the fact that, according to Corno (1993), volitional control strategies call up motivational strategies as needed. Corno (1993) distinguishes two large classes of volitional control strategies: motivation control and emotion control strategies. Examples of the motivational control strategies are 1) "Set contingencies for performance that can be carried out mentally (e.g. self-reward; self-imposed penance)", 2) "Escalate goals by prioritising and imagining their value", and 3) "Visualise doing the work successfully" (ibid: 16). Emotion control strategies include 1) "Generate useful diversions", 2) "Visualise the work successfully and feeling good about that (change the way you respond emotionally to the task)", 3) "Recall your strengths and your available resources", and 4) "Consider any negative feelings about the experience and ways to make it more reassuring" (ibid: 16). Thus, according to Corno, the main difference between motivation and volition is not between pre- and post-decisional states, but between energizing and direct behaviour (motivation) and monitoring implementation and upholding chosen goals (volition). Volition is thus one aspect of a larger self-regulatory system.

When delving deeper into the phenomenon of self-regulation, operant theorists, phenomenologists and social cognitive theorists, for example, tend to differ in the terms that they use and views that they hold to define the exact processes of self-regulation, as well as the processes on which they concentrate. In point of fact, some other researchers (e.g. Järvenoja and Järvelä 2005) use the term volition to refer to "the control processes of motivation and emotion only, and exclude the metacognitive and environmental control" (ibid. p. 467) that are included in Corno's view. However, despite the surface differences that these approaches display, the deep understanding of self-regulatory processes is the same, stressing the students' proactive measures to self-regulate their learning. It is also agreed that such self-regulation demands more time and effort from a student than he/she

may be willing to expend in order to reach a certain goal. In the following subsections, some major perspectives on self-regulation are briefly described

3.3.1 Phenomenologist View of Self-Regulation

Zimmerman (2001:7) notes that phenomenologists try to motivate students to use self-regulatory strategies by cultivating their academic identities, and by fostering their self-image and self-worth. McCombs (2001, referring to Robinson 1987) notes that the phenomenologist view is that humans are 'authentic' to the degree that they choose and value those external influences that seem most nurturing to themselves. In other words, it is learners' views of themselves and their own worth in various contexts, as well as their views of the worth of the context and field to themselves, that determines their motivation to use self-regulatory skills in their learning. If learners see themselves as completely separate from the context (the field, the people that they see as representing it) and the topic that they study and do not see the topic offering any boost to their own self-worth, they are unlikely to use self-regulatory strategies and succeed in their studies.

In the phenomenologist view, self-regulation begins from the formulation or selection of a goal. According to McCombs (2001: 78) this goal selection is affected by one or several of the following factors: "a) expectations about self-competencies and task outcomes; b) affective factors such as needs, motives, and values; and c) desired self-conceptions that represent general life goals" (incl. learner's personal style and behaviours). Such a selection of a learning goal would then strengthen the learner's intrinsic motivation to use self-regulatory strategies. Archer (2001) notes that college students who selected the goal of doing the best they could on a course, also did well as a result of the clear goal that they had. On the other hand, she reports that those who received poor grades also had a so-called academic alienation goal and wanted to do the least just to pass the course.

After the goal has been set, learners need to self-monitor, self-evaluate and self-reinforce their actions in order to correct their actions, enhance their learning and keep up their effort to develop themselves (McCombs 2001: 102). In order to do this, learners need to have

strong control of their motivation and emotions (McCombs 2001: 107). Deci and Ryan (1991) point out that in order to be motivated, learners need to be able satisfy at least one of their basic psychological needs for autonomy, competence and relatedness, but in order for this motivation to arise from the self and not be controlled from the outside, the activity has to start within the individuals themselves. The use of self-regulatory skills is therefore enhanced if the learner is motivated intrinsically, rather than extrinsically (McCombs 2001: 100).

According to Manderlink and Harackiewicz (1984), intrinsic motivation is enhanced by the learners' success at a task. Success strengthens the learners' beliefs in their own control over goal attainment. Furthermore, they note that this belief in self-causality, i.e. the belief that one's own skills and knowledge are somehow responsible for the success at a task, is a more important determinant of intrinsic motivation than one's perceptions of competence, i.e. success itself. In addition, Butler and Winne (1995) note that feedback from an external source is an important factor in enhancing one's learning and self-regulation. It follows that a precondition for the growth of the sense of self-causality, is that the learner has good self-awareness and self-monitoring skills. If learners are unable to appreciate their own part in the success of the task, they will see that success as independent of themselves and thus their sense of self-causality will not increase. In the present research, the learners' belief in self-causality (or control beliefs) is one of the factors that is appraised by the APL questionnaire.

While criticizing the various theories of self-regulation, Zimmerman and Schunk (2001) note that the weakness of the phenomenological view is in its conception of self-identities that learners are supposed to strive towards. It is their opinion that these self-identities are difficult for researchers to define, measure and validate, and thus different researchers have used very different definitions from current self-identities to possible self-identities and domain-specific self-identities. While it is persuasive to believe that when one can imagine oneself as a researcher, for example, and even like that image, there is, as of yet, little data to show that self-images help an individual to use self-regulatory strategies any more effectively than they would in any case.

3.3.2 Social Cognitive View of Self-Regulation

Schunk (2001: 125) observes that according to the social cognitive theoretical perspective, self-regulation is highly dependant on context. Self-regulation is not seen as a trait or a level of development in an individual's personal development and it is accepted that learners will not engage in self-regulatory strategies in all situations or fields of study. Social cognitive theorists also emphasize students' perceptions of self-efficacy in their decision to use certain strategies. This means that they will not blindly use a new learning strategy if they feel that it is alien to their normal methods. (Zimmerman 2001: 7).

Zimmerman and Schunk (2001: 295) also note that the social cognitive theory of self-regulation stresses the situational and task-specific nature of goals and expectancies, pointing out that the proximity of the attainment of the task is an important enhancer of learner motivation. Social cognitive theory also emphasizes the importance of the social environment and the models that a beginning learner can draw from more experienced peers (Schunk 2001). Social modelling and guidance are seen as important sources of the early development of self-regulatory competence. Schunk (2001: 143) presents four steps along which self-regulatory competencies develop: 1) observational, 2) emulative, 3) self-controlled, and 4) self-regulated. The first two steps take influences from the social environment, while the latter two are self-influenced. Thus, the theory proposes that only after using external sources of models and teaching, can individual learners develop their self-regulatory strategies.

Zimmerman (1998, quoted in Schunk 2001) lists six areas in which learners can use self-regulatory strategies: motives, methods, time, outcomes, physical environment and social environment. According to him, self-regulation occurs to the degree that the learners themselves have influence in these six areas. If they are all determined by an outside source (model of teaching), students may still learn, but the control is external, not internal.

A central term in the social cognitive theory of self-regulation is perceived **self-efficacy**, the learner's belief "about one's abilities to learn or perform behaviours at designated levels" (Schunk 2001: 126). Schunk (1995, 2001) found out that students' self-efficacy beliefs influenced their choice of tasks, their persistence at the task, as well as their effort

and eventual achievement. The relationship between the learner and the task is reciprocal in nature, which means that while the learner's self-efficacy affects the choice of the task, the progress that they make on the task also affects their self-efficacy beliefs. Thus, if the learner notices that he/she is doing well on a task, his/her self-efficacy beliefs grow stronger and he/she is inclined to perform even better.

Bandura (2001) states that self-efficacy beliefs influence whether people think pessimistically or optimistically about their possibilities of reaching a certain goal, and they "play a central role in the self-regulation of motivation through goal challenges and outcome expectations" (p. 9). He adds that self-efficacy beliefs determine, in part, what challenges people undertake and how much time and effort they invest in the endeavour, even when faced with obstacles and setbacks. He notes that a "strong sense of coping efficacy reduces vulnerability to stress and depression in taxing situations and strengthens resiliency to adversity" (p. 9).

In social settings, efficacy beliefs influence the types of activities and environments in which people choose to engage. Bandura (ibid.) explains that the social influences operating in these self-selected environments "promote certain competencies, values, and interests long after the decisional determinant has rendered its inaugurating effect . . . thus, by choosing and shaping their environments, people can have a hand in what they become" (p. 9).

Ip and Chiu (2001) discovered that learners, who focus on their performance, rather than their own development, tend to infer their level of intelligence from it. In order to avoid a negative evaluation that might endanger their self-efficacy beliefs, they may avoid challenging tasks. They are also likely to blame their own poor skills and abilities when they fail at a task.

In their study of the critique of the social cognitive view of self-regulation, Zimmerman and Schunk (2001: 296) note that some critics have seen the term self-efficacy merely as a verbal index of learner's subsequent behavioural performance and thus questioned its ability to predict trans-situational measures of expectancy. Zimmerman and Schunk (ibid.) admit that self-efficacy is not a surrogate for behaviour as it is affected by many factors, such as the learner's cognitive, affective and social ability to judge one's skills, the task

and other related factors. If the learner is not an expert in the field of a particular task, their self-efficacy statements are more likely to go wrong. On the other hand, Salili et al. (2001) discovered that students' self-efficacy beliefs correlated positively with their academic performance in three groups of students from different cultures. Therefore, it seems that self-efficacy beliefs, although they are not omnipotent and research has not yet agreed on their true effect, can have predictive value at least in situations where different groups working on similar tasks are compared with each other.

3.3.3 Definition of Self-Regulation in the Present Study

According to Pintrich (2000b), self-regulation refers to learners' planning, monitoring and regulating their own cognitive actions and actual behaviour. Pintrich (ibid.) clarifies that the planning phase includes the learners' ability to set a clear goal for their own learning. Monitoring includes their ability to track their own attention, to self-check for understanding and comprehension and to keep track of the available time for studying. Finally, regulation is closely tied with monitoring and takes place, for example, when the learners realise that they have failed to understand something. Regulation is the learner's own activity to correct this failure by, for example, rereading the passage of text that was unclear or asking for clarification.

Pintrich and McKeachie (2000) also list cognitive strategies that learners can use in their self-regulation. These include rehearsal, elaboration, organisation and critical thinking strategies. Rehearsal affects the learner's attention, while elaboration builds connections between the new materials and old that is already stored in memory. Organisational strategies help the learner to select the material to be learned and organise it internally, and critical thinking strategies allow the student to apply the learned material in practice and transfer it to new situations.

In the present study, a major focus is directed towards learners' self-efficacy beliefs, as they were described in subsection 3.3.2 and as they will be described, from a collective perspective, in later sections. It is believed that people's self-efficacy beliefs are a major determinant of their willingness to practice self-regulatory learning strategies and to enter

into and work in social learning situations to their fullest capability. Rather than abandon the idea of control beliefs that is important in the phenomenological perspective, it is included in the APL questionnaire as well as in the qualitative analysis of the research data. It is believed that the interplay between these two concepts, amongst others, is an important factor in the understanding of learning, especially in social situations.

3.4 Premises of Individual Learning

This section presents the theoretical division of the capabilities that a learner needs in order to learn. The following short descriptions of these capabilities draw on the previous discussion on goal-orientation and self-regulation. The capabilities are divided into strategic capabilities, a) cognitive strategies, b) metacognitive strategies, and c) resource management, as well as motivational capabilities, d) goal orientation, e) efficacy beliefs, and f) attributions. The following subsections present short descriptions of all of these capabilities and their subdivisions.

It should be remembered that the full understanding of learning requires consideration of the social situation that surrounds the learner. Although the resource management strategies described in this section refer to peer learning, it is advisable to also consider so-called social motivation in this context. It is, however, only in subsection 3.5.3 that this phenomenon is more fully explained.

3.4.1 Strategic Capabilities

a) Cognitive Strategies

Cognitive psychology uses the metaphor of "humans as information processors," which means that human behaviour is explained by speculating how the human mind processes

the information it experiences and retains. **Cognitive strategies** help individuals perform their tasks and activities that support successful learning are generally called learning strategies (Dansereau, 1985; Pintrich, 1989; Weinstein & Mayer, 1986). **Cognitive knowledge** is knowledge that a learner possesses. It may be knowledge of one's own skills or deficiencies, or knowledge of how learning takes place, or even knowledge of how to throw a dart in a way that it actually hits the intended target. Cognitive knowledge could also be described as static knowledge when it is compared to metacognitive knowledge (see next subsection). It is this cognitive knowledge that is used as the basis, or the groundwork, for some of the learning strategies introduced below.

There are identifiable cognitive strategies, previously believed to be utilized by only the best and the brightest students, which can be taught to most students (Halpern, 1996). The use of these strategies has been associated with successful learning (Borkowski, Carr, & Pressley, 1987; Garner, 1990). According to Weinstein and Mayer (1986), cognitive learning strategies are "behaviours and thoughts that learners engage in during learning and that are intended to influence the learner's encoding process" (p. 315), such as rehearsal and elaboration. Learning strategies are thus understood as a schematic structure that combines specific learning activities that are used by learners to reach their goal of gaining new knowledge. Weinstein and Mayer (ibid.) categorise the cognitive learning strategies by defining their roles within the encoding process, and they give four main components: 1) selection, 2) acquisition, 3) construction and 4) integration.

The first one of the cognitive strategies to be presented here are so-called **rehearsal strategies**, or repetition strategies. They refer to memorisation techniques such as recitation, which is rote learning, and recapitulation, that are used with the understanding that reiterating information will help the learner to learn, especially in the case of factual information. In addition, they refer to strategies such as self-questioning, in which the learner questions him/herself about the information that has been read in order to drive it deeper into his/her memory. Another group of cognitive strategies that may be used in learning are **elaboration strategies**. These strategies involve the purposeful use of the material to be learned in a way that it is connected to the learner's previous knowledge, such as using a new unit of vocabulary (a word) in a sentence, or expanding on a topic, building context for it, using one's previous experiences or knowledge. It is generally agreed that elaboration strategies are a way to deepen comprehension of information, so

that it becomes a part of a learner's own knowledge and not just another isolated fact. Other cognitive strategies include so-called **mnemonic strategies**, which are sometimes considered part of elaboration strategies, but are often also seen as a separate entity or part of rehearsal strategies. They include a variety of memorisation techniques, such as mentally joining a newly learned unit of vocabulary with some detail along one's way to work for example.

Another categorisation of cognitive learning strategies has been to divide them into **deep-level** and **surface-level strategies**, depending on the level of processing (deep or surface) that they require (Prokop, 1989: 18). Prokop (ibid.) categorises strategies such as repetition, note-taking, auditory representation and resourcing as surface-level strategies, while deep-level strategies involve strategies such as deduction, recombination and key words. According to Entwistle (1987: 58) and Newble and Clarke (1986: 65-66), deep-level cognitive strategies are all those strategies in which the students learn new information by relating it to their previous knowledge, other topics and personal experience using demanding mental processes, while surface-level strategies involve the least demanding mental processes, such as rote learning (e.g. reading aloud). The distinction between demanding and less demanding mental processes comes from the classification by Bloom (1956), who categorised various mental processes according to their complexity.

It is the author's belief that adult learners are more likely to be able to use deep-level strategies effectively than young children or adolescents. Since elaboration and deep-level strategies involve deduction, recombination, and, most importantly, combining the new information with previous knowledge and experiences, adults are better equipped (i.e. they have significantly more experiences and previous knowledge than children and adolescents) to use these strategies. It is not, however, an automatic matter to start using these deep-level strategies; the mere existence of previous knowledge and experiences does not mean that the adults will actually use the more demanding cognitive strategies in their learning. As was said earlier, the use of cognitive strategies has to be taught to learners, and if adult learners have not learned these strategies as a part of their earlier experiences, they will be no better at using them than younger students. An online environment, such as a discussion forum, offers opportunities and an impetus to learners to use deep-level strategies in cooperation with other learners. In a discussion forum, where

the learners cannot see each other and thus are unable to use visual cues to help their verbal communication, it is especially important to write clearly and concisely, to describe one's thoughts and experiences as their pertain to the learning assignment at hand. Online communication, in this context, provides an excellent context for rehearsal and elaboration strategies (deep level strategies).

The line between cognitive skills and strategies and metacognitive skills and strategies is sometimes difficult to draw. For example, a learner may use self-questioning both as a cognitive and a metacognitive strategy (it is the latter when it is used to monitor what has been learned and how well, and the former when it is used simply as a tool for rehearsal). We will return to this topic at the end of the following subsection, which concerns metacognitive strategies.

b) Metacognitive Strategies

Metacognition refers to people's knowledge and regulation of human cognition; it is cognition about one's own cognition. Metacognitive strategies are those that help people to understand and regulate their cognitive performance (Artzt & Armour-Thomas, 1992; Slife & Weaver, 1992) and to benefit from instruction (Carr, Kurtz, Schneider, Turner & Borkowski, 1989). Setiyadi, Holliday and Lewis (1999) found that effective learners used more metacognitive strategies than others and that weaker learners employed more surface level cognitive strategies than other learners. The term metacognition is most often connected to John Flavell, who (1979, 1987) proposed that metacognition consists of both metacognitive knowledge (also **knowledge of cognition**) and metacognitive experiences or regulation (also **regulation of cognition**) (c.f. Baker, 1989; Schraw & Moshman, 1995).

Knowledge of cognition refers to our acquired knowledge about our own cognitive processes, knowledge that can be used to control cognitive processes. Flavell (ibid.) further divides knowledge of cognition into three categories: knowledge of person variables, task variables and strategy variables. Brown (1987) and Jacobs and Paris (1987) give different terms to these three components and call them **declarative knowledge**, **procedural knowledge** and **conditional knowledge** about one's cognitive processes.

Declarative knowledge about cognitive processes includes general knowledge of how humans learn and process information as well as individual knowledge of the factors that affect our own performance. Most adults, for example, know their own limitations (memory capabilities, attention span) and can plan their behaviour according to that knowledge. Procedural knowledge includes knowledge about strategies and procedures related to the task at hand, e.g. learning. These strategies can include note taking, skimming and careful reading, summarisation, self-testing etc. The third component of knowledge of cognition, conditional knowledge, refers to knowledge of when and how to use different strategies; that is, schemas and scripts. Those who have a high degree of conditional knowledge can plan their activities according to the circumstances and their limitations and use strategies that best fit a particular kind of situation (Schraw, 1998: 90). In the original classification by Flavell (1979), the second and third categories differed slightly from the categorisation given here (knowledge of task variables referred to individual knowledge about various tasks and their demands on an individual, whereas knowledge about strategy variables included the knowledge of cognitive and metacognitive strategies as well as the conditional knowledge of when and how to use these strategies), but the categorisation presented here offers a clearer separation between the latter two categories.

According to research, knowledge of cognition seems to be expressible and late developing (Baker, 1989; Brown, 1987). Baker (1989) proposes that adults often possess a higher degree of knowledge of their own cognition and they are better able to describe that knowledge than children. Other research, however, has shown that adults may also have trouble expressing their expert knowledge and may have trouble transferring their knowledge and skills into new situations (Glaser & Chi, 1988; Gick & Holyoak, 1980).

Regulation of cognition, which is the second aspect of metacognition, or the use of metacognitive strategies is involved with all metacognitive experiences (Brown, 1987). Metacognitive strategies are sequential processes that an individual uses to control his/her cognitive activities and to ensure that a cognitive goal (e.g. understanding a concept) has been achieved. These processes help to regulate and monitor learning, and they are divided into three components: **planning**, **monitoring** and **evaluation** (Jacobs & Paris, 1987; Kluwe, 1987). According to Schraw (1998: 90), planning includes the selection of proper strategies, allocation of resources, setting goals, activating relevant background knowledge

and budgeting time. Bereiter and Scardamalia (1993) have noted that experts excel over novices mainly because of the effectiveness of their prior planning. Schraw (ibid.) notes that monitoring includes self-testing and questioning skills that one needs in order to control one's own learning. Further, evaluation refers to the assessment of the products of learning and the regulatory processes that were used in learning. Examples of the latter include re-evaluating one's goals, revising predictions and merging intellectual achievements with earlier skills and knowledge. (Schraw, 1998: 90.)

Schraw (1998: 91) notes that many of the regulatory processes, including planning, monitoring and evaluation, may be so highly automated, at least among adults, that they may not conscious and thus not expressible in many learning situations (see also Baker, 1989; Brown, 1987). He adds that they may also develop without conscious reflection and thus reporting them to others can be difficult.

At the end of the previous sub-section, the problematic nature of separating cognitive and metacognitive strategies was mentioned. This is especially apparent in the case of cognitive and metacognitive knowledge, and Flavell (1979) himself acknowledged that separating these two types of knowledge may be difficult. However, it should be understood that learners use cognitive strategies to reach a particular goal while they use metacognitive strategies to make sure that the goal has been reached. The use of metacognitive strategies usually precedes or follows a cognitive activity. A situation in which a learner realises that cognitive strategies have failed, metacognitive processes are activated as the learner seeks to remedy the situation (Roberts & Erdos, 1993).

As was pointed out at the end of the previous subsection, some strategies, such as questioning, may be used both cognitively and metacognitively. A learner may question him/herself cognitively in order to learn information, or metacognitively to monitor what has been learned. Thus, as Livingston (1997: 2) points out, it is not possible to examine cognitive and metacognitive strategies separately, without reference to the other, because they are closely intertwined and dependent upon each other. Similarly, the points made about the importance of cognitive learning strategies in online learning environments hold in relation to metacognitive skills as well. Learners in all learning environments need to understand cognitive and metacognitive strategies and their utilisation in order for them to

be successful in their learning, especially if they are not only interested in the grades that they receive.

c) Resource Management

A learner has several resources that are used in learning and everyday life. Such resources include both **external resources**, such as time, money, space, help-seeking, equipment, and **mental/cognitive resources**, such as mental energy, processing speed, attentional capacity and the capacity of consciousness or working memory (e.g. Carney & Levin 1998). Ruohotie (2002a: 41) notes that skilful self-regulators are known to widely use various resource management strategies. The use of different resource management strategies helps the learner to adapt to her surroundings and to change the surroundings to suit his/her needs (Ruohotie, 2002a: 44). Carney and Levin (1998: 161) note that aging and the decrease of cognitive functioning, if they go hand-in-hand as is often assumed, could lead to a reduction in cognitive resources. This, in turn, would make the use of some cognitive strategies, such as mnemonic strategies, difficult. However, they add, drawing on Poon (1985), that even if the working memory may deteriorate over time, there is evidence that long-term memory will stay intact.

The previous subsections explored some cognitive and metacognitive strategies that learners may use. These included, for example, such concepts as declarative knowledge, procedural knowledge and conditional knowledge. In cognitive psychology, human beings are seen as information processors (Mayer, 1996a), and according to this view, all the knowledge that a human has gathered over his/her lifetime is collected in so-called long-term memory, while this knowledge will be accessed by the above-mentioned cognitive resource, working memory, when some external or internal stimuli requires it (Doolittle, 2001). According to Baddeley (1986), working memory represents a composite of that part of long-term memory that is keeping activated in mind representations of the world (stimuli) so that they may be effectively used to guide behaviour. The capacity for short-term memory varies between individuals (e.g. Doolittle, 2001) and it can change during the life-span of a person (for example, due to ageing or substance abuse).

Resource management refers to the individual learner's attempt to control, or manage, the above-mentioned resources. Many of these resources are interconnected. For example, it is important for learning that one has enough time devoted solely to the activity of learning. Learners should not be preoccupied by other factors, such as pressing appointments, while engaged in learning, because that will place a burden on their attentional capacity. They will also have to be able to use the time set aside for studying efficiently and that requires self-regulatory time management skills (Ruohotie, 2002a: 44). Similarly, the learning space and equipment should be readily available and free of distractions or they will detract from the learner's ability to concentrate on the learning itself. If learners lack the ability to manage their time resources, or do not have the equipment needed for learning, it will become more difficult and the learners will need additional cognitive resources in mental energy, attentional capacity and working memory to overcome these obstacles. Also, lack of money is an important factor in learning; many countries have education systems that require the students to pay term fees, without which the possibility for learning may become inaccessible. Whereas many of the other resources can be managed by the learner herself, there is rarely much one can do to acquire more money without diminishing the ability to manage other resources, such as time.

With adult learners, there are several factors that affect their ability to manage their resources. Those with small children will necessarily have less time to study and it is almost impossible to devote a certain time of the day or a week to personal time for studying. Also, adults are often engaged in work life and much of their time resources are taken by the everyday routines of their work, even if the work itself provides them with better access to other necessary resources, such as personnel training programmes, equipment and financial resources. Another factor affecting human cognitive processes is substance abuse. Excessive alcohol use also affects and, in many cases disrupts, the cognitive and motivational processes that serve critical roles in the adaptive regulation of behaviour (Finn, 2000). Also, the usual assumption that one's cognitive resources deteriorate as one grows older will affect the adult learner's ability to learn. Poon's (1985) evidence, that long term memory might not deteriorate in the same manner as working memory evidently does, indicates that whereas older people may suffer from less ability to handle complex issues in their working memory, they have a more developed ability to make connections between their long term memory and the issues that they are presently working on. With a more extensive body of background knowledge, older people may still

compete successfully with younger students when it comes to learning and problem solving, given that they have similar access to other necessary resources.

Another resource that a learner may use to good effect on his/her studies is other people. Seeking help from peers or teachers, when one has problems with one's studies, is a strategy based on social interaction. In **help seeking**, the learner takes part in cooperative learning situations in which he/she has to engage in discussions and explain and specify his/her own viewpoints. Thus, a learner needs to know when the support of others is required and how it can be obtained (Ruohotie, 2002a: 45). In addition, Ruohotie (ibid.) notes that help seeking is related to learning motivation and that those learners who think that they do not need help even with difficult material usually have trouble controlling and managing their other resources as well.

Pintrich and McKeachie (2000) bring up another cognitive resource managing strategy that they call **effort management**. They propose that this is one of the most important learning strategies, since it is the nexus between motivation and cognition. As such, effort management can be seen as a generic term that covers some of the previously mentioned cognitive resource management strategies, since, in order to manage one's efforts, a learner must manage his/her mental energy and attention level. It should be noted that learners are usually unable to manage or control some of their cognitive resources, such as their processing speed and the capacity of their consciousness, unless their cognitive resources have been weakened by something that they may have some control over, such as exhaustion or intoxicants.

3.4.2 MOTIVATIONAL CAPABILITIES

a) Goal Orientation

Goal orientation theory, and its development, was described in detail in section 3.2 and the present section merely aims to recapitulate the most important aspects of this earlier treatment. In the present research, goals are seen as cognitive representations of the different purposes learners may adopt in different situations. Following Linnenbrink and

Pintrich's (2000) division, the author sees goal-orientation as four different categories of goal orientations and approach and avoidance states. In approach mastery orientation, the learner is interested in mastering, learning and understanding a task, as well as self-improvement. In avoidance mastery state, the learner avoids misunderstanding and not learning a task because of his/her own self-set standards of achievement and striving for perfection. On the other hand, individuals with approach performance orientation focus on besting others and receiving the highest grades, and those with avoidance performance orientation try to avoid being inferior to others, mostly by avoiding tasks at which they do not excel. (Linnenbrink & Pintrich, 2000: 196-202.)

Although it is not possible to study learners' approach and avoidance states in the scope of the present study, it is believed that the above-described interplay between various goal-orientations greatly diversifies any group of students and thus poses challenges for the structuring and designing of the learning materials and assignments used in teaching and learning contexts. It is also recognised that while the learners' variable goal orientations affect their own learning, they will also affect their behaviour and conduct in group learning environments, especially when the learning tasks call for collaboration and cooperation between learners.

b) Efficacy Beliefs

As was discussed in section 3.3.2, social cognitive theorists stress the importance of the learners' perceptions of self-efficacy, their beliefs in their own abilities or possibilities, and their decision to use certain learning strategies. This means that they will not blindly use a new learning strategy if they feel that it is alien to their normal methods. (Zimmerman 2001: 7). Schunk (2001) reports that students' self-efficacy beliefs influenced their choice of tasks, their persistence at the task, as well as their effort and eventual achievement. The relationship between the learner and the task is reciprocal in nature, which means that while the learner's self-efficacy beliefs affect the choice of the task, the progress that they make on the task also affects their self-efficacy beliefs. Thus, if the learner notices that he/she is doing well on a task, their self-efficacy beliefs grow stronger and he/she is inclined to perform even better.

It was also noted in section 3.3.2, that students who focus on their performance, rather than their own development, tend to infer their level of intelligence from it. In order to avoid negative evaluation that might endanger their self-efficacy and self-worth beliefs, they may avoid challenging tasks. They are also likely to blame their own poor skills and abilities when they fail at a task.

Salili et al. (2001) note that, in their research, students' self-efficacy beliefs correlated positively with academic performance in three groups of students from different cultures. Therefore, it seems that self-efficacy beliefs, although they are not omnipotent and research has not yet agreed on their true effect, can have predictive value at least in situations where different groups working on similar tasks are compared with each other. However, it must be remembered that if the learner is not an expert in, or at least knowledgeable about, the field of a particular task, his/her self-efficacy statements are more likely to go wrong.

c) Attributions

Individuals rate and attribute goals and results differently with respect to their importance to themselves, and they give different meanings to the tasks and their outcomes (e.g. Molden & Dweck, 2000; Deci & Ryan, 1987; Deci & Ryan, 1991). Goals are basically constructions built upon meanings that individuals give to their experiences. Individuals who value good grades will study harder than those who see education as having no importance in their life. People who have different personal goals employ different strategies and give different meanings to situations (MacCallum, 2001: 164). Molden and Dweck (ibid.) argue that learners, who, for example, consider a person's intelligence to be fixed, may be more likely to choose performance goals than learning goals, since they are interested in gauging their intelligence. On the other hand, those who believe in the malleability of skills and abilities may be more willing to choose tasks that involve, or are solely about, learning, because they are interested in developing themselves, rather than merely gauging their abilities or comparing themselves to others. A practical example involving sports hobbyists would be a badminton player with a performance orientation, who values victory and gets upset about losing a game, because he/she believes that wins are a measure of one's stable abilities, versus another player who has chosen a mastery goal, and sees lost games as just another learning experience and does not draw permanent

conclusions about his/her skills on the basis of won and lost games. An activity may also be seen as incidental to one's long-term goals. An athlete engaged in playing badminton may not attach much importance to the games won and lost simply because the ultimate goal that he/she is striving for is improved health, not better skills at badminton. Similarly, a learner may engage in study programmes out of pure interest that does not place value on the grades received. The learner may be satisfied with the mere glimpse of another world that the study programme offers, without feeling the need to study it in depth. Nowadays, however, because information is readily available online, such learners probably find what information they want online and do not enter into study programmes (see also the concept of situational interest, below).

To summarise, Molden and Dweck (ibid.) contend that the interpretations that individuals make of the qualities that various tasks are reveal about them affect their approach to those tasks. If they believe the qualities involved to be unchanging, they are more likely to choose performance goals than mastery goals, because the latter may prove detrimental to their sense of self-worth. On the other hand, an individual, who considers the purpose of even a temporary performance goal (receiving a high grade in a test) to be a chance to develop oneself in the long run, will perceive primarily positive consequences and thus show high levels of intrinsic motivation for such tasks (see also Butler, 2000: 164-165).

As a term, attributions refer to the way learners react to success or failure. Some learners, possibly extrinsically goal orientated, may believe that their failure in a task was caused by limitations in their ability. This will cause them to believe less in their skills and abilities and possibly avoid similar tasks in the future. When they have to engage in a task with which they do not believe that they can be successful, they may perform below their real ability level. On the other hand, someone intrinsically goal oriented, and skilful in self-regulation, will attribute failure to a poor learning strategy or method, or insufficient practice. They will therefore understand that they could have achieved better results, and may do so in future, if they only practice more or use a different strategy. Thus, they will not see failure as something that cannot be overcome, something resulting from a lack in themselves, but something that can be corrected with enough effort (see Ruohotie, 2002a).

Another factor that has a connection with mastery and performance goals in addition to attributions, is **interest**. Hidi (2000) differentiates between two types of interest: situational

and individual. In brief, a situational interest is one that is triggered in a specific situation by particular conditions or objects that arouse attention. Hidi (ibid.) notes that this initial affective reaction may be either positive or negative in tone and it may or may not last. She explains (drawing on research by Mitchell, 1993) that interest therefore has two distinct stages, one on which the interest is triggered and another on which the interest is potentially maintained. Renninger (2000) notes that situational interest relates to curiosity and sense of enjoyment, but that it gives no indication of the individual's knowledge of the topic or interest. Furthermore, situational interest can, in the long run, be the first stage of a long term individual interest through increased knowledge, value and positive feelings. Hidi and Harackiewicz (2000) argue that only when situational interest is maintained, should it be seen as behaviour that is intrinsically motivated. Thus, only lasting situational interest may lead to mastery goals. Individual interest, on the other hand, is described as a continuing tendency to attend to specific activities and stimuli (Renninger, 2000; Hidi, 2000). Thus, over time, an individual with such an interest gathers extensive knowledge and positive feelings, and comes to value the objects of their interest (Hidi, ibid.). Hidi (ibid.) explains the relationship, and the elusive difference, between individual interest and intrinsic motivation leading to mastery goals thusly: "When one is describing specific actions, intrinsic motivation is one of the two general classes . . . and interest is one of a set of motives that may result in intrinsically motivated behaviour . . . [s]imilarly, when one is dealing with motivational orientations, individual interest can be viewed as a specific case of intrinsic motivation" (2000:316).

3.5 Learning in a Group Setting

The previous sections have discussed learning from the point of view of individual learners and their learning strategies and cognition. It is, however, important to take into account that human beings rarely work completely alone and that, in order to reach the goals that they consider worthwhile, they are more often than not required to work in groups, be it in their working life, school, military service, administration, or other activities. Furthermore, as social learning theory shows, even those who think that they are working alone, striving

for their own personal goals, are rarely doing so. Writers may think that they are writing for their own enjoyment and that any commercial value of their products is purely coincidental, but even they find their inspiration from their environment, which is socially constructed, and their works refer to that reality, or some aspect of it, and speak with the socially constructed words and expressions of that reality. If such a writer's work were to be completely individual, devoid of any social constructs, it would likely be deemed the work of a madman by the society in general. As such, social groups, large and small, both create and enforce the reality that surrounds them. Individuals, who have good, socially constructed reasons not to be considered madmen, are affected by this reality and it is through their cognitive abilities that they interact with and create this reality together with others.

In the learning context, the importance of interaction among learners is explained by current theories; particularly social cognitive constructivism (see subsection 3.1), which stresses negotiation of meaning and shared knowledge construction alongside individual cognition and learning skills. From a learning perspective, people are in constant interaction with others at three levels, all of which involve social construction of reality: learner-content, learner-instructor and learner-learner interaction (e.g. Moore 1989). Moore (ibid.) notes that learning through the first form of interaction relies heavily on the learner's self-direction and motivation, whereas in the second form of interaction the teacher provides a necessary model or sounding board for the learner when they need to apply their learning to practice. The last form of interaction, learner-learner interaction, is generally considered to be the core of cooperative learning methods (more so than teacher-learner interaction).

There are several definitions of cooperative and collaborative learning. The simplest definition is that in cooperative learning small groups of learners maximise their own learning and each others' learning (Johnson et al., 1991). A more complex definition explains that learners engage in knowledge sharing and inspiring each other, they are interdependent and individually accountable and that they are self-directed. This last aspect indicates that teacher is the facilitator of learning rather than the controller. Taking a closer look at this definition, it is clear that social interaction is very important to the success of cooperation. In learning and working life contexts, individuals will be part of many different groups, either concurrently or consecutively, in which they are required to

perform some tasks together with others. In order to function efficiently in such rapidly changing contexts, learners need to have 1) good social skills to interact and maintain relationships with other people, and 2) good group working skills to share work tasks with others and support each other's work.

A more detailed categorisation of the elements of successful group learning is provided by Johnson and Johnson's (1986, 1994; see also Johnson, Johnson & Smith, 1991) social interdependence theory. According to this theory there are five basic elements that affect the success of cooperative learning: 1) positive interdependence, 2) face-to-face promotive interaction, 3) individual accountability, 4) social skills and 5) group processing. Johnson and Johnson (1994) define positive interdependence as a state in which learners must rely on each other in order to complete their task and in which the learners share their resources openly, maximising the learning of all members. Face-to-face promotive interaction, in turn, means the acts that the learners perform to encourage and facilitate each other's learning. Individual accountability means that the learners share responsibility for the learning assignments and that everyone does their part in the group work; there are no free-riders. The fourth element, social skills, is necessary for the learners to learn to know and trust each other, communicate accurately and unambiguously, show support and resolve conflicts. The fifth element, group processing, refers to the act of self-analysis in which the group reflects on their performance and attempts to improve it.

Looking at the five elements in Johnson and Johnson's theory, one can see that in order for these social elements to be successful, individual learners must also have adequate individual learning skills (see section 3.4). Unless each group member is individually capable, the group as a whole will not be able to function at a high level. This social cognitive approach to constructivism thus sees individuals working on many different levels that all interact and affect each other. The following sub-section examines the issues of relationship-based learning, after which the concepts of learning, which are important to consider from the point of view of collective learning, are introduced, such as collective self-efficacy beliefs and social motivation. These collective concepts are important to complete our understanding of human beings as learners.

3.5.1 Relationship-based Learning

The concept of relationship-based learning is derived from the idea that, throughout their lives, people are involved in various networks and relationships through which change and learning take place. Ruohotie (1999: 27 ff.) notes that, in relationship-based learning, learning is seen as change that takes place in an individual and that the individual is the creator of knowledge. Organisations learn through their employees and foster this learning by providing experiences for their employees. Following cognitive theory and constructive learning theory, mere experiences are not enough for people to learn. In order to learn from their experiences, people must be able to reflect and give meanings to their experiences, thus constructing their knowledge.

In order for interaction between members of a group to develop, it is important that relationships in the group foster interdependence, mutuality and reciprocity (Fletcher, 1996). This implies that the individuals in the group must understand that their joint achievement is dependent on their abilities to recognise their relationships as the source of each individual's learning. People thus need to exhibit empathy, self-reflection, self-expression, active listening and acceptance of feedback (Ruohotie, 1999). The aforementioned three features of relational interaction that foster learning and growth require people to realise that feelings of vulnerability and inadequacy are always present in relationships (interdependence), all the members benefit from and foster each other's development (mutuality), and that all members have skills and knowledge that benefit the whole group (reciprocity) (Fletcher, 1996). In the ideal state, such learning groups would therefore consist of individuals who are open about their own ideas and feelings while also being open to accept the feelings and ideas of others. They would also strive to succeed as a group, benefiting equally from every individual member's personal skills and knowledge. Such learners would also have to be able to openly admit their own shortcomings and lack of knowledge in areas where they feel uncertain.

From the perspective of traditional western culture, which values individual achievement over collaborative work, these requirements may seem impossible to achieve. Also, Ruohotie (1999) observes that "professionalism is often confused with perfection or even omnipotence" (p. 43-44). Thus, people who are supposed to be experts in their fields are

often reluctant to admit it if they have a gap in their knowledge and they become defensive if someone challenges them. Overcoming such barriers can be difficult, perhaps even impossible. However, it is only when people learn to trust their group members and peers that they can start working and learning together.

3.5.2 Social Motivation

The social aspects of motivation work on as many levels as the individual motivation discussed in previous sections. According to the social cognitive view, the individual level of operation cannot be studied separately from the social level of operation and, thus, one should pay attention also to the social aspects of motivational processes, such as collective goal orientation, collective attributions, collective efficacy beliefs, collective control beliefs and collective awareness. Of these, the efficacy beliefs are the most important, because they affect learning and change both directly and indirectly, through their impact on other determinants (Bandura 2001: 9). Bandura (ibid.) notes that self-efficacy beliefs influence whether we think about something positively or negatively, or in ways that are self-enhancing or self-hindering. They affect self-regulation of motivation by influencing our goal challenges and outcome expectations. The following paragraph gives a brief explanation of the collective characteristics of some important concepts in social motivation, but the rest of this section is dedicated to the most central concept of social motivation from the social cognitive point of view: collective efficacy beliefs.

Just as people's individual goal-orientation determines how they approach a task or an assignment, a group's shared goal-orientation, be it besting other groups or aiming for improved understanding, affects how the group, as a whole, choose their learning strategies. Just as individual learners may use surface learning strategies when they have a performance goal, a group of learners may rely on rote learning when they have no interest in mastering the topic that they are studying or when they feel unattached to the subject field in question. Both individuals and groups can give tasks or goals different attributions; that is, they can interpret differently how important it is for the group to learn or perform a particular task or what they think the accomplishment of the task will tell about the group

(and its members). Furthermore groups may have control beliefs and collective awareness just as individuals may.

As has been discussed previously, individual self-efficacy refers to an individual's belief in being able to perform a specific task. Thus, unlike general beliefs about the self—such as self-esteem, self-worth and self-concept—self-efficacy beliefs always refer to a specific situation or a specific task (Goddard, Hoy & Woolfolk Hoy, 2004: 4). Collective efficacy beliefs refer to a group's belief in its ability to perform a specific task, or, as Bandura (1997) describe, "the performance capability of a social system as a whole" (p. 469). It must be noted that a group may have poor collective efficacy beliefs even if the individual members all have high individual self-efficacy beliefs about a specific task. Other factors, such as poor social skills or emotions can result in the group members failing to see or acknowledge the abilities of the other group members, which, in turn, will affect their willingness to work efficiently with each other.

Bandura (2001) notes that several studies "attest to the impact of perceived collective efficacy on group functioning" and that

> ...the stronger the perceived collective efficacy the higher the groups' aspirations and motivational investment in their undertakings, the stronger their staying power in the face of impediments and setbacks, the higher their morale and resilience for stressors, and the greater their performance accomplishments (p. 12).

Goddard et al. (2004) also claim that their studies have documented a strong link between perceived collective efficacy of teachers and differences in student achievement between schools. Furthermore, Goddard et al. (ibid.) have found that "even after controlling for students' prior achievement, race/ethnicity, SES, and gender, collective efficacy beliefs have stronger effects on student achievement than student race or SES" (p. 7).

As with individual self-efficacy beliefs, collective efficacy beliefs are expected to affect the group's goal setting, collective effort and persistence when faced with difficulties. Additionally, because group work takes place mostly through interaction between the members, low collective efficacy beliefs may influence the quality of that interaction and thus lower the performance. Collective efficacy beliefs may result from the perceived efficacy of a group working together (individual beliefs about how well the members can

work together) or the skills and abilities that the group members are perceived to possess (individual beliefs about the skills and knowledge of other group members).

It is implied by the above description, but also worth noting specifically, that individual self-efficacy and collective self-efficacy do not work separately. Individual self-efficacy beliefs affect collective self-efficacy beliefs in several ways, as collective self-efficacy beliefs affect individual self-efficacy beliefs, and one cannot entirely separate them. Individuals function in a social system and their individual characteristics are as rooted in that system as are their collective characteristics. A group of individuals with very low self-efficacy beliefs when facing a specific task will not necessarily possess high collective self-efficacy when facing the same problem as a part of a group, but neither can the groups' collective self-efficacy beliefs be directly derived from the self-efficacy beliefs of its members. Bandura (2001) notes that group achievements are the product of not only the individual skills and knowledge of its members but also "the interactive, coordinative, and synergistic dynamics of their transactions" (p. 12). Thus, the perceived collective self-efficacy of a group is a group-level property, which emerges only in group work situations, and is not simply the sum of individual self-efficacy beliefs of the group's members. However, Bandura (ibid.) also points out that collective self-efficacy is not an emergent entity on its own, but is based on the individual characteristics of the people who comprise the group.

As was discussed above, a strong sense of efficacy is important to performance, be it for an individual person or for a group working together. Personal and collective efficacy beliefs are both strengthened through mastery experiences, as Goddard et al. (2004: 9) note in their discussion of the individual and collective efficacy beliefs of teachers at a school that has achieved a high score on a state-mandated test. Furthermore, Bandura (2001) notes that personal efficacy beliefs are as important in collectivistic cultures as they are in individualistic cultures, but that the culture in which people are raised affects the way efficacy beliefs are developed and in what kind of situations they are at their best. "People from individualistic cultures feel most efficacious and perform best under an individually oriented system, whereas those from collectivistic cultures judge themselves most efficacious and work most productively under a group-oriented system" (p. 14). However, whether efficacy beliefs are personal or collective, high belief in one's efficacy is likely to foster high group effort and performance attainments.

3.5.3 Processes of Group Learning

Henri and Rigault (1996) state that group learning takes place when learners gather together for "discussion, exchange, interaction and mutual assistance" (p.46). Cooperative learning is essentially a social process and is grounded in the socio-constructive theory of human development. Humans are affected by the groups and communities in which they participate, and they must both create the communities that they belong to and learn to become their members. Each community and culture has its own distinct language, customs, values, knowledge etc. According to the social cognitive approach to constructive learning theory, it is through this process of acculturation that knowledge construction occurs.

In groups, learners must communicate in order to solve problems peacefully. In order to achieve this, they have to paraphrase, critique, modify and justify their own ideas (Fischer & Mandl, 2001). Scardamalia and Bereiter (1992) point out that articulation of thoughts and concepts gives the learners an opportunity to refine their ideas and correct misunderstandings. The other learners provide feedback, which supports this process (Salomon & Perkins, 1998). Paechter (2000) notes that exchange of information supports and elicits metacognitive processes, such as recognising and producing coherence or deducing rules.

Dillenbourg and Schneider (1995) provide a more detailed classification of collaborative and cooperative learning. They identified eight mechanisms of and three conditions for collaborative learning. They note that the mechanisms of collaborative learning are not independent and that some of them may refer to the same cognitive processes seen from a different perspective. **Conflict or disagreement** is a process that produces learning from a simple misunderstanding or disagreement, because social factors demand that the learners try to find a solution to such conflict situations. **Alternative hypothesis** is a process that prevents so-called confirmation biases; that is, the tendency of people to design only experiments that support their hypotheses and ignore all contradicting empirical data. In collaboration, the learning partner may offer an alternative hypothesis, which induces a

conflict or a disagreement that requires solving. The **(self-)explanation** effect proposes that "providing an explanation improves the knowledge of the explainer himself, even more sometimes than the explainee's knowledge" (ibid.), because it leads to active internal thinking or **internalisation** (Vygotsky, 1978), which is the fourth mechanism in Dillenbourg and Schneider's (1995) list. They note, however, that Vygotsky's internalisation is rather vague and mysterious process and thus propose their fifth mechanism, **appropriation**, in which a less skilled learner learns by reinterpreting and renegotiating some action that a more skilled learner has proposed or performed, and the more skilled learner, in turn, learns from observing how the less skilled learner appropriated the said action. **Shared cognitive load** is a mechanism often referred to in the research literature, and refers to spontaneous distribution of the work that the group has to perform. Dillenbourg and Schneider (1995) stress that this is not the same as the purposeful division of labour in cooperative learning, but a situation in which one learner assumes the low-level operations, while another steps back and observes the activities. An example of this would be a situation in which one learner sits at the keyboard, writing, while the other observes and provides input from the side. **Mutual regulation** refers to a process in which learners have to justify their actions to other group members, and thus explicate strategic knowledge that might otherwise remain implicit. This exchange of justifications ensures that the learners mutually regulate their performance. **Social grounding**, the last of the eight social mechanisms of collaboration, is a process in which "the speaker monitors the listeners' understanding and, in case of misunderstanding, attempts to repair communication. Verbal and non-verbal cues are important to detect misunderstanding." (Dillenbourg and Schneider, 1995.)

The three conditions of collaborative learning that Dillenbourg and Schneider (1995) propose are group composition, task features and communication media. These conditions will be discussed further in the next subsection, since they are generally seen as imperative for the beneficial effects of collaborative and cooperative learning to appear, but they will also be briefly explained here. **Group composition** is critical because many of the above-described mechanisms of learning can function only in small groups. Many researchers have also found evidence that there is so-called "optimal heterogeneity" for the composition of these groups (Dillenbourg & Schneider, 1995; Webb 1985). **Task features** refers to the importance of the careful preparation of learning tasks, so that they encourage collaboration over cooperation and shared work instead of individual work.

Communication media is, naturally, very important for collaboration and cooperation to exist. In regular face-to-face learning situations this rarely poses a problem, but in online learning the nature of computer-mediated communication (CMC) systems is very important. We will return to this topic in Chapter 4, which deals specifically with virtual learning environments and online learning.

All in all, the mechanisms of collaboration described above can be also considered to be important mechanisms of cooperative learning. Most of the processes (conflict or disagreement, alternative hypothesis, self-explanation, internalisation, appropriation, mutual regulation and social grounding) offer the same learning opportunities, the only exception being the sharing of the cognitive load. The way that cognitive load is shared is the most significant difference between cooperation and collaboration, and it can be argued that the different development levels of the learning community, or differences in the group members' social skills and the social interrelations between them, creates this difference. The next subsection gives a brief account of how groups of individuals develop into learning communities.

3.5.4 Group Development

As the previous sub-section suggested, many processes of collaborative and cooperative learning are dependent on the ability of a group of people to work together. When designing a new course or a learning programme, it is important to understand that a group of people who start working with each other for the first time will work differently from a group that has worked together before. Established groups will be able to handle new topics and assignments quickly and efficiently, whereas newly formed groups will have to struggle through developmental phases in order to recognise their strengths and weaknesses and to discover the best methods of work for themselves.

Learning groups are sometimes referred to as learning communities. Learning community is a concept that differs from the similar sounding concept of "community learning" by the fact that in a learning community participants learn together and learning occurs horizontally, whereas in community learning, learning is gained both horizontally and

vertically. Thus, in the latter, it is not only the participants that learn, but also the community, or the organisation, which learns to work together and make the most of its members' skills and knowledge. These terms are another way to look at social constructive learning, in which learners learn as individuals, but at the same time they learn to become a part of a community or a group.

According to the categorisation of group development theories by Arrow et al. (2004) there are five major types of group formation theories: 1) sequential stage models, 2) repeating cycle models, 3) robust equilibrium models, 4) punctuated equilibrium models and 5) adaptive response models.

According to the **sequential stage model**, there are four or five classic group formation phases that have been researched extensively. The first four stages are sometimes referred to as forming, storming, norming and performing. Corbitt, Gardiner and Wright (2004: 3) explain that in the **forming** stage, the group members get to know each other and each others' weaknesses and strengths. In the following stage, **storming**, individual differences start to surface and conflicts arise. It is generally believed that no group can bypass the storming phase and it is considered important for the group members to address their differences and the issues that might keep them apart. After the storming stage, the group enters the **norming** stage where they develop common understandings and common processes to handle conflicts and tasks. The fourth stage is **performing** and it is in this stage that the productivity of the group is at its highest. The optional fifth stage of group development is the **termination**, which may cause disruption and conflict but also positive feelings (e.g. Mann et al., 1967; Lundgren & Knight, 1978). Over their lifespan, groups generally move up this ladder of stages, but this development may be arrested or may regress because of external disruption or membership change, or the group may skip some of the early stages if some members have worked together previously.

Repeating cycle models posit that whereas change is an intrinsic part of group development, there is no sequential progression between different stages. Worchel (1994) lists six stages through which groups cycle. In the **discontent stage**, group members feel separated from each other and their participation in the group activities is low. A **precipitating event** gets the group past this stage as they have to work together and find common ground to respond to this event. This process brings the group to the **group**

identification stage where the group defines or redefines its boundaries and group membership becomes an important part of the lives of its members. A **group productivity stage follows** in which the group works hard to reach a common goal. With the **achievement of the goal**, the group enters an **individuation stage** in which members demand recognition for their contribution to the group effort. This focus on the individual causes the group to decay and the group returns to the discontent stage. (Worchel, 1994.)

According to Arrow et al. (2004), in **robust equilibrium models**, group development is seen in terms of two major stages: early and late stage, or beginning and established state. It is believed that once the group has gotten past the initial social processes of becoming a group (trying on different roles and working methods), the group will be maintained through a process of self-regulation that alleviates or withstands outside disruptions (e.g. Gersick & Hackman, 1990). Groups vary in the length of time that it takes for them to reach the established state, but after it has been reached, external intervention may be needed to change it further.

The **punctuated equilibrium model**, proposed by Gersick (1988), posits that group behaviour is characterised by lengthy periods of stasis (or very slow change), interrupted by short periods of radical change when the group attempts to improve itself in order to respond to new challenges. In his study of eight naturally occurring teams, Gersick (ibid.) noted that groups developed quickly to a stable stage in which they remained until the midpoint of their existence when the groups reorganised their structures. In Gersick's (1988) words, "groups develop through the sudden formation, maintenance, and sudden revision of a framework for performance; the developmental process is punctuated by equilibrium" (p. 32). The periods of change can be triggered by internal or external forces, while the stability is maintained by the groups' internal processes, namely self-regulation.

The last classification of group development models, which are called **adaptive response models**, conceive that change and continuity in groups is guided by their response to environmental opportunities and constraints (Arrow, 1997). Arrow (ibid., p.78) posits that as groups encounter operating constraints, such as changes in work environment, tools and communication media, they will respond by adjusting their structure. She continues that group and the environmental demands determine how quickly the group may adjust to new situations. Gersick and Hackman (1990) proposed that groups that have encountered many

situations requiring change will eventually develop specific meta-level strategies to help them switch between different frameworks. The need for the group to observe the changes in their environment requiring their own restructuring, as well as the need for them to plan and carry out this process, requires that the group members, and the learning community in itself, have a high degree of self-regulatory abilities.

Considering the differences in performance between established groups and emerging groups, Gersick and Hackman (1990) note that established groups are likely to have created norms for member support and group well-being, as well as processing norms for working on assignments and tasks. When such a group is given a routine task to perform, they will reapply their established working processes and are more likely to move directly to execution and spend little time on problem solving and conflict resolution. McGrath and Hollingshead (1993) further note that as groups become more established, they "are likely to become able to carry out all their functions, at least for routine projects, with much less rich information exchanges" (p. 95). This increased experience and accumulation of shared norms will interact and the group members will gradually turn into a learning community. The lessening of information exchanges may be due to the fact that the group members need to use simpler and shorter messages to achieve the same level of mutual understanding than a beginning group would have to use.

On the other hand, Dennis and Valacich (1999) state that newly formed groups will not have as many established norms as older groups and they are likely to spend more time in inception, technical problem solving and conflict resolution, as they strive to perform while also attending to group well-being and member support (ibid: 8). They also suggest that various newly formed groups may have quite different focuses on task-performance and social activities. In some groups the focus may be on member support and well-being activities while in others the focus will be more on the learning task. Earlier research suggests that early meetings between new group members will be more socially focussed than task focussed (e.g. McGrath, 1991) and that this social focus is important for the participants to have a better understanding of each other.

In the present study, the last two models presented above seem to offer the most useful framework for the analysis of the development of online learning groups as they take into account the importance of group members' own self-regulation. Rather than seeing the

development of groups as an automatic process going through specific stages that can scarcely be influenced by the participants, the last two models view the group members as active agents responsible of their own growth and development. On the other hand, the first models pay more attention to the social processes of dealing with conflict situations which often do take place in learning communities, whereas the latter models merely take them as given, and as evidence of self-regulatory processes.

3.5.5 Effects of Cooperative Learning

According to research, cooperative learning supports the development of critical thinking in students, as they engage in discussion and take responsibility for their own learning (Totten, Sills et al. 1991). Vygotsky (1978) asserts that students working in cooperative teams achieve a higher level of shared cognition and remember information longer than students who work individually (see also Johnson & Johnson, 1986). According to Bruner (1985), cooperative learning strategies improve students' problem solving abilities because they are exposed to other points of views and interpretations of events.

Research has produced convincing evidence that cooperative learning methods produce better results than traditional large-group instructional settings (e.g. Alexander & Dealba 1997; Dansereau 1983; Smith 1987; Pintrich & McKeachie 2000). According to research, cooperative learning influences, among others, achievement (Slavin, 1991), persistence (Springer et al., 1997) and attitude (Ocker & Yaverbaum, 1998). Later research has concentrated on cooperative learning itself and the understanding of why cooperative learning works. Good et al. (1989) noted, in their study, that learners who worked in small groups were more active learners and were more motivated and enthusiastic than those learners who did not work in groups. Mulryan (1992, 1994, 1995) studied elementary students' behaviour in group settings and discovered that low achieving learners professed more passivity than higher achievers in cooperative learning situations. Webb (1985) found that the achievement levels of learners affected their behaviour in groups, so that middle achievers benefited most from working with either high or low achievers, but suffered when working in a group that mixed learners from all different achievement levels (high, low and middle).

However, Peterson and Miller (2003) criticise a lot of the later research on cooperative learning for its emphasis on learner achievement and failure to include consideration of learners' motivation and affect. In their research, including 90 undergraduate education students, concentrating on, for example, cognitive and motivational levels of student experience, they found that instructional context (cooperative or large-group) accounts for 47 % of the variance in the quality of students' experience and prior achievement levels account for 22 % of the overall variance of students' experiences. They investigated these dimensions with questionnaires handed out to students in the middle of their learning session, asking, for example, what they had been thinking immediately before the interruption. On the cognitive dimension, it was discovered that students were more likely to be thinking about something on- or related-to-task in cooperative learning situations (87 %) than in large-group instruction (73 %). Students also reported greater cognitive efficiency (control and allocation of their attention) during cooperative learning, although it was also reported to be harder to concentrate during cooperative learning, due to their feeling more self-conscious in this context. In terms of motivation, Peterson and Miller (ibid.) found statistically significant and positive results in favour of cooperative learning. The students were more engaged in their learning, perceived their tasks to be more important as well as more challenging. Peterson and Miller (ibid.) note, however, that the learning assignments have to be meaningful to the students for these effects to surface. On the whole, Peterson and Miller (ibid.) conclude that although a social learning situation makes learners more self-conscious and thus they find it harder to concentrate, their greater degree of engagement counteracts this difficulty and makes it possible for them to concentrate at higher levels.

It should also be noted that the learners in the above-described study had both large-group instruction and small-group cooperative learning sessions. The large-group sessions acted as introductions to new topics and gave the learners material that they could process in their small-group discussions. This same basic method was also used in the learning programme studied in the present work and thus it is to be expected that the findings described above are also valid in the current research situation.

The above discussion of Peterson and Miller's (2003) study proved that both social and cognitive processes are important for learning to occur. Whereas learning always takes

place (for individuals) through cognitive processes, it is important to realise that social situations and cooperation may greatly affect these processes. The next chapter moves this discussion to another level: namely, learning and cooperation in online learning environments. Whereas it is to be expected that the basic processes of learning remain the same despite the situations, it is important to note the supporting and hindering effects that different environments and working methods have on learning.

4 ONLINE LEARNING ENVIRONMENTS

The 'Net is a waste of time, and that's exactly what's right about it.
William Gibson (1948 -)

There are many different terms that are used to refer to the same general concept of computer and communication-technology supported learning environments, such as virtual, web-based, distance and (collaborative) online learning environments. There terms are, for the most part, interchangeable. In most cases these learning environments are used by individual learners (and/or teachers) in different physical locations to work on a shared project or a learning assignment. It should be noted, however, that there are authors who study and discuss virtual learning environments as they are used in a single classroom. In a situation in which it is important to differentiate between the uses of this kind of virtual environment for learning purposes from actual distance learning situations, the present study uses the terms online learning environment and online learning (where learning assignments are performed “online”), or distance learning (environment). Most often, though, the term virtual learning environment (VLE) is used in generic contexts. This terminology is further explored in subsection 4.5.

It is important to know how virtual learning environments have developed during their existence in order to understand the types of cooperation and collaboration that they can support in learning contexts. The following subsections will investigate both these areas of VLEs, while the last subsection (4.5) introduces the reasons why we need a new term, collective online environment, for the purposes of the present study.

4.1 Technical Development

The field of distance education has always taken advantage of the best available technology in order to serve learners as well as possible over long distances. Before computer networks like the Internet, distance education tools included conventional mail, radio and television. Such forms of learning relied heavily on the individual learning capabilities of the learners; their self-regulatory and (meta)cognitive abilities. Therefore, the development of the Internet has gradually introduced drastic changes to this field.

In another context, the field of computer-assisted education started using computers in education as early as the 1970s. The first applications were basically rehearse-based question-answer programs or programmes that presented problems to the user who then attempted to solve them. Jonassen (2000) observes that these programmes, the use of which continued well into the 1980s, were based on rote learning and failed in teaching transferable skills. The programs also expected learner responses to be exactly the same as the programmers had expected them to be and a correct response could be deemed incorrect in case of a typo or some other slight dissimilarity. More developed and sophisticated (tutoring) programmes were also being developed, but they never reached a level at which the programme was able to respond to all the different ways in which a human user could approach a specific problem (Derry & LaJoie, 1993).

The development of the Internet brought distance education and computer-assisted education together and the forms of training began to change. Initial courses that were conducted over the Internet took advantage of e-mail in the form of mailing lists (listservs), which replaced the conventional mail with a faster and more easily manageable system. It also, however, introduced new demands to students who wanted to take part and the first signs of the so-called digital divide began to surface. Later, the development of the World Wide Web (WWW) introduced additional means of communication for distance education in the form of web pages. The earliest web sites that were designed to support distance learning were little more than a different means of presenting material that would otherwise have to be photocopied and sent to the students (time tables, course descriptions

etc.). These websites also worked as bulletin boards, but the communication was mostly unidirectional: from the teachers to the students (e.g. Dumont, 1996).

Only the newsgroup and IRC technology provided a possibility for true multidirectional communication (teacher-learner, learner-teacher, learner-learner). Newsgroups are a characteristic of the Usenet, or Unix User Network. They (normally accessed with programmes such as Tin, but nowadays also through applications such as Google) are groups into which users send posts just as if they were e-mails, but instead of going to certain recipients, the mail is posted to a newsgroup host and can be accessed by everyone who accesses the same newsgroup. Discussion topics and responses to them are presented in threaded format, so that the reader may follow the discussions as they develop. Figure 4.1 shows an example of one newsgroup and a sample of the threaded discussion. The first screenshot shows a selection of newsgroups, the second some threads in one of the newsgroups and the final screenshot shows an example of one particular discussion thread.

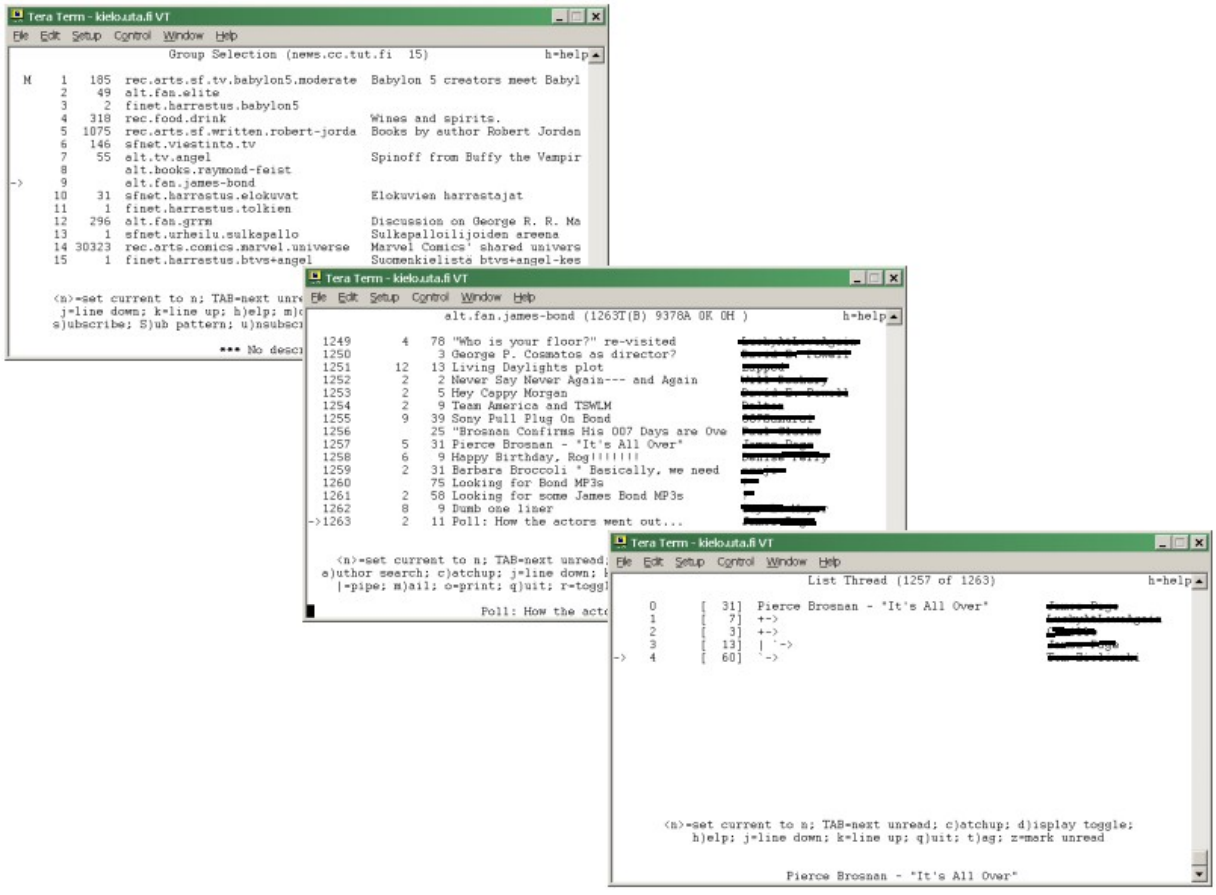

Figure 4.1: Three sample screenshots of newsgroup discussions

The presentation of asynchronous discussions in threaded format has survived to this day and is still used in many virtual learning environments, although following a topic can become hard when one thread continues for a very long time and starts to have several sub-threads. Whereas newsgroups are one example of asynchronous communication which frees the participants from restrictions of time and place, but IRC discussion forums were also widely used in distance education. Unlike newsgroups, IRC offers a chance for text-based real-time discussion.

With the development of the WWW, discussion forums and real-time chat started to move to this new medium, although it has to be noted that newsgroups and IRC are still very as active because they are accessible to everyone and are fast to load and use even with older equipment and a slow Internet connection (since they contain only text, no graphical elements that take time to load and may require special programmes to view properly). Eventually, the previously separate chat forum, discussion forum and bulletin page media were collected together into so-called WWW-based virtual learning environments to better serve the needs of distance and computer-based education. Environments that encompassed all the different communication methods available for educational purposes made it possible for learners to access a single WWW address to find all that they needed in their learning. Also, with the advancement of presentation technology, discussion boards started to find new and better ways to present the discussion threads and topics to users. Figure 4.2 shows an example of a modern discussion forum in which the topics and threads are more easily followed and with less jumping back and forth to get from post to post.

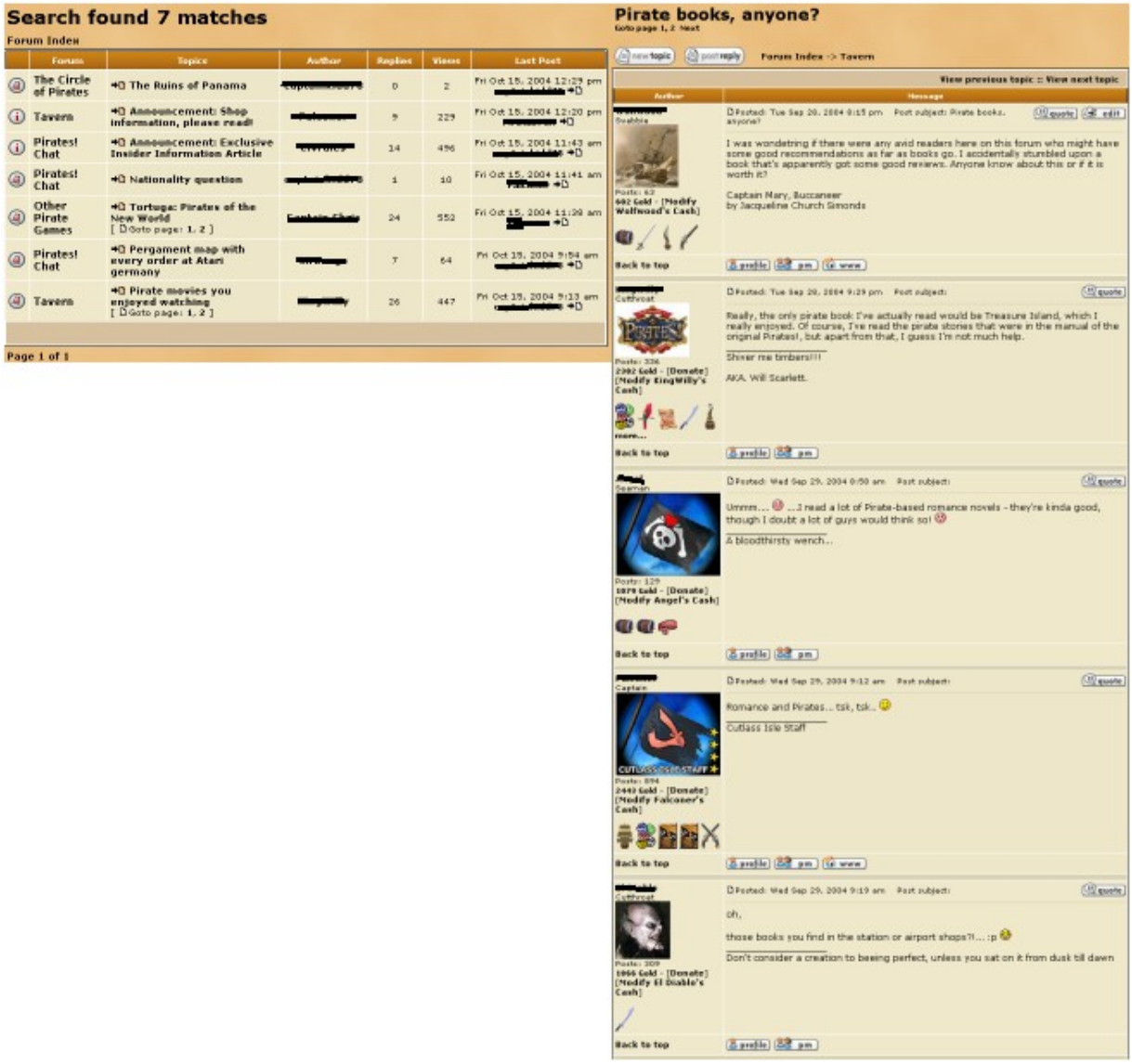

Figure 4.2: Example of a modern discussion forum

Modern virtual learning environments offer a variety of tools for communication and cooperation for learners and educators. Since in research literature these terms are often used confusingly and even illogically, it is necessary to provide here a short list of communication tools that VLEs usually provide.

- Discussion forums (or discussion boards) were discussed extensively above and are perhaps the most important tool for small-group work and cooperation. Both learners and teachers may discuss asynchronously on these forums by creating new topics or responding to existing ones. It is also possible to create sub-forums intended only for small group work (either inaccessible or accessible to other students). It should be noted that these tools are sometimes also called

"newsgroups", but actually this term should only be used for the discussion forums that are available through Usenet (see above).

- Bulletin boards work like the traditional bulletin boards on school hallways and they are used to post notices and announcements to others. Such communication is usually unidirectional (from the poster to the rest of the group), but it is often possible to attach a separate discussion thread to any single bulletin.
- Chat forums (or chat boards) are intended for synchronous communication and work best with short messages and with small groups when all members are able to work online simultaneously.
- Work areas. These may consist of whiteboards (group members can access the same whiteboard simultaneously in order to draw, write or otherwise work on ideas), file areas (where group members may share their files and access, assess and edit each other's individual work), web-page editors etc.

Virtual learning environments usually offer some or all of the aforementioned basic tools for communication, but their repertoire of work areas and tools may be quite different. Certain modern tools offer learners the ability to access any article that is presented online and annotate it for their learning purposes. Students in the same VLE can see each others' annotations and comments and make their own. Also, many VLEs offer their own learning material that has been prepared by the educator or the education provider and is only available to the users of that system.

With the development of technology and virtual learning environments, it has become easier for learners and educators to collaborate. At the same time, the technology that is used to realise these environments has created a digital divide between those with limited computer technology and Internet connections and those with the latest equipment and a high-speed Internet connection. A gap also exists between those well versed in the use of computer and Internet applications and those who are only learning how to use them. Therefore, it is very important to the usability of virtual learning environments that all of the tools that they offer are logically organised and easy to access and use by the learners, so that the technological barrier between the environment and the learner is minimized.

4.2 Pedagogical Development

As discussed in the previous section, The Internet has produced tools that education providers can use to offer distance education programmes to a wide public. It has also changed that nature of distance learning from individual learning to cooperative and collaborative learning. Simultaneously, with the spread of Internet technology and growing awareness of the possibilities that it offers, distance learning programmes have begun to be offered by education providers who previously did not work in the field. Distance learning technology is now used by most providers of higher education to support the learning of their younger students and/or to provide learning opportunities for adults who are already in working life and who cannot attend conventional lectures.

Researchers have proposed three possible motivations for the design of online learning (Spitulnik, Bouillion, Rummel, Clark & Fischer, 2003). The first of these is the so-called **access/equity** argument, which posits that VLEs are expected to provide increased access to limited resources, expand specialised learning opportunities or provide means to cope with an increasing number of students. The second argument is called **knowledge building**, which contends that VLEs can bring together different perspectives and resources that are otherwise separated by space and time. VLEs created for this purpose seek to involve collaborative problem solving and knowledge building strategies. A third reason for the design of VLEs is called the **unique learning affordances** argument, which results in environments designed to provide support for learning processes. This support can include self-paced access, the option of anonymity, connection to real-world experts and access to external representation tools. (Spitulnik et al. 2003.)

Most of the literature dealing with CMC technology in learning and online courses stresses that with the introduction of cooperative and collaborative distance learning, the role of the teacher has changed tremendously and that a completely new type of instruction and support is required in order for such distance courses to succeed (e.g. Beaudoin, 1990; Catchpole, 1992; Olcott & Wright, 1995; Wiesenberg & Hutton, 1996). Various writers and researchers point out that the teacher can no longer merely provide information to learners with one-way lectures, but that the teacher has to become a mentor who guides

learners through the learning process, supporting them when necessary but making sure that they construct their own knowledge. Learning can thus no longer be teacher-centred and treat learners as passive recipients. According to Dillon and Walsh (1992), distance education requires "personalised, empathic rapport with the student in both verbal and printed communications".

It is, however, worth noting that distance learning and virtual learning environments did themselves create the need for this change about and that this instructional approach is by no means unique to distance education. In fact, in the context of modern education the change from passive learning to more engaged and participative modes began in the early 20th century, when, for example, Dewey (1936) urged the abandonment of lecture-based instruction and the adoption of problem-based learning. It thus follows that the collaboration and cooperation techniques required in modern distance learning contexts are basically the same techniques that have been used by effective educators in conventional classrooms for the last few decades. It is, naturally, true that the stereotypical droning lecture would be even duller in an online environment than it is in a conventional classroom and thus it is doubly important to realise that the teacher's role has changed from what it once used to be. However, one should not make the mistake of thinking that virtual learning environments and distance learning have changed the basic nature of teaching and learning. Virtual learning environments are only a new tool for the age-old concept of teaching or mentoring and the trick is to learn how to use it to best effect.

Although distance learning environments have not changed the teacher's role from what it has already been for some time, the new technologies have put new demands on the teacher's work. The new skills needed to convey one's meaning through text rather than spoken words and expressions, to structure the learning path so that it is easily carried out in the virtual environment, to follow learners' discussions and offer support where and when necessary are all skills that teachers also require in conventional classrooms, but they have to be adapted to work in virtual environments. Currently, most teachers have to learn how to transfer their existing skills by themselves and they also do most of the work required to convert their courses to a format appropriate to virtual learning environments by themselves. Markel (1999: 209) notes that in most institutions, policies fail to acknowledge the time and effort necessary to convert an existing course into a distance course. He also points out that policy makers in higher education fail to recognise the fact

that distance educators have to take much more time to individually communicate with the students and thus that online distance courses should have smaller class sizes rather than larger, as seems unfortunately to be the view of many administrators (ibid: 209).

Virtual learning environments and distance education have not changed the nature of pedagogy, but distance education has put new demands on teachers' skills and education providers' economy and planning. The following subsection will examine collaboration and cooperation between learners in online environments, but sub-section 4.4 will return to the role of educators in these learning environments and how they can best facilitate learning.

4.3 Cooperation in Online Environments

As discussed in the previous sub-section, cooperative and collaborative learning in online/virtual learning environments does not change the basic challenges and methods of effective teaching and learning. In online communities (see subsection 2.2) cooperation works in much the same way as in face-to-face communities (see subsection 3.5), but it is important to note that the nature of virtual environments compared to face-to-face situations changes the social processes of cooperation. This chapter compares characteristics of communication and interaction that distinguish face-to-face learning from cooperative/collaborative online learning.

Interaction through a computer interface is qualitatively different from traditional face-to-face interaction and the generally accepted result is that social interaction takes longer to develop in an online environment than in a face-to-face environment (e.g. Walther, 1992; Collins & Berge, 1996). Drawing on earlier research, Winkler and Mandl (2004) compiled a list of technical and social factors that make virtual interaction different from face-to-face interaction. Their analysis of the social factors also sheds light on the reasons why social interaction takes longer to develop online.

The technical aspects include system performance, documentation and coordination effort. **System performance** refers to the difficulties that low system performance (e.g. slow Internet connection) may cause to the use of CMC systems and to the formation of an online community. **Documentation** refers to the tendency of CMC systems to document and archive all the discussions and work that learners have made, thus making it possible to refer to earlier parts of a discussion when trying to find new approaches and ideas. The problem arises from the large quantity of data and the ways it should be processed by the learners, and the fact that large amounts of data may lead to information-overload (see social factors below). **Coordination effort** refers to the tendency of online discussion forums to produce discussion threads where the individual messages may have little to do with each other (other learners' responses may completely ignore an important point made by some other learner and the discussion may veer off the intended topic). This means that the learners have to work harder in virtual environments in order to coordinate their work properly. (Winkler & Mandl, 2004.)

In their review of social factors affecting online interaction as compared to off-line interaction, Winkler and Mandl (2004) list such issues as a lack of social indication stimulus, lack of social presence, hindered development of trust, information overload and negotiation of aims. By **lack of social indication stimulus** they mean that online communication precludes non-verbal and para-verbal forms of interaction. This affects the quality of the communication, making it more difficult to spot difficulties in understanding and give direct feedback. Winkler and Mandl (ibid.) point out that this leads to social norms that seem to be less binding in online communities. **Lack of social presence**, on the other hand, refers to the fact that virtual environments offer fewer communication channels than face-to-face environments. Participants are not usually aware that someone has read the message they have written and profited from it, which, according to Winkler and Mandl (ibid.) can lead to apersonal structures of relationship and dysfunctional social behaviour. Online/virtual learning environments also offer the participants a certain degree of anonymity, which makes it easier for them to "lurk;" that is, to not take part in the learning process even though they are present in the environment. It is easier to hide from others when all that reveals your presence is your textual input. **Hindered development of trust** refers to the fact that online environments offer fewer possibilities for informal exchanges between the participants, which is the primary sphere of interaction in which feelings of trust between individuals are developed (see also Wenger, 1998; Wenger,

McDermott & Snyder, 2002). Winkler and Mandl (2004) note that in online environments participants should consciously create informal opportunities for interaction and that some aspects of working together, such as norms and procedures for cooperation, should be discussed openly even though they are often taken for granted in face-to-face communities. **Information overload** can take easily occur in online environments since all participants can write as many and as lengthy messages as they like. This, according to Winkler and Mandl (ibid.) may lead to disorientation if the assimilation capacity of the participants is exceeded. Lastly, they note that due to the asynchronous method of communication, the **negotiation of aims** at the beginning of a cooperative effort is very important. In online environments, this will take more time than in face-to-face negotiation, but it is very important to take this extra time. If the group starts working before they have clearly agreed on their aims, they may end up wasting much of their time and energy trying to get back into focus later.

Winkler and Mandl (2004) conclude their account by claiming that all these technical and social factors can be overcome if their existence is accepted from the beginning. As it is, the existence of factors differentiating between online and offline interaction is the greatest challenge for online cooperation. The basic process for cooperation (or to learn, see the previous sub-section) does not change, but the medium and challenges are different and thus pose problems for many who fail to detect and take these differences into account.

Schweizer, Paechter and Weidenmann (2004) point out that while face-to-face communication and online communication may differ from each other, it should not be mistakenly believed that online communication is the underdog in this comparison. Like many other communication media researchers (e.g. Daft & Lengel, 1986), they categorise communication media according to their richness (Media Richness theory). Media richness refers to the variety and amount of information that is available in various media. Like Winkler and Mandl (2004) above, they recognise that online communication misses certain social indication stimuli, such as non- and para-verbal communication, but rather than seeing this as a failing that has to be remedied, they recognise it as a strength that can be used in certain types of tasks. Communication media that are considered rich offer the participants more cues, greater personalisation and rapid feedback, which can improve the group's achievements. However, Schweizer, Paechter and Weidenmann (2004) concur that rich communication is not always favourable. They propose that rich media is best suited

for tasks in which group participants are required to reach a consensus or to reconcile different viewpoints, whereas less rich media better support tasks that are more creative, such as information gathering (rather than evaluation) and brainstorming.

Similar findings are reported also in the so-called Media Synchronicity theory, in which communication media are categorised according to their synchronicity—as opposed to asynchronicity (Dennis & Valacich, 1999). Dennis and Valacich (ibid.) argue that empirical tests of media richness theory have not been convincing as they pertain to online learning environments, and that a new approach is needed. Dennis and Valacich (ibid.) dismiss the idea of task outcome objectives and argue that the synchronicity theory considers group communication to be composed of two primary processes, conveyance and convergence. The synchronicity theory is based on five media characteristics that affect communication: 1) immediacy of feedback, 2) symbol variety, which refers to the variety of information channels, 3) parallelism, which "refers to the number of simultaneous conversations that can exist effectively" (ibid., 2), 4) rehearsability, which refers to the extent to which the participants can fine tune their messages before sending them, and 5) reprocessability, which refers to the extent to which a message can be re-examined and processed again within the communication event. As it is, Dennis and Valacich's (ibid.) analysis is clearly geared towards online communication and various computer tools that can be used for communication and does not, as such, pay much attention to face-to-face communication. However, one of their findings is that high synchronicity supports the development of a common understanding of the task, while low synchronicity supports the distribution of information, which supports the conclusions of media richness theory.

Dennis and Valacich (1999: 8) further note that established groups (see subsection 3.5.2) with accepted norms will require less communication through high synchronicity media than new groups. This is because of the greater need for immediate social feedback during the inception and conflict solving phases of a newly formed group, whereas more experienced groups have generally already established their working norms and enough shared enough experiences to let them convey meanings with shorter and more asynchronous messages. Similarly, Dennis and Valacich (ibid.) note that when a newly formed group, or a group with new members, gains experience and builds norms, it will feel less need for highly synchronous communication. New groups, groups with new members and groups without accepted norms therefore require communication media that

offers them a wide variety of symbols for greater social presence, whereas established groups, focussed on learning, use asynchronous communication as a tool for information exchange in order to work on their learning assignments.

This suggests that, in order to construct functional learning communities, one needs to give learners a chance to discuss casually and interact socially in order for them to grow into a group, rather than restrict their communication to learning activities and discussions that directly pertain to their learning tasks. In online learning, chat forums offer the required synchronous communication media and even on asynchronous discussion forums the learners can use various emoticons (aka smileys) as non-verbal and para-verbal forms of communication to convey their social presence. In some practical applications of virtual cooperative learning, it is possible to arrange face-to-face meetings to accommodate this initial social construction of the learning groups and communities, as was the case in the present study.

All in all, online learning environments present numerous challenges for cooperation and collaboration. Some of these challenges may be overcome by simply acknowledging their existence and taking them into account in the design of the online learning environments. For example, system performance, one of the technical factors that may hamper the use of online environments, can be taken into account by designing the virtual learning environments so that they can be used with slow connections and older hardware (i.e., only light graphics, few or no frames and quick database look-ups). Lack of social indication stimulus can be partly countered by the use of emoticons and partly by paying special attention and taking care that all the participants understand each others' messages. Venues for informal exchanges can be increased in the form of open discussion forums to give the participants a chance to build mutual trust and, at least at the beginning of group formation, synchronous chat forums and face-to-face meetings will also support this goal. There are, however, some aspects of online learning that require the establishment of special support systems for the learners. These include encouraging learners to take part in group processes to lessen the learners' tendency to "lurk", caused by the lack of social presence and resultant anonymity, and helping them to get over any social clash that may occur in their community. These aspects of support for learning will be the topic of the next sub-section.

4.4 Support for Learning in Virtual Environments

The previous sub-section explored some issues of online/virtual learning environments that may hamper their use for learning purposes. It was noted that some of these challenges can be overcome in part by the simple admission of their existence, whereas others may require additional support structures for individual and group learning. The focus of this sub-section is on the support that a teacher/facilitator can provide to learners in a VLE.

Facilitator is the term used for a teacher in cooperative/collaborative learning environments, where the work is more about facilitating learning than providing knowledge "from above." According to Borges and Baranauskas (2003), the main goal of the facilitator is to support learning by promoting learners' participation and collaboration. Learners themselves often lack the domain-specific information that would make it possible for them to raise thoughtful questions and provide critical feedback to one another. Novice learners also often lack the necessary metacognitive skills, such as reflection, monitoring and evaluation that are needed in order for them to be able to ask meaningful questions about their subject domain, and thus they are often unable to ask the right questions or to generate productive feedback. Land (2000) calls this phenomenon a "metacognitive knowledge dilemma". The simplest way to counter this problem is to have someone present in the learning situation who already possesses the required metacognitive skills and domain knowledge. Traditionally, this individual is the teacher or the educator.

In a traditional classroom during a collaborative/cooperative learning task, the teacher would move from group to group to listen to their work and to help them along with a few questions and feedback if necessary before moving along to the next group. In virtual learning environments, the communication may lose some of its immediate social presence, but it will also be better in other ways. Whereas in normal classroom surroundings, the teacher will only get a glimpse of a small part of the groups' discussion and problem solving, in a virtual environment, the teacher has access to the entire discussion and can see the progress of the different groups in their totality. Also, the

teacher becomes a natural part of the group, a facilitator, rather than someone who visits the group occasionally and provides pointers.

Previous research on young learners asserts that the facilitator's main energy should be directed towards the support of the learners' own questioning and feedback activities (e.g. Scardamalia & Bereiter, 1992). Based on these findings, Choi, Land and Turgeon (2003) studied a group of college students and the effects of online support for their small group discussions. They discovered that learners were able to overcome their lack of metacognitive skills and domain knowledge with the help of online support to "generate more effective challenges." In their study, however, guidance was given in the online learning environment through static models rather than a human facilitator and it was provided only well after the learners had started their course. It was the premise of the researchers that the educators did not engage in facilitating the learners' learning activities but merely pointed out to them that there was online help available and that it could be used to enhance their learning methods. As such, even though the learners were able to generate more effective challenges and more questions to their peers, this had little effect on their learning outcomes.

It has already been stated that virtual learning environments demand more time from the teacher/facilitator than traditional collaborative classroom instruction does. The very benefit that the facilitator can be a part of the whole span of all the individual groups' work indicates that the facilitator has to be a more integral part of the learner's learning process than he/she is in traditional classroom settings. He/she has to read most of the messages that learners post on the discussion forums and post facilitating massages to help the learning process along. In fact, it is important for the facilitator to make his/her presence known, so that the learners do not think that they have been left adrift in the learning environment. This means that the work load of the teacher increases tremendously, and, in order to maintain the quality of their work, it is often necessary for teachers to have fewer learners participating on their online courses than it is on traditional settings. This is especially true for new groups and beginning learners, who have not yet sufficiently developed their metacognitive skills.

The earlier discussion on collaboration and cooperation indicated that the situation should be different in more established groups. In these groups, the learners have already

developed their own work methods and may be better able to support each other in their learning processes. They no longer need as much support from the facilitator and they are able to work by themselves, needing only occasional guidance. However, in most learning situations, the groups do not have sufficient time to become established, as the group structures differ from one course to the other and the learning domain changes with the courses. Thus, the teachers/facilitators most often work with newly established groups and their support is therefore very much needed.

The previous description and analysis on the various methods of cooperation in virtual environments, and the various ways to use virtual environments in learning, make it necessary to find some coherence in the terminology that is used in the field at the moment. The following sub-section presents a new term, collective online environment, and specifies how this term differs from others used in the field and shows why this kind of specificity is necessary.

4.5 Collective Online Environment

The terms that are used to refer to the learning environments that learners and teachers use with their computers, or that they access through a computer terminal, have been given many names: virtual learning environment, online learning environment etc. These terms are used to refer to these environments independent of the ways that the environments are used or the kind of pedagogy they employ. For this reason, it is often hard to know, on the basis of the title or abstract alone, whether researchers are actually researching the same areas, or if their approaches are very different from each other. Some understand that the term virtual learning environment simply refers to the use of the WWW or the use of online sources in the learning event, while others understand that it also includes cooperation or collaboration with other learners. Furthermore, the term virtual learning, or virtual course, is often used to refer to courses that are taken by students or learners who all sit in the same classroom, or relatively often occupy the same physical environment. On the other hand, some virtual courses are completely virtual, actual distance courses, and the

learners or students never physically meet either each other or their teacher. Also these kinds of courses may rely on individual work alone, or involve cooperative and collaborative tasks.

In light of this confusion of terms, it is important that the reader of the present study has a clear idea of what specifically is discussed. At the same time, the introduction of specific terms in the present work is hoped to clarify, in its small part, the use of these terms in the field. It is proposed here that the term virtual learning environment may refer to practically any environment used in computer-assisted learning, whether it is used by learners in the same room, or if they access it from their own homes. On the other hand, online learning environment should refer specifically to an environment that is always used online; that is, the learners use only that environment, or little else, to work on their tasks and learning assignments and they rarely, if ever, meet outside the environment. Therefore, neither of these terms indicate that the learners necessarily collaborate with each other.

Now, the term that the present writer proposes to use is **collective online environment**. This term includes the assumptions that the environment is used 'online' and that it is used collectively. One could ask why we use the term collective to refer to the fact that the environment is used by several learners, working together. However, it is the author's belief that that the terms 'collaborate' and 'cooperate' only include the work methods that the learners use in order to achieve a shared, or distributed, goal. Neither of these terms is necessarily specify, nor does either term specifically require that when learners study together and work on shared assignments, they also depend on each others' motivation to work collaboratively, their social skills as well as their ability and willingness to adapt their learning strategies in order to work as a part of a group. The word 'collective' also unifies the terminology used in this work about collective learning strategies and collective motivation and helps the understanding that these terms, and issues, go hand-in-hand when we study a group of people working or learning together in an online environment.

All in all, the term collective online environment refers to an environment that is used 'online' (i.e. the users are at their computers, accessing the environment through, for example, an Internet service) and that is used collectively (i.e. several learners who work together in order to reach a shared goal and whose individual motivation and learning

strategies therefore intertwine and affect each other as the process progresses and the group develops).

The next chapter introduces the questions that directed the present research and the learning environment and learners who took part in the study. In accordance with the previous discussion of learning in virtual settings, the learning programme was designed to support learners in their studies and engage them in cooperative and collaborative group work.

5 RESEARCH METHODS

> There are many methods for predicting the future. For example, you can read horoscopes, tea leaves, tarot cards, or crystal balls. Collectively these are known as "nutty methods." Or you can put well-researched facts into sophisticated computer models, more commonly referred to as "a complete waste of time."
>
> Scott Adams (1957 -), The Dilbert Future

This chapter aims to provide an in-depth description of the research participants and the process of data acquisition. Finally, the chapter presents a description of the research methods that were used to find answers to the research questions in preparation for the following chapters that will present the analysis and findings of the study. The research questions themselves were previously presented and described in Chapter 1.

5.1 Research Setting and Participants

5.1.1 Research Setting

The research data was gathered in 2002 from a group of adult learners who took part in a one-year-long university entrance level study programme on vocational education. The learning programme consisted of four consecutive courses and a literature examination. Each of the four courses was taught by a different teacher and consisted of three face-to-face workdays. In the technical execution and content planning of their courses, the teachers worked with a tutor (the author), who was familiar with the learning environment and the issues of cooperative learning. The tutor also helped the adult learners to become

familiar with the learning environment and offered them support through comments on their study journals and on the discussion board of the learning environment.

The first course was an introductory course into the topic of vocational education, adult learning and cooperative/collaborative learning. The course also introduced the differences between face-to-face and online group work, and the online learning environment that would be used throughout the year was also introduced and its use practiced with the assistance of the tutor. During the first meeting, the learners formed five groups of five members each for their group work. It was also during the first face-to-face meeting that the author presented his intention to study the learners and use their experiences as the material for the present study. In this context, it was asked that the learners use the journal option available in their online learning environment to write down their experiences over the course of the studies, and permission to use this material for research purposes was received from all participants.

The second and the third course dealt with various aspects of education, especially adult education, skills and knowledge, development and assessment of education, aspects of staff training, as well as prediction of the future of work and skills and knowledge requirements. The fourth course concentrated on the basics of conducting scientific research and development projects. The four courses were followed by a literature examination, a so-called fifth course, which ended the year-long study programme.

Each of the four courses started with a face-to-face, or a contact work, meeting that was usually spread over two days (from Friday evening to Saturday afternoon). Before this meeting, the learners had familiarised themselves with applicable course material and, during the meeting, the teacher built on this pre-understanding and the learners had a chance to interact socially in order to develop as groups and begin their group work. After the first face-to-face meeting there was a little over a month for the learners to work on their group learning tasks in the VLE before they were to meet again in a face-to-face environment. After the second meeting, which took one day and which marked the end of the course, the learners had two or three weeks to return their individual assignments after which they could start preparing for the next course.

During the whole course of their studies, the learners were using the online learning environment either from their home or work computers (or both), taking part not only in their shared learning assignments but also helping each other out in their individual assignments and understanding the learning materials.

The online learning environment contained several tools for the learners and the course designers to use: 1) web pages for the presentation of the course description and learning materials, 2) a link area for the teacher and learners to provide links to additional sources of information, 3) a file area, for the learners and the teacher to share files, 4) a journal area for the learners to write semi-privately about their experiences and thoughts, 5) a calendar for planning studies, 6) a discussion forum for discussions, 7) an e-mail list for the cases in which it was necessary to send announcements to the learners' own e-mail addresses, 8) a bulletin board on which the teacher could post important announcements, 9) a portfolio, where the learners could read their teacher's feedback to their assignments, 10) a course instruction area, where the teacher could write instructions about the course, and 11) a list of teachers and tutors for the course to let the learners know who had access to their diaries. Many of these tools existed merely to offer options for the teachers. For example, they could write their course instructions either on the instructions section or on the web page section, and some even made PowerPoint presentations on the file areas. The teachers could thus select which tools they preferred to use during their course and, if necessary, unnecessary tools could be hidden from the learners. Each of the four courses had their own course areas with separate work areas for the five groups and there was also an additional course area for the final literature examination, where the learners could discuss the essay topics and the books with each other.

Over the course of the research period, it became evident that the learning environment had some significant weaknesses. The first of these was the fact that the environment had not been designed for those with slow Internet connections. The graphic elements were too large (in kilobytes) and made the site slow to load. Furthermore, the database system used in the background to store all the courses, materials, discussion board data, user data etc. was slow and unresponsive. As a result, clicking from one discussion board message to another, or moving back or forth in a thread, sometimes took several seconds even though all that was transferred to the end user was plain text. When there were dozens of new messages to read, each one of which had to be clicked on and read separately, all these

time lags were frustrating. Furthermore, the file area was counter-intuitive and required the users to learn a completely new way to move between files and folders.

5.1.2 PARTICIPANTS

There were 25 adults taking part in the learning programme, most of who worked in the field of adult education at various adult education centres around Finland and some who were otherwise involved in staff training. Most of the learners had little experience studying at the university level and many had not studied in online learning programmes before. However, when the learners applied to take part in the learning programme, it was made clear in the application papers that they were expected to possess skills with computers, Internet browsing, information searches and text document editing. This was done because it was believed that the lack of such skills, and the work that would have to be done to rectify that lack, would divert attention away from the learning goals themselves and collaboration and cooperation in online environments.

Nine of the 25 learners were male and sixteen were female, with an average age of 40.96 years. The following figure (Figure 5.1) presents the age variation in the whole learner group:

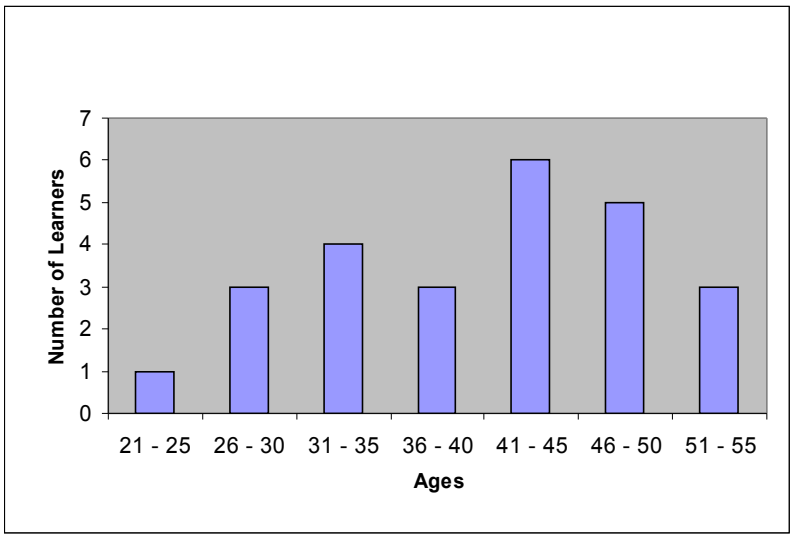

Figure 5.1: Ages of learners participating in the study (n=25)

It is apparent from the above table and the average age of the learners that most of the learners in this group had a long work and life experience behind them. There were only four learners younger than 31 years old, but as many as eight were older than 45 years. The following figure (Figure 5.2) provides additional information about the learners' genders as they vary in the different age groups. For the purposes of the figure the age groupings used in the previous figure were combined into larger wholes. This figure suggests that, at least in the context of vocational education, adult women may be more active in entering training and education programmes, and at a younger age, than men.

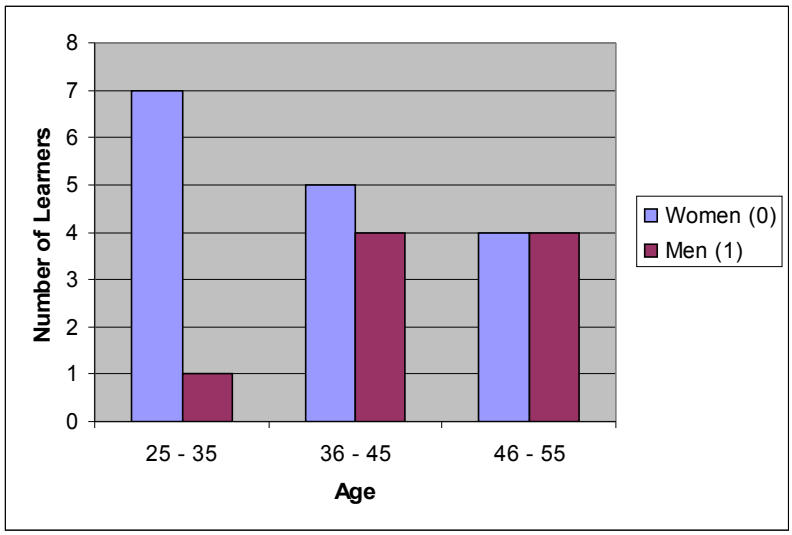

Figure 5.2: Learners grouped by age

Since the learners came from various parts of Finland, sometimes across very long distances, both from the educational institution and each other, taking part in a learning programme delivered mostly online was their best chance of acquiring the education that they sought. For most of the participating learners, basic studies in vocational education were a step towards a complete teacher's training, which they needed to continue working in the field of adult education, to secure their current position or to earn an increase in their salary (because of having education relevant to their work).

5.2 Acquisition of Data

The present study combines phenomenographic and Bayesian analysis methods to study the collaboration, self-regulatory skills and motivation of the participants. The qualitative part of the research relies on the study journals that the learners wrote during their studies. As mentioned above, the learners were asked to write about their experiences in the journals at the start of the studies and permission was asked to use the material in the study journals as research material in the present study. This body of data totals over 300 pages (A4 size) of study journal notes.

The semi-quantitative part (Bayesian analysis) of the present study relies on a survey questionnaire, Abilities for Professional Learning (APL), in which the learners' study strategies and motivation are assessed. This questionnaire is based on the MSL (Motivated Strategies for Learning) questionnaire, which has been modified by Ruohotie (2000) for the Finnish context (see Subsection 5.3.2). A total of 23 of the 25 adult students taking part in the present research responded to this questionnaire during their studies with all the other students studying at the Research Centre for Vocational Education, as a part of an ongoing educational efficiency study.

The following two subsections describe the acquisition of data in more detail and provide information about the questionnaire to which the learners were asked to respond. After that, the phenomenographic and Bayesian analysis methods used on these data are described in more detail.

5.2.1 Study Journals

The learners either wrote their journal entries online when visiting the learning environment, or, in some cases, offline with a text editor which they then copied to the journal during their next visit. This choice of methods allowed those learners with modem access to the Internet to shorten the time they spent online. Furthermore, the entries the

learners wrote in their journals were date-stamped and appeared separate from each other, which makes it possible to observe the progress and change in the learners' thinking and the development of the learner groups over the span of time that they spent on their studies.

The learners knew that the teachers of the four courses could read the journals when they were written in the work areas of their courses. Some teachers took this opportunity to support their learners in the learning process by giving them feedback regularly, while some others only commented when they felt the need to do so. As the tutor, the author of this study concentrated on solving any technical difficulties that the learners might have and offering a supportive comment when he saw that a learner needed one. In general, however, the author attempted to let collaboration and learner interaction take place naturally so that his presence would not unnecessarily affect the content of the material to be used in the study. The learners used this private channel and their journal to write about many things that affected them over the course of their studies, such as their difficulties and interpersonal problems in their groups, their personal difficulties that affected their studies, their study techniques and their successes and failures. They also commented on the teaching styles of the various teachers and how it felt to them to study in an online environment, working on various different learning tasks.

There were no set rules on how much the learners had to write in their journals, or how often. The journal entries did not affect the learners' grades in any way and writing them was not obligatory. It is the author's belief that any rules "given from above" could disturb the free process, and cause the learners write 'something' in order to meet these expectations, rather than write openly about themselves and their own experiences. The result was that some learners wrote very long entries, very often, whereas some others only wrote once or twice during a single course. Some learners stayed away from their personal feelings in their writing, while others shared their emotions and fears openly.

Over the course of the studies, the author made some attempts to persuade those learners who wrote very little on their journals to reveal some details of their experiences. To achieve this, the author offered various open questions about group work and learning in general and at the end of the studies the learners were encouraged to write about their overall feelings about the studies and take a "look back." These interventions were done in a manner that would not lead the research participants to write in a particular way, but

would encourage them to write from their own point of view, about topics that were important to them. This is very important to the type of phenomenographic methods that the present study employed (see subsection 5.4.1).

All in all, the study journals provided a very rich material for the present study, totalling over 300 pages of regularly set text, and although some learners wrote much more than others, everyone's personal voice can be heard.

5.2.2 Abilities for Professional Learning Questionnaire

Ruohotie (2002a) notes that, in order to understand the relationship between motivation, volition and self-regulation, the Research Centre for Vocational and Professional Education at the University of Tampere has extensively studied the possible integration of the current understanding of motivational and volitional cognitive processes in self-regulated learning.

The questionnaire used in the present study, Abilities for Professional Learning, or APL, was developed by Ruohotie (2000a), who used Pintrich's (1995) Motivated Strategies for Learning Questionnaire as the basis. He revised this original questionnaire on the basis of new research in Finland. The questionnaire includes two categories, one measuring motivation and the other learning strategies (see Table 2). The *motivation* category is further divided into three sections of *values, expectancies* and *affective components*. Ruohotie (ibid.) notes that the value section has three subscales: intrinsic goal orientation, extrinsic goal orientation and meaningfulness of studies. The expectancy section has two scales: control beliefs and self-efficacy, while the affective section includes a scale for test anxiety. The *learning strategies* category is divided into four sections with single scales for each: *metacognition in learning, metacognition in practice, learning by doing* and *resource management*. More detailed descriptions of the scales are presented below.

Motivational Scale

- Intrinsic Goal Orientation: The learners' estimate of how interested they are in deep contemplation, learning new things and solving problems that they find interesting.

- Extrinsic Goal Orientation: The learners' estimate of how important they consider success in their studies and showing others what they are capable of doing.
- Meaningfulness of Studies: The learners' own beliefs and assumptions about how useful and interesting it is to study the chosen field.
- Control Beliefs: The learners' belief that their success and failure in their studies is dependent on themselves.
- Self-Efficacy: The learners' beliefs and assumptions about how capable they are of performing at the level required to be successful in their studies.
- Test Anxiety: The learners' estimate of how much a test or an assessment situation distracts their performance (for example, because of nervousness or stray thoughts).

Learning Strategy Scale

- Metacognition in Learning: The learners' beliefs about the extent to which they consciously direct (i.e. plan, observe and assess) their own learning during studying.
- Metacognition in Practice: The learners' beliefs about the extent to which they consciously direct (i.e. plan, observe and assess) their own learning during practical implementation of their skills.
- Learning by Doing: The learners' beliefs about how effectively they will learn new skills and knowledge in practical situations.
- Resource Management: The learners' beliefs about how effectively they use their available time and energy on studying.

In the version of the APLQ used in the present study, there are 28 questions (statements 1-28) in the motivation category and 40 questions (statements 29-68) in the learning strategies category. Table 5.2 shows how the questionnaire is structured and shows how the different items on the questionnaire belong to the above-mentioned scales in the original APLQ. Table 5.3 presents the structure of the Learning Strategy Scale.

Table 5.1: Structure of the Motivational Scale of the APL questionnaire (Adapted from Ruohotie & Nokelainen 2002a:183)

Motivational Scale (A)	Statements (28) in APLQ
1 Value Section	
1.1 Intrinsic Goal Orientation	A1, A18, A23, A25
1.2 Extrinsic Goal Orientation	A8, A13, A27
1.3 Meaningfulness of Studies	A4, A5, A11, A15 (rev.), A19, A24, A28
2 Expectancy Section	
2.1 Control Beliefs	A2, A10, A20, A26
2.2 Self-Efficacy	A6, A7, A12, A17, A22
3 Affective Section	
3.1 Test Anxiety	A3, A9, A14, A16, A21

Table 5.2: Structure of the Learning Strategy Scale of the APL questionnaire (adapted from Ruohotie & Nokelainen 2005)

Learning Strategy Scale (B)	Statements (40) in APLQ
1 Cognitive Strategies	
1.1 Rehearsal	B36, B56
1.2 Elaboration	B32, B50
1.3 Organisation	B39, B46, B60
1.3 Critical Thinking	B35, B44, B48, B59, B63
2 Metacognitive Strategies	
2.1 Planning and Self-Monitoring	B30, B38, B41, B51, B52, B53, B54, B58, B62
2.2 Self-Evaluation	B66, B67, B68
3 Learning by Doing	B43, B49, B61, B65
4 Resource Management	
4.1 Time and Study Environment	B29, B33, B40, B55
4.2 Effort	B34, B45, B57, B64
4.3 Peer Learning	B31, B42, B47, B37

All the responses are given in Likert scale from 1 (completely disagree) to 5 (completely agree). The questionnaire (English version) is presented in Appendix 1. In previous research, it has been noted that the variables in this questionnaire tend to be skewed towards positive values (Ruohotie & Nokelainen, 2000; 2002), which makes it unsuitable for linear statistical analysis without modifications. Therefore, the responses to the APL

questionnaire are investigated in the present study with modern modelling techniques, namely Bayesian network modelling. These techniques are described more thoroughly in the next subsection.

5.3 Analysis Methods

Qualitative analysis of the study journals is performed with the help of an analysis programme, Nvivo. This is one of the few recently developed programmes available to help qualitative researchers in their work. Nvivo is a later generation version of a similar programme, NUD.IST, and offers a wide range of possibilities for the qualitative researcher. All results are reported anonymously in a manner that renders the original authors of the comments unidentifiable.

5.3.1 Phenomenographic Analysis

Phenomenographic analysis examines how people understand and experience certain situations, and the preconceptions that affect this experience. Learners may understand learning in dissimilar ways: one learner may understand it as a memorisation task to pass a test, while another may understand it as self-development. This preconception of learning will affect the ways in which the learners read their learning material.

According to Marton and his fellow researchers (1994, 2003), the recurring principle of phenomenography is that independent of the situation or phenomenon, one can "identify a limited number of qualitatively different and logically interrelated ways in which the phenomenon or the situation is experienced or understood" (Marton, 1994). Situations and phenomena are always experienced, seen or thought about by someone. Humans cannot deal with an object or a situation without conceptualising it in some way and there is thus always a connection, a unity, between the one who experiences and the experience. Marton (ibid.) notes that the way in which someone experiences or understands a phenomenon or a

situation and describes it tells as much about the phenomenon as it does about the experiencing and understanding subject (the person).

Marton (ibid.) calls the experience or a conception of a phenomenon the internal relation between subject and object and states that it is a "way of delimiting an object from its context and relating it to the same or other contexts and it is a way of delimiting component parts of the phenomenon and relating them to each other and to the whole." This internal relation can be further divided into the internal horizon (delimitation and relating of parts) and external horizon (delimitation from and relating to a context) and these parts "together make up the structural aspect of the experience."

In phenomenographic research, the researcher is interested in exploring the different ways in which individuals can be aware of a certain situation or phenomenon. When people are aware of a situation, certain things are in the foreground and are explicit, while other aspects of the situation are in the background and are implicit. However, this is not an either/or question between these two classes, because there is continuous variation in how we observe situations in the explicit-implicit axle. We may be keenly aware of a learning problem, but we are simultaneously aware of other things that surround it in space and time, such as the working environment, our mood, other persons in the vicinity etc. Marton (1994) says that therefore the external horizon of the situation extends indefinitely in space and time. Any particular situation is always experienced through all of our experiences in the world, but the world is also experienced through the specific situation. In phenomenography, "we want to find out the differences in the structure of awareness and the corresponding meaning of the phenomenon or situation" (Marton, 1994).

The data in phenomenographic research is most often gathered in open interviews with the research participants, but other methods are also used, such as observation, drawings, written responses and historical documents. Individual interviews have the possible benefit of letting the researcher delve more deeply into the individual ways of experiencing a situation or a phenomenon, since the interview situation is open-ended and the researcher can ask the interviewee to explore and reflect on certain aspects of their experiences and awareness. The interview situation may therefore help the research participant consider such aspects of their thinking that have not been under scrutiny before. However, such

probing questions also pose the danger of leading the interviewee to think and respond in a certain manner, this ruining the reliability of the data.

In the present study, however, the research participants were asked to write study journals in which they reflected on their learning, collaboration etc. including their problems and successes. No one was forced to write the study journal, although they were encouraged to do so (see subsection 5.3.1). It is the author's belief that such unforced and less stressful (to the participants) methods of data gathering will produce data that is more revealing of the learners' way of experiencing and conceptualising the phenomena surrounding their learning activities. Whereas in an interview situation, the interviewer has the opportunity to lead the interview in directions that are of greatest interest to him/her, that may impose a bias on the data by making the research participant ponder or explore areas of their thinking that do not necessarily have as much of an effect on the situation or phenomenon under study as the researcher might think. By asking the research participant to explore these areas of their thinking, the researcher makes them more prominent in the research material and thus they receive more attention in the final analysis than they may deserve.

It has to be noted, however, that the present study gave the research participants almost a full year to write entries on their study journals. The interview method is certainly a faster and more efficient method of data gathering and ensures that the research participants provide data on the very phenomenon under research. In a written account, especially one that is produced in a process that takes almost a year, it is more likely that the research participants reveal their general ways of thinking and their general beliefs, rather than the thinking and beliefs that happen to be active in the interview situation. The method used in the present study might not have worked as well as it did if the time constraints had been stricter and there had been a need to have the data available by a specific date. In the present situation, however, the learners could write entries on their journals whenever they wished to do so and had something to say. The author provided encouragement and reminders for the learners to write on their journals over the year that the learning programme was running and sometimes did so by providing sample questions or topics that the learners might want to write about. These interventions were done carefully, though, to ensure that the sample questions covered an extensive enough area of interest that they would not lead the research participants to a certain way of thinking, but would only encourage them to write from their own point of view, about things that were

important to them, rather than to the researcher. In particular, this means that the author did not use specific terms, such as intrinsic motivation, learning strategies or resource management strategies etc. to lead the learner to write about such topics. Rather, the questions were general, touching on learning, cooperation, difficulties and successes.

In phenomenographic research, the researcher's task is to explore variations in the way that a certain phenomenon appears to the participants. In the first part of the analysis, the researchers have to forget about their own preconceptions and the individual people that they are researching and concentrate on the variation within the data. The data is organised according to topic or phenomenon and then the specific topics and phenomena are studied individually. The study journals that the research participants wrote contained material on many areas that pertain to learning, such as their motivation, learning strategies, cooperation and collaboration etc. These were chosen as the various phenomena to be studied individually.

It has to be noted here, in preparation for the next few paragraphs, that as the author also used the APL questionnaire to derive data from the research participants, he was already considering the use of the categorisation of motivation and learning strategies in the final analysis of the material provided by the study journals. These categories are a result of extensive previous research on the said topic areas and proved helpful in the categorisation of the present research material. It has to be remembered, however, that the author prioritised the qualitative material and contrasted the evidence provided by the research material against the categories provided by the APLQ and accepted them only after careful analysis. In some areas of the study, the categories provided by the APLQ proved not to be sufficient, especially in the case of the so-called peer learning strategies and in those cases the analysis goes beyond these previous categorisations.

The next step is to explore the variation in the participants' experiences of the particular phenomenon, by contrasting different viewpoints and conceptions against each other and finding separate categories within the continuum of experience. The NVivo analysis programme was used in both parts of the study to group the participants' statements into themes and categories. Particular attention was paid to finding separate categories within the so-called pool of meanings within each topic. But it is also important to remember that it is not enough to study the phrases that the learners have used in their journals by

themselves, only in the context of the topic under which they have been "pooled." It is also important to consider the phrases and meanings in the context of the individuals who wrote them, taking into account what else they have said and how it affects the meaning of the phrase that they have used to describe their experiences about a particular topic. The combination of individual and collective contexts of particular expressions is the hermeneutic element of phenomenographic analysis.

In the next phase of analysis, the different categories that were found under specific topics were compared with each other and the distinguishing features were explicated. This part of the research was done by hand, with the help of printed paper slips, as it was necessary to categorise the same material in several different ways, and the present researcher found it the easiest to do this by hand, using different colour codes to keep the material in order. The distinguishing features were then used as a basis when descriptions for each topic and category were written. These qualitative descriptions form one result of the present study (Chapter 7), since one aim of the study is to understand the variation within the categories of learners' strategic and motivational capabilities. These categories were compared to the categories suggested by the theoretical background (see Section 3.4). The preconception of the categories is mainly provided by earlier quantitative studies and theories based on them, and it is interesting to see how the qualitative findings compare to this background. In order to achieve deeper comparison, the present group of research participants also responded to a questionnaire on their motivational and strategic abilities, which were then analysed quantitatively with Bayesian modelling methods.

5.3.2 BAYESIAN MODELLING

In the present research, there were several factors that led to the use of nonlinear modelling methods. One of these reasons was the small number of the learners who took part in the study. Traditional linear methods, multivariate analysis, demand that the data that is used conforms to three basic criteria: 1) standard distribution (S.D.) cannot exceed half of the mean for each acceptable variable; 2) the skewness of the variable should be less than +/- .3; and 3) correlation should fall between +/- .3 - .7 (e.g. Tabachnick & Fidell, 1996: 13-17; Thompson, 1999; Bradley & Schaefer, 1998: 79-83). These are criteria for which, in

traditional linear modelling methods, allowances often have to be made. In a group of only 23 research participants, it cannot be expected that the variables follow the standard deviation on a Likert scale questionnaire. Often some response choices may not be used at all. It is in these problems with small sample sizes and skewed variables that Bayesian modelling methods become useful for the present study.

When a Bayesian modelling approach is compared to classical frequentist linear methods, the following major differences should be considered: (1) the Bayesian approach is parameter-free and user input is not required, (2) Bayesian methods work with probabilities and is thus capable of handling discrete data containing nominal and ordinal attributes, (3) the Bayesian approach has no limit for minimum sample size, (4) the Bayesian approach assumes no multivariate normal model, and finally, (5) Bayesian modelling allows a researcher to analyze both linear and non-linear relationships between variables. (Nokelainen, Silander, Ruohotie & Tirri, 2003.)

Bayesian dependence modelling

A Bayesian network is a viable way to examine dependencies between variables by both their visual representation and the probability ratio of each dependency. A Bayesian network is a representation of a probability distribution over a set of random variables, consisting of a directed acyclic graph (DAG), where the nodes correspond to domain variables, and the arcs define a set of independence assumptions which allow the joint probability distribution for a data vector to be factorized as a product of simple conditional probabilities. (Ruohotie & Nokelainen, 2002.)

The graphical visualization of Bayesian network (Myllymäki, Silander, Tirri & Uronen, 2002) contains two components: (1) observed variables visualized as ellipses and (2) dependences visualized as lines between nodes. Solid lines indicate direct causal relations and dashed lines indicate dependency where it is not certain that there is a direct causal influence or latent cause. A variable is considered to be independent of all other variables if there is no line attached to it.

Previous research in the field of vocational education has demonstrated that Bayesian networks are useful for explorative analysis of dependencies between observed variables (Ruohotie & Nokelainen, 2000; Nokelainen, Tirri, Nevgi, Silander & Tirri, 2001).

Bayesian classification modelling

Bayesian classification modelling (Silander & Tirri, 1999) allows a researcher to find out which variables included in the study are the best predictors for differences within the selected class variable. In addition, the most common components between categories of the class variable are revealed. In the classification process, the automatic search looks for the best set of variables to predict the class variable for each data item. This procedure is analogous to the stepwise selection procedure in traditional linear discriminant analysis. (Nokelainen, Tirri & Merenti-Välimäki, 2002.)

Bayesian unsupervised model-based visualization

Bayesian unsupervised model-based visualization differs from Multidimensional Scaling (MDS) in the following ways: (1) the Bayesian approach is parameter-free and user input is not required, instead, prior distributions of the model offer a theoretically justifiable method for affecting the model construction, (2) Bayesian methods work with probabilities and can hence be expected to produce smooth and robust visualizations with discrete data containing nominal and ordinal attributes, (3) the Bayesian approach has no limit for minimum sample size, and (4) it assumes no multivariate normal model. When examining single data vectors (i.e. respondents) the data is mapped into different set of dimensions according to the optimized solution from which the Bayesian algorithm produced one optimal model. The three-dimensional model is plotted into a series of two-dimensional figures each presenting one dimension at the time. (Nokelainen & Ruohotie, 2002.)

6 INTERNAL COOPERATION OF THE LEARNER GROUPS

If you want creative workers, give them enough time to play.
John Cleese (Actor, b.1939)

In order to answer the research problem one (*What are the greatest differences in the cooperative performance of the five learner groups over the course of their studies?*) and to provide background for the later analysis, this chapter provides qualitative descriptions of the development each of the five groups of learners, concentrating on the development stages that they went through over the course of their studies and what level of cooperation their group reached in their work on the learning assignments and learning in general. This chapter also introduces some findings about the groups discovered through Bayesian analysis of their responses to the APL questionnaire. The findings from this analysis are later used to determine the factors that contribute to the success or failure of effective group work (research problem 4).

The next chapter (Chapter 7) groups the learners into three groups on the basis of their general achievement in their studies in order to find the most meaningful differences in the motivation and learning strategies between high achievers and average and low achievers. It also considers how these strategies correlate with the learners' group working skills and whether the high achievers were also skilled collaborators. This chapter will present the results of the Bayesian analysis of the APL questionnaire.

In the present chapter, the descriptions and analysis of the five learner groups is based on the nodes that were coded in the students' study journals pertaining to their statements about the group work in their groups. These descriptions also include information and analysis about the Bayesian analysis of the learners' responses to the APL questionnaire.

The analysis on the questionnaire refers to Appendix 2, which presents the applicable unsupervised visualisation model of the responses of the learner groups. Similarly, some charts concerning learner activity in the online learning environment are presented in Appendix 3. These group-specific descriptions and analyses are followed by a summary (subsection 6.2) of the greatest general differences in the cooperative performances of the groups (research problem 1).

In order to ensure the ethics of the present research, this chapter does not provide the names of the learners whose journal entries are quoted in the descriptions. Neither does it explicitly state who, in the various groups, the high, average or low achievers were.

6.1 Descriptions of Group Development

6.1.1 Description of Group 1

Group 1 consisted of five members who all successfully finished the study module. According to the study journal entries and the activity on the message boards of the CMC system, two members of this group were the driving force that pulled the others along. Over the five courses, these two members both wrote about 2.1 – 2.2 times as many messages on the message boards as the average learner, whereas the three other members each wrote only about .25 to .5 times as many messages as the statistical average of 102.76 messages. In addition, the active members both received very good grades from the whole study module, while the three others received only average grades. According to one learner: “I think my written work is average compared to those produced by my group. Or rather, [names two other group members] are on their own level and the rest of us come along after a small gap.”

The Bayesian Unsupervised Visualization analysis of Group 1 shows clear differences between the group members on both motivational and learning strategic continuums (see

Appendix 2). The motivational continuum consists of all the questions of the APLQ pertaining to motivation and thus combines intrinsic and extrinsic goal orientation, meaningfulness of studies, control beliefs, self-efficacy beliefs and test anxiety. In this combined motivational scale, the blue dots, signifying the members of Group 1, are clearly separated into two groups, two of them in the one, and three at the other end of the continuum. A similar finding is also apparent in the learning strategies part of the APLQ. This continuum combines factors pertaining to metacognitive learning strategies in studying and at work, working by doing and resource management strategies, and it is clear that Group 1 is also divided in two on this axis.

The general feeling in Group 1 was that they interacted well in face-to-face situations and the group worked well in web discussions, although the lower achieving learners generally admitted their lesser role in the CMC system as well as in the group processing. In their study journals, the two high achievers often noted the difficulty of getting the three other members to participate and they both tried several methods to get them to join them, sending private messages and supporting them at difficult points of the studies. Part of this difference between the learners is clearly a result of their backgrounds, as one of the learners wrote during the fourth course:

> In these studies, the support of the group has been invaluable to me. There are five members in our group and it has been a delight to see how the two stronger and more hard-working learners have encouraged the others. Although there are big differences in our educational backgrounds, I feel that everything has worked well. I have admired how well some of the learners in our group can produce text and I see it as something to strive for myself.

Another learner observed the gap between himself and the high achievers, using a delightful metaphor in describing his feelings about the situation:

> I followed the discussion yesterday evening and read every message and there were lots of big words. But I did not have a [dictionary] with me and I felt that I was left out of something. I feel like a small squirrel with a frozen cone.

One of the group members possessed well-developed social skills and he and one of the other dominant members had somewhat different views about the way the group worked. The first of them demonstrated his social skills by showing interest in and understanding of the other group members, as he stated in his answers to the final questionnaire:

> Certain people were more hard-working than others. The active learners created the atmosphere that drew the whole group along. But I don't think that anyone let go completely or was ignored at any point. The life situations of some learners got harder, but that had nothing to do with these studies.

The highly socially oriented learner also noted that he felt that it was great to have some informal discussion on the message boards. On the other hand, the other member was more matter-of-fact in her approach to the discussion on the net. She observed that:

> The discussions are, on one hand, great, but, on the other, there is too much that is irrelevant to the studies. It is great to realise that one gets help from others for one's own work, but I would not like to discuss matters that fall outside the topic. Sometimes I do it just out of politeness towards others and because I think that they might get something out of it...

It should be noted that even though the second high achiever was critical towards some aspects of the discussion on the CMC system, she still recognised the possible need of others to have less formal, socially engaging topics of discussion, and took care to behave accordingly. Furthermore, she admitted that she also needed the support of the group, when she said during the fourth course, that "At least I get motivation from this also for my individual work, when I get the feeling that 'I belong to the group' and that I'm not a lone, unattached learner."

The cooperation in Group 1 changed relatively little over the course of the studies. The first course consisted mostly of group formation activities and the members were searching for their own roles in the group. The second and the third course saw a stage in which the two high achievers in the group took most of the responsibility of the group performance, while trying to urge the three other members to improve their participation. The efforts of the two active members did bear fruit at the end and one of the high achievers noticed, during the fourth course, that "Our group is discussing again: these more silent boys in our group have also joined in. This is great!" Both high achievers made a note about this new activity in the group and commented that the discussion with all different points of view gave them a lot. At this point, the group was clearly entering the production state in its development cycle and the learners began to trust each other enough for them to offer their own individual works to each other to comment on.

Despite the success of the group in terms of all the members finishing their studies successfully, it is evident that, because of their drastically different working styles and backgrounds, the group engaged in true exchange of ideas only late in their development and their group processing never reached the level that it probably might have if the members had started at a more equal level. Still, the learners received support from each other, encouraged each other and could rely on each other to finish their shared assignments, which shows that they achieved a good state of cooperation and were on their way towards collaboration by the end of the studies. In a sense, this was clearly a bi-polar group, with two high achievers with the necessary high social skills to support the other members of the group in their learning.

6.1.2 Description of Group 2

There were no clear leader figures in Group 2, but there were still differences in the number of messages that each member wrote. The least active member wrote about .72 times as many messages on the discussion forum as the average learner, while the most active member wrote about 1.91 times as many messages as the average. The three others ranged from 1 to 1.2 times the average message count. One of the members of Group 2 failed to complete the last two courses of the study module. Of the four learners who finished the whole study module, two were rated high achievers according to their grades and group participation, although the differences with the rest of the group were relatively small. Overall, the group members worked at about the same level of performance.

The Bayesian Unsupervised Visualization analysis of Group 2 shows that the five group members spread relatively equally on the motivational continuum (see Appendix 2). It is nearly impossible to see clear groupings of the cyan dots (signifying the members of the group. Thus, motivationally, the group is highly differentiated. The findings from the learning strategies part of the APLQ are quite different, however. Here, the cyan dots are grouped clearly so that three members of the group are at one extreme end of the continuum, while the two others are closer to the opposite end, meaning that three members of the group share very similar learning strategies.

The members of Group 2 discussed the issue of group leadership in their journals relatively extensively. In the group formation phase one group member had given an indication, without meaning to, that he would be willing to be the leader. He backed off from this, but later wrote that he had purposefully remained a doer rather than a leader and that he had been in a leadership position long enough for one lifetime. Nevertheless, he held a strong opinion that the group should have had a leader and saw many later difficulties as a direct result of the fact that no one was in charge. The other members were divided in their opinion on the question of having a leader, but one of those who were in favour of one commented that:

> Our group seems to have some problems with the writing of our summary. Everyone seems to be waiting for someone else to start the work without a separate "command". (Me with the others.)

The learner who had been about to assume the role of the leader at first, later commented himself: "I think someone should have taken the responsibility for the whole group, after all. Now, I don't think anyone was in charge of anything."

Despite the statistically active discussion on the online forums, the group members noted that they had lost some of their initial drive when the fourth course started. Some blamed the long summer for this and others commented apologetically that they had been busy with some other responsibilities. One learner wrote: "during this course we have been less active, I think it's because of my and [name removed]'s work and other responsibilities." Still, she was happiest with her own participation during this very same course. She also commented that:

> Our own group has been relatively silent, the greetings and other pleasantries are not enough. I think that we have the most interesting collection of people in our group, from so very different planets that it has been hard to stop us in some earlier discussions.

On the whole, this group worked well together as far as the assignments went. The learners had very different personalities, but they shared the responsibilities and processed their assignments in cooperation that seemed to work well. The variety of the group members was seen as strength and, during the first course, a learner wrote that "we were making a summary together and it feels nice to have people with us who know computers, they know

their stuff so well." Despite this, one of the learners in this group began to see at the end of the study module that trouble would not have been far ahead:

> I think that we spent time together for just as long as it was necessary. I think there would have been conflicts between the members very soon; sometimes it felt like it was not so far from becoming so. The beginning was very good – almost too good. I think some of us were rather childish in our expectations insofar as it came to the whole system and its permanence.

This was not the only sign of the fact that the social skills of the group members were failing towards the end. There was evidence of a slight clash between the personalities of some of the members, for example in one member's complaints about messages on the discussion board that were too long and hindered group processing. Also, the question of leadership may have been a dividing factor. This potential clash never surfaced, however, and it seems that the learners saw the danger and purposefully veered off from it in time to continue their cooperation. All in all, it seems that the group's collective self-regulatory abilities were strong, as they were able to continue working together despite their differences. Some group members expressed uncertainty of the group's ability to function without a leader, while others saw the suggestion of a named leader as a possibly negative development. This indicates that the group's collective efficacy beliefs had certain weaknesses as far as it came to the members working as a group.

6.1.3 Description of Group 3

Originally, Group 3 had five members, like all the other groups, but after the first course, one of the learners discontinued her studies due to personal reasons. This group did not have a clear leader, but one of the members was slightly dominant on the discussion board and in the group discussions. Her total message count was 2.25 times the average, while the three other members wrote 1.1 – 1.3 times as many messages as the average learner (102.76 messages). The group achieved the best average grade of all the groups, not counting Group 5, with two of the learners rated high achievers and the other two following very close behind.

The Bayesian Unsupervised Visualization analysis of Group 3 shows that the four group members (the fifth one who discontinued her studies never responded to the questionnaire) spread almost equally on the motivational continuum (see Appendix 2). The green dots representing this group are located between the two ends of the continuum separated with almost fixed distances. Thus, it seems that motivationally the group is highly varied. The distribution of the group members on the learning strategies part of the APLQ is clearer, however. Here, the green dots are positioned so that two of them are clearly inside the cluster in the upper left corner, while the two others fall towards the centre and lower right side of the continuum. Thus, two of the learners seem to share very similar learning strategies, whereas they are all separated by differences in their responses on the motivational scale of the APLQ.

The study journal entries tell a clear story of how Group 3 developed during their studies. All four members expressed enthusiasm towards their initial group work and the topic that they handled on the first course. They expressed pleasure with their other group members and had high hopes for their future. Then, on the second course it seems that two of the members were happy with the topic for the group work while the two other members indicated that they felt little motivation for the selected topic. One learner writes:

> It was difficult for our group to find a mutually interesting topic to study. At last we settled on one, although it was not actually "it" for me. It would have been more interesting to study something that's personally more relevant to me, but the members of our group have rather different backgrounds which lead to different interests.

This separation of interest seems to have caused a slow division of the group into two pairs, a separation that was exacerbated by the fact that the pairs worked at the same workplaces and thus spent time together outside the online learning environment. The second course also proved to this group that online distance learning is not completely free of time constraints. One of the members was unable to access the Internet during work hours, when the three others were able to access the discussion forum and thus felt separated from the group work and indicated that it was hard to join in when there were so many new messages on the board when she finally could log in.

The third course widened the divide between the two subgroups. This was the course that turned out to be the most difficult for all the learners, because it fell in the summer months,

which were considered the holiday season by most of the learners. In Group 3 this caused fewer problems than in some other groups, but the drift between the two pairs continued to take them apart. One learner refers to this gap while discussing their group work:

> I feel that I'm being a little nasty when I left [the two others] to work on the summary. On the other hand, their investment has been rather weak so now it is their turn to work.

During the fourth course, the group started to settle down and they shared their work more evenly between the members. When thinking back at the development of their group, the members indicated that, despite the problems at some points, they still gave each other a lot and their group "worked." Considering the above quote in this context, it is clear that although the learner says that she left some part of their group work on the shoulders of the two other members, she is also indicating that she trusts that they will get it done. No one in the group seems to have ducked out of their responsibilities completely and the members could rely on each others' investment, even if they had troubles now and then. Near the end of the study module, the learners wrote:

> I think collaboration worked well in our group, because of the unreserved atmosphere where everyone's opinion was respected. In my opinion, the atmosphere remained supportive throughout the studies.

> I think we did not have much in the way of individual responsibilities. On some assignments, we agreed on what the final product would be like and who would make it. We all took rather equal part in preparing the material. On the discussion forums, we occasionally cried out after each other if someone had been missing for a while. I think we shared our responsibilities very well.

Despite the negative feelings expressed by the group members about their group work, which indicated weakened collective efficacy beliefs, the group was able to continue functioning. Towards the end, their collective self-regulatory abilities succeeded in overcoming the rift that was forming between the two sides of the group.

6.1.4 Description of Group 4

Like most of the other groups, Group 4 did not have an acknowledged leader, except at the very beginning. The group also suffered from discontinuing learners: one learner discontinued after the second course and another after the third for personal reasons. These learners wrote only about .1 - .4 times the messages of an average learner, while the three others wrote between .7 – 1.4 times the average number of messages. These message counts are affected by the fact that the group decided to use alternative means of communication; namely the online learning environment's file section, rather than the discussion forum. In the analysis phase, one of the group members was categorised as high achiever, while the two others followed relatively close behind.

The Bayesian Unsupervised Visualization analysis of Group 4 shows that the five group members spread relatively evenly on the motivational continuum (see Appendix 2). However, looking at the yellow dots on the motivational continuum, some tendency towards the left end of the continuum can be seen. From this data, it seems that motivationally the group is very varied. On the other hand, the distribution of the group members on the learning strategies part of the APLQ is much clearer. Here, the yellow dots are positioned so that two of them are clearly inside the cluster in the upper left corner, while two others lie close by and the fifth lies far away from the others, at the other end of the continuum. Thus, although the members' motivational background seems varied, there seems to be a certain amount of cohesion in their learning strategies, at least for four of the group members, according to the Bayesian analysis of the APLQ.

Group 4 had difficulty getting their work started, even though they expressed enthusiasm after the first face-to-face meeting. All group members recognised these difficulties and commented on their progress in their study journals, and one learner wrote simply that "This group seems to have unusually hard time starting its work." Another complained that they did not seem to be able to find times for online discussions that would suit them all, and two commented that they felt that they had not really invested all that they could.

There were also some personality issues that may have affected this negative development, as well as a simple lack of group working skills, which showed in the fact that two of the

group members shared the same workplace and worked together outside the online learning environment. Also, it seems that the learners' starting levels were very different and caused some of the members to feel intimidated. One learner admitted openly that she felt that she did not understand another member at all, while another, looking back at their work together, wrote:

> [A member] was a clear leader at first, out of his own will, and it took time for the others to gather enough courage to say what they thought, as [the member] clearly knew what he was talking about.

During the second course, the group's work seemed to improve. There had been some talk about breaking the groups up and making new ones, and one group member ventured to write that perhaps this threat of dismantling the groups had caused the group members to try harder. Still, the differences in the levels of the learners were apparent, as the learner who had taken the leader's role commented that the group discussion was not deep enough and that he thought that the discussions should move on a more theoretical level, rather than day-to-day practicalities. However, he expressed a hope that the theory might eventually rise from the practical discussion.

The difficulties of Group 4 continued all through the course of the studies, partly because the group lost members after the second and third courses. The learners described their work in terms that referred to division of responsibilities, rather than shared work. Furthermore, the group members were often taking part in other groups' discussions, while avoiding their own. Following from this, it seems that the interpersonal relations inside the group were not ideal. One group member wrote:

> After the beginning others started to take part and everyone took responsibility of their own share of the work. We tested other methods in addition to the online environment, which doesn't necessarily show. Still, the group did not appear to be able to engage into stimulating discussion, although we all commented eagerly on other group's forums :) So, there was something wrong in our ability to inspire each other.

However, even though the group never entered into real cooperation, there was some improvement during the fourth course. Some group members thanked the instructor of the fourth course for this, but they also admitted that their own thinking about group work had changed. Two learners wrote:

> My attitudes changed somewhat, I understood that as a learner I have to invest more of myself, especially when I'm part of a group. It is easy to activate others when you try, otherwise the whole group will fall silent.
>
> All in all, this learning experience taught me much more than a regular teaching would have. This way, I have to adapt to different teaching methods and different people, as well as different schedules. We have had good time together.

All in all, the group seemed to suffer from low collective efficacy beliefs on the part of some members and it took time for the group to develop the necessary self-regulatory abilities to partially recover from the aimless drift that the individual members' distrust towards the groups' abilities had caused. In the end, it took the outside influence of one of the teachers of the study module to bring them back together, although the group had already lost two of its original members by then.

6.1.5 Description of Group 5

Group 5 ended up being the group that was not a group. The activity on the message board during the first course was the lowest amongst the five groups and later, when the message counts did rise, it was mostly due to one or, at best, two members of the group. Two learners wrote less than .1 times the messages of an average learner, one wrote only .4 times the average number and one almost reached .6 times of the average number, mostly due to a single period of high activity during the second course. The fifth learner, and the only one of the group who finished her studies, wrote more messages than anyone else did in any of the other groups (2.8 times the average), but even she became active only after the first course. (The question of how one learner can write so many messages when no one else is posting anything is handled below.) Hers was also almost the only study journal in her group that produced nodes for the group working categories. Two members finished only the first course, although they participated in a minor way in later discussions as well, and one quit after the third course. One learner never turned in the written assignment for the last course. On the basis of these outcomes, only one group member was considered a high achiever.

The Bayesian Unsupervised Visualization analysis of Group 5 does little to explain the failure of this group. The first image shows that the four group members, who responded to the questionnaire, are all located to the right of the continuum (see Appendix 2). However, looking at the red dots on the motivational continuum, it can be seen that only one dot is located near to the extreme right end of the continuum. Additionally, the distribution of the group members on the learning strategies part of the APLQ is very homogenous. Here, the red dots are positioned so that one of them is clearly inside the cluster in the upper left corner, while the three others lie near by in the fringes of that cluster. Thus, judging from these graphs, and especially the learning strategies graph, it would seem that the members of Group 5 were relatively homogenous in their approach to the studies. Their motivational approach is more varied, but that does not explain their failure to work as a group.

The answers to the problems that Group 5 exhibited lie, in part, in the learners' study journals. During the first course, none of the group members posted more than six messages on their own group's work area. Furthermore, their study journals show a lack of references to their group. During the second course, one learner who recognises the problem writes:

> The way we work as a group has not progressed much. Out of five members of our group only two take part in the online work in a collaborative manner. I hope for a "spurt" next week before the next face-to-face meeting, so that we could combine some of the pieces together.

Some other journal entries reveal some of the reasons for the lack of participation in the online group work. Two members comment on the same aspect of their group work, but only one of them sees it as a potential problem, whereas the other saw it as a complementary factor. A quote:

> The Internet as a learning environment may be difficult if the group that works through the Internet is also (at least partly) physically in the same location. At least in our group the three of us from [city name] talk more in our coffee table discussions, which is never recorded anywhere and is eventually forgotten.

At the same time, a member of the group who did not belong to this group of three wondered what kinds of methods she should use to entice the other group members to participate more in their online group work. At the same time, she expressed feelings of envy towards some of the other groups that seemed to be working a lot better than her own.

The third course, which was difficult for all the groups because it stretched over the two months that most teachers considered a holiday, saw the total collapse of Group 5. Here, the high achieving learner was left practically alone in the online learning environment by her group peers and she ended up discussing topics in the discussion forums with herself, writing 99 messages where the second most active member during that course wrote 5 messages. She sent several messages to the other group members, begging them to take part, but, according to her statements in her study journal, none of them did. Apparently, some of the learners did not see the online work as an important part of the course, while the others felt that summer offered more interesting things to do than studies. As it was, the high achiever was the only one in the group who completed the third course.

During the fourth course an intervention was attempted as the group was joined by an additional member, who was patching up his studies from the previous year. His presence proved to have a partial healing effect, as one of the original members of the group became more active than he had been. The high achieving member commented:

> It was nice to see the new group member during the face-to-face meeting. We immediately entered into an exchange of ideas and we had similar experiences from work life. Since we had already discussed online, it was very easy to get to know each other.

The group, or rather its only active member, received some further help and understanding from the other groups. During the fourth course, she wrote:

> It is nice to receive someone else's differing point of view, when it is presented in the right way. Some learners have an ability to sense someone else's need for support and attention, even to read it between the lines: I was allowed to receive that during the third course from [three members] from Group 3 and [one member] from Group 1, when I felt that I was much too alone in my own group, working on our group assignment and discussing with myself. During this fourth course, I have been able to continue open discussion, in addition to the people above, with [a member] from Group 3 and [a member] from Group 1, as well as with [two members] from our own group.

The difficulties with Group 5 resulted in the high achiever from the group seeming to identify herself more fully with the whole study group than with her small group and wanting to keep in touch with some of the others even after the end of the programme. This

may be the reason that she was able to analyse the functioning of the groups in general, as she did in her study journal during the fourth course:

> A group increases the feeling of belonging to somewhere, being a part of something. I can personally discuss with people other than those in my group, but you can feel it in some groups that they don't want visitors from other groups. A well-working group develops a collective spirit. On one hand, this is good, but, on the other, it can create competition and desire to be better in front of other groups. That kind of behaviour does not help the progress of the studies of those who belong to less active groups.

In general, it seems clear that group 5 had virtually no collective self-regulatory ability as the members were unable to organise their work, observe their progress, or correct their mistakes (not taking part in the online work and discussion). Since the group never seemed to have time or opportunity to become a group, there is little reason to discuss their collective efficacy beliefs.

6.2 Differences in the Cooperative Performances of the Learner Groups

As the descriptions of the development of the five groups show, the learners were very heterogeneous in their skills and abilities, as well as in their learning strategies and motivation. Some learners would have preferred to have a single leader to their group, whereas others abhorred the idea and preferred a looser form of cooperation and collaboration. Thus, there was no single group amongst the five that succeeded completely and for all members in cooperating and collaborating effectively as a group. Group 1 had two members who helped the other group members along and thus showed a clear sense of responsibility for others' success, but because of the differences in their achievement levels, their cooperative work on their studies never reached the level of shared responsibility and shared knowledge construction as it might have done in a group with learners of a more equal ability. Group 2 members were more consistently engaged, but they had differences as far as the question of group leadership went and it is clear from the

study journal entries that the group never worked on this problem and thus did not solve it. Group 3 started out well in their collaboration, but their working was hindered by the fact that they soon separated into two separately working pairs (with the fifth member quitting). However, towards the end, the remaining members of this group started to work well together. Group 4 had more interpersonal differences than many of the other groups and their work showed less characteristics of shared problem solving and more signs of division into independently completed tasks than any other group, except for Group 5 which never worked as a group.

Reading the accounts of the groups' development separately from their overall context, it would seem that none of the groups really worked well. However, it has to be noted that all the learners had opportunities to discuss things with one another during the contact work days and that many of their online assignments involved discussions across the group boundaries. Thus, the learners had an opportunity to work together even if they did not belong to the same group. It was a common practice for individuals to visit the other groups' discussion boards to offer additional comments or to ask questions. This general cooperation allowed, for example, for the fact that the sole active learner from Group 5 found help and opportunities for collective learning from her peers.

These findings are in accordance with earlier knowledge on group learning and relationship-based learning, presented in subsection 3.5.1. Ruohotie (1999) states that learners need to exhibit empathy, self-reflection, self-expression as well as active listening and acceptance of feedback. In the present study, it is clear that some learners possessed more advanced skills for this than others. For example, some of the learners in Group 3 expressed clear empathy towards the lone learner in Group 5. Furthermore, Fletcher (1996) indicated that group members should realise their interdependence, their need to foster each other's development mutually and their need to recognise their individual strengths that benefit the group (reciprocity). It is clear from the descriptions of the learner groups (section 6.1) that not all learners understood these requirements, even though they had been taught the basics of collaboration during the first course of their studies. Overall, the characteristics and abilities proposed by Ruohotie and Fletcher are such that would all be present in an ideal learner group, but, as is apparent in the descriptions of the learner groups in the present study, they are rarely shared by all the learners.

The above descriptions of the groups' development also included early tentative investigation of the collective efficacy beliefs and collective self-regulatory strategies of the groups. It is, however, necessary to study the learners individually and not merely as parts of their groups in order to find out which factors eventually contributed to the success or failure of group work (research question 4). The next chapter explores the individual motivation and learning strategies of the learners, including their self-efficacy beliefs, as well as the emerging collective aspects of motivational and learning strategies.

7 MOTIVATION AND LEARNING STRATEGIES AND ACHIEVEMENT

> Suppose that we are wise enough to learn and know -- and yet not wise enough to control our learning and knowledge, so that we use it to destroy ourselves? Even if that is so, knowledge remains better than ignorance.
>
> Isaac Asimov (1920 - 1992)

The previous chapter provided qualitative descriptions of each of the five learner groups, concentrating on the developmental stages that they went through over the course of their studies and the level of cooperation the groups reached in their work on the learning assignments and learning in general. The main purpose of that chapter was to respond to research question 1 and identify the main differences in the cooperation of the five learner groups, to provide background for the investigation of the other research questions.

For the purposes of the present chapter, the learners were categorised into three groups based on their general achievement in their studies, as indicated by their grade averages. The purpose in doing so was to identify the most meaningful differences in the motivation and learning strategies of high and low achievers (research problem 2). How these strategies correlate with the learners' commitment to group work and whether the high achievers were also skilled collaborators (research problem 3) was also considered. This part of the analysis also includes results from Bayesian analysis of the APL questionnaire.

The next chapter (Chapter 8) will use the results of this analysis and also information from the previous chapter in order to fashion a model of motivational and leaning strategies, including the collaborative work strategies that are important to successful learning in online learning environments. The categorisation of most of these strategies is based on of the earlier research that provides the foundation for this research project, at least insofar as those theoretical conceptualizations are consistent with what was revealed by the

phenomenographic analysis of the study journals. The categories introduced in the model are complemented by qualitative descriptions of their variability in the research data.

As stated above, the learners were categorised as high, average and low achievers on the basis of their general achievement level as indicated by their grades for the courses. It was decided that a division into three groups was preferable to the traditional two (high and low achievers), because initial analysis of the study journals indicated that the differences between high and average achievers, and, in turn, average and low achievers, were sufficient to require a deeper analysis.

During the initial analysis, it became clear that some learners discontinued their studies because of certain disrupting life events, such as unemployment or the death of a close family member even though they had received relatively good grades from the previous courses. On the other hand, some learners continued their studies until the end despite similar incidents in their private lives. Although those who discontinued their studies were categorised as low achievers for the purposes of this study, it is recognised that people are different and that similar events may have vastly different effects on the people who experience them. Thus, it is to be expected that the results drawn from the low achiever category may not be very homogenous and that there may be individuals in that group who, under different circumstances, would have been average or high achievers. In addition, in the light of the present study, it has to be noted that there may also be learners amongst the other categories who, under different circumstances, might have discontinued their studies but who, because of strong peer support or other factors, persevered and finished their studies with the others.

The goal of this part of the study was to find the most meaningful differences in the motivation and learning strategies between high, average and low achievers. It also explored how these strategies correlate with the learners' group working skills and whether the high achievers were also skilled collaborators. This chapter also includes results from Bayesian analysis of the APL questionnaire, in which the three achievement categories were used as a background variable in order to apply Bayesian Classification Modelling to produce a model revealing the questionnaire items that best explain the differences between the three groups. In order to maintain the anonymity of the research participants, authentic quotes are presented only from the high achievers. The quotes in other

categorisations were composed by the author, based on authentic quotes from the study journals but modified so as to ensure that the original authors could not be identified.

In addition, in some learning skill categories explored below, it was necessary to compare the high achievers with the average and low achievers together. This is because the low achiever grouping included all those who failed to finish their studies, which also meant that their study journals were generally the shortest and offered the least information of the three groupings.

7.1 Variation in Individual Motivation for Learning

7.1.1 Bayesian Classification Model

Bayesian Classification Modelling was used to determine the items in the APL questionnaire that best explained the differences between high achievers, average achievers and low achievers. As was explained in subsection 5.4.2, this procedure is comparable to the stepwise selection procedure in the traditional linear discriminant analysis. The motivation and learning experience section of the APLQ consists of 28 items, ten of which were identified as the most important predictors of difference between the groups. Figure 7.1 presents the model derived through Bayesian Classification Modelling (classification accuracy 78.26%).

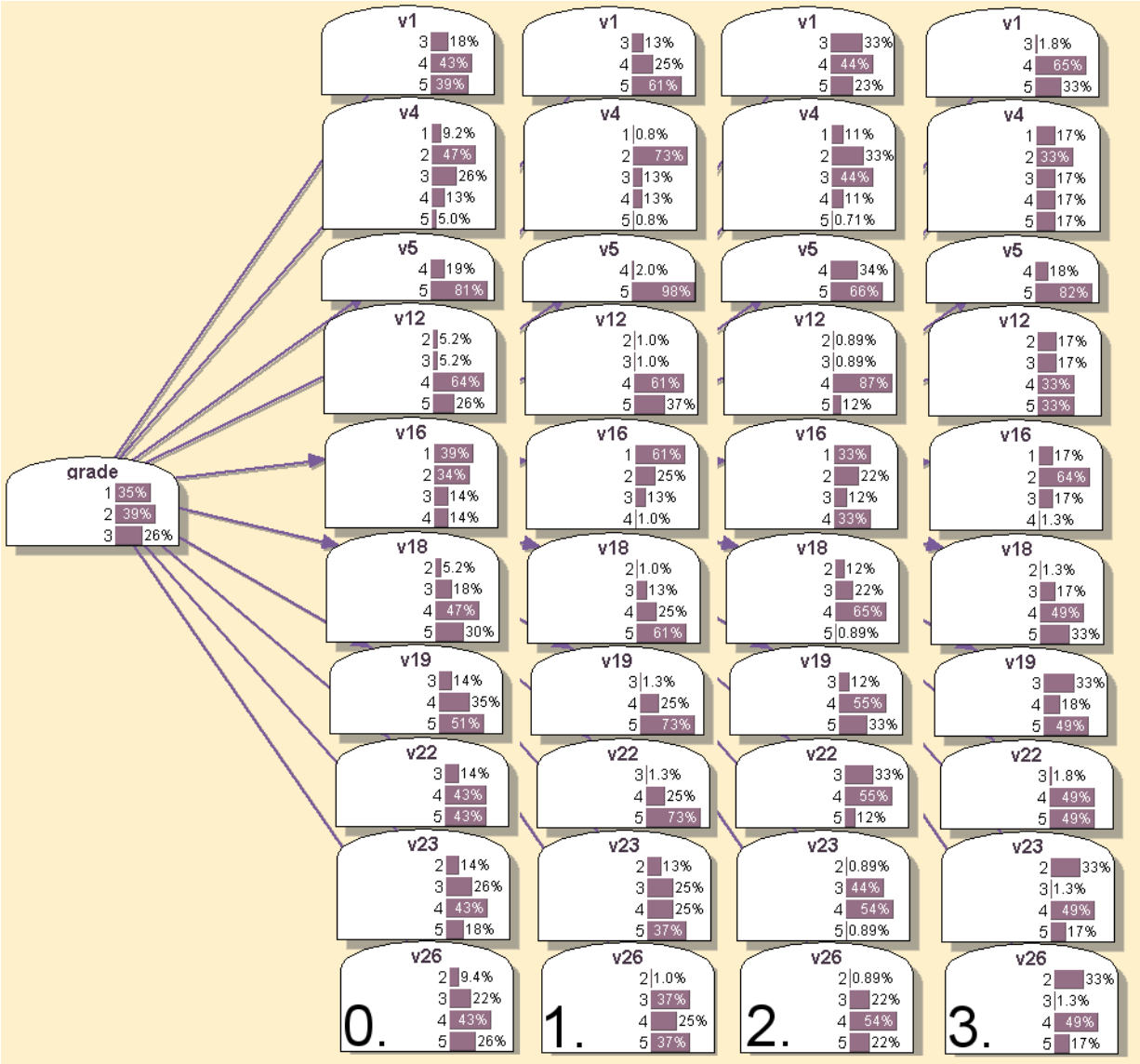

Figure 7.1: Bayesian Classification Model of the Motivation section of the APLQ.

Figure 7.1 consists of four columns, the first of which (marked with number 0) represents the average result of all three achievement groups. Column number 1 represents the high achievers, column 2 the average achievers and column 3 the low achievers. Each of the rows of four boxes represents a different item, or a variable, in the APL questionnaire (see Appendix 1). The bar graphics inside the boxes represent the Likert scale used in the questionnaire and the percentages and bar lengths are Bayesian predictions of the responses that each achievement group would make on the said item (i.e. these are not actual response frequencies, but predictions according to the model). According to Bayesian Classification Modelling, almost all of these variables are strong predictors of group differences, but variable 22 is considered to have a very strong predictive power. Another factor that has to be taken into account in the analysis is that, because of the small

sample size (n=23), many of the variables in Figure 7.1 present only a partial Likert scale, most notably item v5, thus representing only the difference between agreement and high agreement with the particular questionnaire item. Additionally, it should be noted that v4 is a reversed variable, and the analysis below considers responses 1 and 2 as 5 and 4 accordingly.

Referring back to Table 5.1, it can be seen that the most important differentiating scales are *intrinsic goal orientation* and *meaningfulness of studies* (three items from both scales), followed closely by *self-efficacy beliefs* (2 items) and *test anxiety* and *control beliefs* (1 item both).

On the items belonging to the intrinsic goal orientation scale (v1, v18, v23), the high achieving group generally agrees most strongly with all three items (high agreement: 53 % in average for the high achievers, 8.26 % for the average achievers and 27.67 % for the low achievers). However, if we look only at agreement in general (responses 4 and 5 on the Likert scale), the low achievers show the highest agreement (agreement: 78 % for the high achievers, 62.67 % for the average achievers and 82 % for the low achievers). It should be noted that the latter discrepancy is countered partly when we consider that the low achievers are distributed very heterogeneously on item v23, where there is a clear cap between those you responded to the higher end and those who responded to the lower end of the scale, which, in turn can be explained by the fact that the low achiever grouping included all those learners who discontinued their studies, thus making it a heterogeneous grouping in general.

On the items belonging to the meaningfulness scale (v4 reversed, v5, v19), the high achievement group is also most strongly in agreement with the three items (agreement: 90.6 % in average for the high achievers, 77.3 % for the average achievers and 72.3 % for the low achievers).

On the items belonging to the self-efficacy scale (v12, v22), the same pattern continues (agreement: 98 % in average for the high achievers, 83 % for the average achievers and 82 % for the low achievers).

The two remaining items belonging to the test anxiety and control beliefs scales offer less conclusive results, although they indicate that the high achievers profess less test anxiety (86 % of responses in the lower end of the scale, i.e. 1 or 2) than the other groupings (55 % for average achievers and 81 % for the low achievers). The control beliefs (v26) of the three achievement groupings show relatively similar results at the high end of the scale, but it should be noted that 33 % of the low achievers fall on the lower end of the scale, indicating low control beliefs.

Overall, the Bayesian Classification model indicates that the three achievement groupings are strongly differentiated by their intrinsic goal orientation, the meaningfulness that they attribute to studies and their self-efficacy beliefs. Lesser indicators of the group differences are their test anxiety and control beliefs. High achievers are thus more intrinsically oriented, see the studies as more meaningful to themselves and believe in their own abilities to perform at the level required by the studies. To a lesser degree, the high and average achievers are also more likely than low achievers to believe that they are in control of their own performance.

7.1.2 Qualitative Variation of Motivation

Intrinsic and Extrinsic Goal Orientation

One of the greatest differences between the intrinsic goal orientation of the high achievers and average and low achievers was the fact that, in their study journals, the high achievers made more comments that revealed their intrinsic goal orientation than the average and low achievers. The high achievers wrote about their studies and feelings in greater detail than the other groups and seemed more willing to share their experiences with the researcher. More specifically, the intrinsic goal orientation of the high achievers was apparent in the study journals in the several references to their general interest towards the study topic, and how they started to desire and look for additional information.

> I'm looking forward to the next face-to-face meeting and new assignments. I'd wish that the courses were longer, not because I don't have time to finish them as they are, but because we don't have time to go very deep into the topics. It would be nice to have more time to delve into the interesting issues. (high achiever)

> I'm a fast writer, but while I write, I tend to study important and interesting topics from many different sources and that takes time. I cannot just write coldly and put the quotes in place. When something that I've read or written piques my interest and I start desiring for more information, I go and look for it. (high achiever)

The first of the above quotes expresses a simple desire to understand the issues dealt with during the studies more deeply, while the second quote shows that the high achievers were more likely to seek additional information from outside their required study materials. Furthermore, the high achievers indicated several times that it was partly the cooperative aspects of the studies that upheld their enthusiasm and supported their learning (see the following quote).

> This course has again offered so much new information and the online learning sessions with the other groups were very useful, gave new points of view and it is a great way to study... (high achiever)

Also, the high achievers were willing to forgo their other interests and duties to work on their studies as is shown in the following quote:

> I feel very happy about these studies and my motivation to continue my studies further has only grown, learning and studying has even been fun on occasion, although at times it's been hard work, taken a lot of time, and required me to deny myself many other pleasures. (high achiever)

Overall, the high achievers indicated enthusiasm towards their studies, and professed optimism that their enthusiasm would continue throughout the programme. On the other hand, the average and low achievers made far fewer references in their study journals that revealed their intrinsic goal orientation. In addition, they expressed less certainty that their motivation and interest would last.

> I don't know, but somehow I'm excited about these studies, but, well, that may pass… (average achiever)

> I'd think that my motivation will last, thanks to the great start-up. Of course, there will be lapses along the way, depending on the situation, but this year will go quickly and I believe that my motivation will last until the end. (average achiever)

Additionally, the average and low achievers seemed to be less willing to sacrifice their personal life for their studies. The following quote is a composite of what many average and low achievers stated in their journals.

> It feels that there's no time in the summer to do anything else but to think about the studies and that's not right. The sun is shining and the beaches and garden work are calling me out. Some people expect one to take part in the online discussions every day, but I've got a vacation now and that's how I want to keep it. (a composite of average and low achievers)

Still, the difference between the high achievers and the two other groupings is not as clear cut as this composite comment might indicate. Although the other groupings made fewer entries in their study journals about their goal orientation, there were also points in their texts where they wrote how they gained new viewpoints on old issues from their studies and how they found it interesting how humans and humanity work.

There was less variation between the three achievement groupings when it came to extrinsic goal orientation. Both the high and low achievers expressed the importance of good grades and high degrees to their self-esteem.

> The book is tough. But let's just try hard, aiming for the best possible grade. (high achiever)

> I do have enough self-esteem to make me successful in my learning and I'm persistent and hard-headed and I'm irked by my low level of education. I want to get myself a higher degree and I hope that it will be possible... (high achiever)

> Oh, how one quarter increase in the grade of a course can make a person feel better! If I just could do that again in this course, I'd feel that I've managed to develop myself during these studies. After each course, I feel very good for having completed the assignments with honour. It might feel different if I had not had to invest so much of myself in them. (a composite of average and low achievers)

Meaningfulness of the Studies

As far as the meaningfulness that the learners attributed to the studies, the analysis and categorisation of the study journals showed about the same number of references from all three achievement groupings. With the high and average achievers, the learners' statements

were very similar, as they indicated that they had found their studies to be of practical value to their own work or found connections between their work and the topics studied (quote below). One of the learners even described how he used an essay that he had written for one of the courses as a starting point for a proposal that he introduced later at his workplace. Another learner found that the theoretical information in one of the courses was already behind what was actually happening in the field, as far as future planning went.

> My goal is to finish the bachelor's degree, if it will be possible through these TUKEVA studies. What could be better: to finish the whole degree alongside my work so that I can apply the new knowledge into my personal teaching and thus deepen my understanding of the studied issues since I could mirror them to my own work and work environment. (high achiever)

On the other hand, although the low achievers commented on these same issues, finding the courses useful and expecting them to help them in solving problems in their own work, one learner admitted that for him/her it had felt hard, at first, to regard the studies without a certain degree of negativity because of a word "humanist" that had been used by a lecturer during the early courses, as, for him/her, the word alluded to something vague and flimsy, rather than concrete. Another learner complained that one course offered him/her very little, as the assignment was directed to those taking part in development projects and he/she was not engaged in such work.

Control Beliefs

The amount of data available in the study journals about the learners' control beliefs was relatively small. Only the high achievers' journals contained frequent references to issues that could be categorised under this heading, while the average achievers had less than a handful of such comments and the low achievers had none. However, it is apparent from the high achievers' comments that they believe strongly that their success is dependent on their own work. Many of these comments overlap slightly with the next category, self-efficacy beliefs, as the following quote shows.

> I'm slightly afraid of whether I'll be able to find the red thread that would lead me forward? [sic] On the other hand, I've always been studying something and got through it so I think this will go okay as soon as I find the rest of the course books and get a hold of the plot. (high achiever)

> Studying one's own professional growth was surprisingly hard. The issues seemed clear in my mind, but when I went on to transfer them onto the paper, I simply froze. Well, you only learn to write by writing. (high achiever)

> This course has given me a lot to think about. All those thoughts are still rather undefined (like my essay), however. Still, I trust that my brains will deliver the essay in time. My sub-conscious usually works unless I get some allergic reactions or something else that will numb my mind. (high achiever)

The few learners in the other groupings who commented on their control beliefs were generally similarly convinced of the effect of their own efforts. However, there was one learner who commented, apparently half-jokingly, that he/she was a bit nervous about handing in his/her essay since he/she had not been born to be a writer.

Self-Efficacy Beliefs

This category proved to be very bountifully represented in the participants' study journals. At some point over the course of their studies, almost all the participants wrote about either their trust in their abilities or their feelings of inadequacy when facing one challenge or another. For the high achievers, the issue that seemed most challenging was the lack of time to read sufficiently on a topic before having to write the essay (see quotes below).

> The beginning was rather muddled and it took us a while to find the red thread. Now that our work is beginning to go well and we are finding more material to work with, it is already the time to hand in the assignment. (high achiever)

> I feel that I used more time for the essays in the other courses. Well, I don't actually have to hand it in just yet, but I think I will not have time to read as many books and other materials as a proper "scientific" essay would require. (high achiever)

Only a few comments were made of the difficulty of the topics of the studies, or the difficulty of learning a vast number of new terms, and even then the learners seemed to be confident that they would succeed.

> It seems that it is harder for all of us to study during the summer, when there are so many other things to do and the weather has been great. One just needs self-discipline and one has to orient oneself in these studies. There's still time to enjoy the vacation, so this doesn't really feel that overwhelming. (high achiever)

> At first, I felt these education studies were a tough field. Perhaps partly because I had earlier studied engineering – things that either are or are not. There was not such a focus on points of view as there is in education. But as the studies have progressed, I've been able to find the logic also in this field and learned to think from various points of view. (high achiever)

For the average achievers, the main difficulty seemed to be the essays. Several of them included comments in their journals that should concern about the fact that they had little experience with higher education or formal writing before entering the program.

> The final version of the essay is finished and sent to be graded. My biggest problem was with the structure of the essay. I can produce enough text for the essay, but finding the right structure and outline in relation to the topic is problematic. (average achiever)

> It seems that nights fly by as I write my essay. I realised that while I'm writing, I have to constantly remind myself of the assignment. Otherwise, the essay will run off course. (average achiever)

In addition, the average achievers also wrote more than the high achievers about their troubles with the topics and terms encountered in the courses. They also professed less certainly of their eventual success, as can be seen in the following quotes.

> It is very hard to get into the [online] conversation when one cannot produce text in the same way as most of the others. It feels a bit as if I were merely a "yes" man in the group, which may not be too far from the truth. (average achiever)

> I have started to feel pressure when I've seen the works written by the others, because I think they are very good. And that, if anything, increases the pressure since, in principle, I would not like to perform any worse than them and, on the other hand, I fear that I cannot do as well. Well, I guess I'll find out when I've finished my work. (average achiever)

As in the last quote above, some of the learners in the average achiever grouping also mentioned their insecurity about their ability to perform at the required level. One learner wrote that he/she was actively involved in the forum discussions, but that he/she was more at home with everyday issues and tended to withdraw when the others started talking "scientifically." Another learner admitted that he/she would have preferred all the learning materials to be in PowerPoint format, because he/she found long texts to be less clear and long lectures tiresome. The issues that the low achievers brought up were very similar to those of the average achievers, namely the new terminology and the difficulty of writing

"scientific" text, although, because of the smaller amount of data, there were fewer such comments.

Test Anxiety

Because of the nature of the studies in which the research participants were engaged, they did not have traditional tests. Therefore, in the context of the present study, the participants' comments mainly concerned their anxiety about the quality of their essays or the quality of their participation in the cooperative discussion forum work. There was little variation in the degree of worry that the learners expressed in their texts between the achievement groupings. However, a few comments offer interesting insight into what kind of cooperation and collaboration methods some of them preferred.

> My participation in the discussions during the face-to-face workdays is not as active as it is online. It is easier for me to express my thoughts in a written format than orally.

In today's world where everyone is calling for more collaboration and group work at workplaces, it is good to remember that some of us feel more comfortable with the less hectic work environments that give more time to form our thoughts.

7.1.3 SUMMATION

The Bayesian model predicted that intrinsic goal orientation, meaningfulness of studies and the self-efficacy beliefs of the high, average and low achievers were the best indicators of their differences, with test anxiety and control beliefs being lesser indicators. The model also predicted that the learners in different achievement levels would not profess great differences in their extrinsic goal orientation.

The qualitative analysis of the research participants' study journals revealed categories of motivation corresponding with those used in the APLQ. The only clear difference was that the test anxiety scale had to be replaced with a category of more general anxiety related to one's performance. Furthermore, the analysis confirmed the predictions of the Bayesian

analysis by detecting great differences in the intrinsic goal orientation of high achievers versus the average and low achievers, in essence finding the intrinsic goal orientation of high achievers to be superior to that of average and low achievers. In general, the analysis revealed the superior intrinsic goal orientation of the high achievers through the simple fact that the high achievers were more eager to write their study journals and describe their feelings and experiences than the other learners. This finding is in compliance with the earlier knowledge on high intrinsic goal orientation and performance, presented in section 3.2. Ames (1992) and Archer (1994) both find that intrinsically goal oriented learners (or whose with mastery goal) use deeper learning techniques than those with low intrinsic goal orientation (or performance goal).

Similarly, the analysis of phrases and quotes pertaining to extrinsic goal orientation did not reveal clear differences between the different achievement groupings. The analysis of the meaningfulness of studies showed high and average achievers to be relatively similar, whereas the low achievers seemed to find that the studies had little to do with their practical work. Also, the control beliefs of the high achievers seemed stronger than those of the average achievers. This finding is in accordance with the findings of Manderlink and Harackiewicz (1984) and Butler and Winne (1995) who found that the learner's belief in self-causality (control beliefs) were an important determinant of their learning achievement and intrinsic motivation.

The Bayesian analysis also predicted that self-efficacy beliefs would be a differentiating factor between high achievers and the others, and this was confirmed by the findings in the analysis of the study journals. The high achievers experienced little uncertainty of their abilities, and when they did it seemed to be that they were only worried that they did not have enough time to become deeply familiarised with the course content. In the beginning of their studies, however, even some of the high achievers seemed to be intimidated by the large number of new terms that they had to learn. The average achievers, on the other hand, seemed somewhat intimidated by the demands of studying at the university level in general, especially academic writing. The average achievers were also more intimidated by the number of terms and the difficulty of the course content than the high achievers. The same trend continued with the low achievers, although the amount of data was again smaller than that of the other achievement groupings due to the brevity of their journals. Also this finding is in accordance with earlier knowledge of the importance of self-efficacy

beliefs. For example, Bandura (2001) states that high self-efficacy goes hand-in-hand with optimism toward a certain type of activity, which in turn leads to improved achievement. In the present analysis, the higher optimism of the high achievers versus the other learners was clearly evident.

The greatest difference in the motivational category between the background assumptions of the APL questionnaire and the expressed reality of participants in this research was in the test anxiety category. In the present case, the anxiety was more directed towards the quality of one's essays and the learners' participation in the group work, than it was to actual test situations. On the other hand, the three achievement groupings professed little difference in their anxiety levels. Due to the lack of actual testing situations, references to such anxiety were not found in the study journals.

7.2 Variation in Individual Learning Strategies

The APLQ contains *peer learning* as one sub-category of resource management strategies. In this section, however, this sub-category is omitted from the analysis because peer learning and other collective learning strategies are more comprehensively examined in the following section (7.3).

7.2.1 Bayesian Classification Model

As with the analysis of the Motivational scale of the APLQ, Bayesian Classification Modelling was used to determine the items in the APL questionnaire that best explained the differences between high achievers, average achievers and low achievers. The learning strategies section of the APLQ consists of 40 items, eight of which were identified as the most important predictors of difference between the groups. Figure 7.2 presents the model

derived through Bayesian Classification Modelling, which provides classification accuracy of 82.61%.

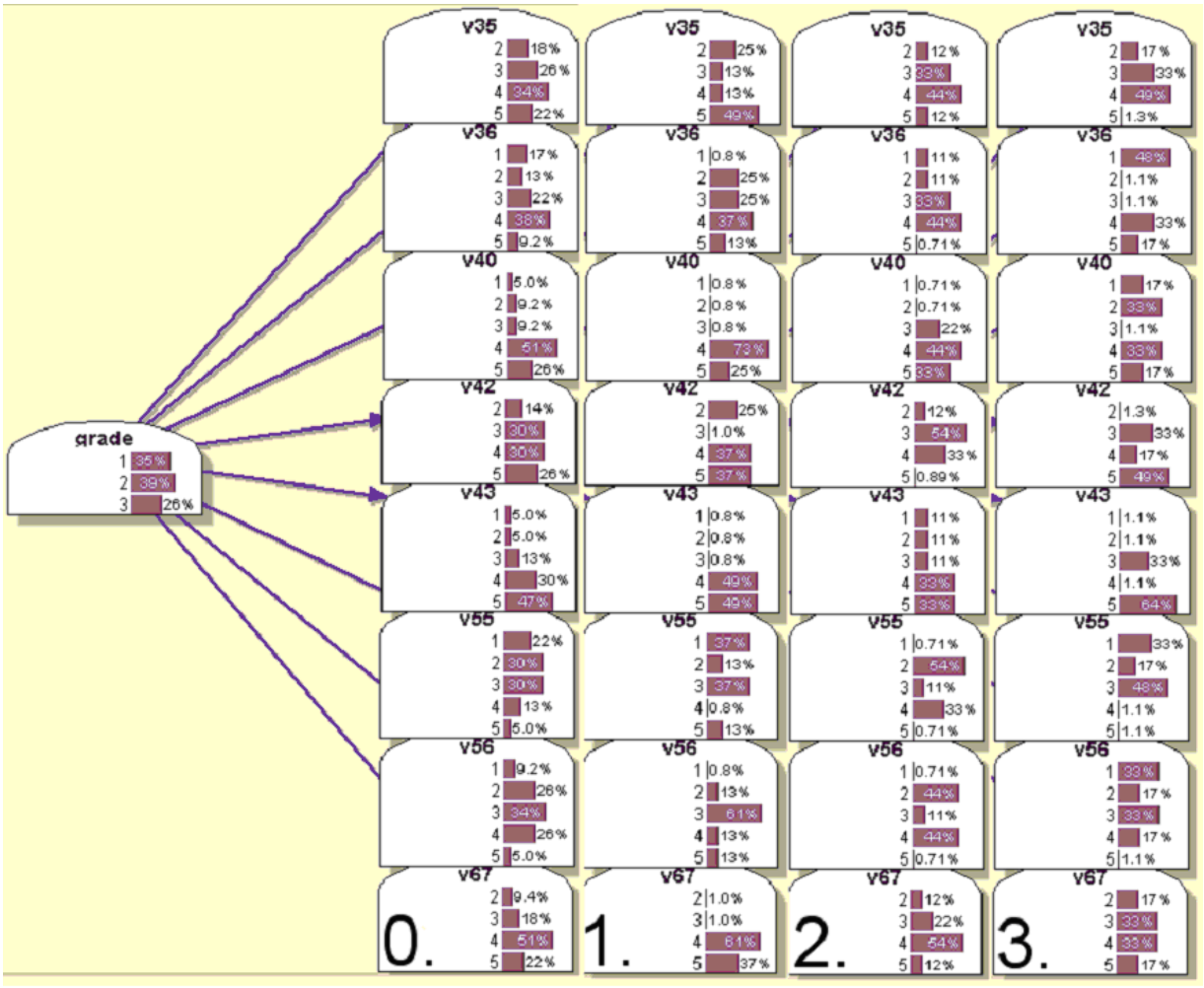

Figure 7.2: Bayesian Classification Model of the Learning Strategies section of the APLQ

Figure 7.2 consists of four columns, the first of which (marked with number 0) represents the average result of all three achievement groups. Column number 1 represents the high achievers, column 2 the average achievers and column 3 the low achievers. Each of the rows of four boxes represents a different item, or a variable, in the APL questionnaire (see Appendix 1). The bar graphics inside the boxes represent the Likert scale used in the questionnaire and the percentages and bar lengths are Bayesian predictions of the responses that each achievement group would make on the said item (i.e. they are not actual response frequencies, but Bayesian predictions of them based on this model). According to the Bayesian Classification Model, almost all of these variables are strong predictors of group differences, except for variable 43 which is considered to have slightly

weaker predictive power. In contrast to Figure 6.1, the variables included in Figure 7.2 show an almost perfect spread of responses on the Likert scale. The only exceptions to this are variables 35, 42 and 67, which predict that the lowest mark on the Likert scale would not be used by any of the three groups. Additionally, it should be noted that v55 is a reversed variable, and the analysis below considers responses 1 and 2 as 5 and 4 (and vice versa).

Referring back to Table 5.2, it can be seen that the most important differentiating learning strategy scales are *cognitive strategies* and *resource management* (three items from both scales), while *metacognitive strategies* and *learning by doing* are both represented by one item.

On the items belonging to the cognitive strategies scale (v35, v36, v56), the high and average achievement groups are in average agreement with the three items (agreement: 46 % in average for the high achievers, 48.67 % for the average achievers and 39.33 % for the low achievers). It should be noted that the low achievers illustrate the most disagreement with these items, especially items v36 and v56, both of which belong to the rehearsal strategies subscale in the cognitive learning strategies scale.

The items belonging to the resource management scale (v40, v42, v55 reversed) demonstrate a greater divide between the achievement groups. The high achievers were in strong agreement with the three items relating to resource management strategies, while the average and low achievers show only average agreement (74 % agreement in the high achiever grouping, 55.33 % in both average and low achiever groupings). It should also be noted that 50 % of the low achiever grouping is shown to be likely to report either total or partial disagreement to item 40 (“I use the time reserved for studying efficiently.”).

The two remaining items, belonging to the metacognitive strategies (v67) and learning by doing (v43) scales both show clear differentiation between the three achievement groupings. The model indicates that the high achievers are more likely to look back on their performance and attempt to find ways to improve it in the future than the average and low achievers (98 % agreement in the high achiever grouping, 66 % in the average achiever grouping and 50 % in the low achiever grouping). Similarly, 98 % of the high achievers report that they are able to benefit from their practical experiences when they

study, while 66 % of the average achievers and 65 % of the low achievers agree with this item.

Overall, the Bayesian Classification model indicates that the three achievement groupings are strongly differentiated by their resource management strategies, as well as by their metacognitive learning strategies. To a lesser degree the achievement groups differ in their use of cognitive learning strategies. According to these results, the high achievers are more efficient in using their resources, especially time, for learning and they are much more likely to evaluate their own performance than the lower achievers. To a lesser degree, the high and average achievers are more likely than low achievers to use cognitive strategies in their learning.

7.2.2 Qualitative Variation of Learning Strategies

Cognitive and Metacognitive Strategies

As far as cognitive learning strategies, such as rehearsal, elaboration, organisation and critical thinking, were concerned, high achievers made the most comments about their use of such strategies in their study journals. One of the high achievers notes that he/she printed out the forum discussions to be better able to concentrate on them and follow the progression of the discussion, while another wrote notes about what he/she read in the course books and other materials. The average achievers did not mention using such learning strategies, although a couple of them used the study journal as a tool to reiterate and develop their thinking about the issues that they had studied from course books or other sources. The qualitative analysis uncovered no references in the low achievers' study journals to the use of cognitive learning strategies, nor did the low achievers use the study journal to write about what they had learned.

Metacognitive learning strategies were more evident in the research participants' study journals than their cognitive strategies. The high achievers commented on their study planning, self-monitoring and self-evaluation on several occasions, and they also discussed and pondered the work methods that they thought suited their learning style the best. The

planning and self-monitoring strategies are closely related in practice as is evinced by the following quote, where a high achiever plans his/her studies (in order to begin… / before I write…) and simultaneously observes his/her need to study the issue further.

> In order to begin my essay, I've read more literature and Internet sources. Before I write, I'll need time to gestate, internalise and understand the issue. (high achiever)

The following quote represents what was a typical journal entry about study planning from the high achievers. The quote shows how detailed plans some of the high achievers made about the progress of their studies.

> Now is the high time to return to my studies. I began to read [one of the course books] and I was planning to read it through first and make some notes for myself and the essay. In addition, I viewed some sources from the Internet and there was a lot of material there [. . .]. I should start my essay as soon as possible as I aim to have it finished by the end of the month. I can then polish it at the start of [the next month]. (high achiever)

The high achievers practiced also self-evaluation and self-monitoring very extensively and it showed in their study journals. The following quote shows how one of the participants evaluates him/herself against the others in terms of his/her course essay.

> I printed my essay for the first time today and read how it looks like now that the hardest pressure to get it finished is over [. . .]. I read some of the essays written by the other learners and some of them are very excellent work, and everyone had their personal style. I saw some deficits in my own work – perhaps I could have expressed myself more clearly in many points. I would have liked to express more clearly how important... (high achiever)

Another quote from a high achiever gives a typical example of self-monitoring (as well as the use of cognitive learning strategies):

> I've begun to work on my essay and I've already written 12 pages! [. . .] I just hope that I'll not be penalised for making it too long. At least it has been beneficial to my learning that I've been able to "pour my understanding" onto paper. At the same time, different issues become organised and are easier to remember.

In addition to the metacognitive strategies directly related to learning, and also covered by the APL questionnaire, the high achievers often pondered their learning styles and their ways of expressing themselves in comparison to their peers. Probably because of the cooperation and collaboration that was stressed in the studies that they were engaged in,

they discussed their feelings about social interaction and studying in groups versus individually, as is shown by the following quote.

> Before, I've been a kind of a loner in my studies. I am social, but somehow I've thought that I could not study in a group and that I'm not too chatty in group work situations – more contemplative, in fact. These studies in an online environment and the group discussions have suited me very well – although I'm not quick with my mouth, I'm fast enough a typist to write my thoughts down. It's been very educational to study things with others – some things I've felt that I've actually learned because of it – although I feel that I learn the most by reading and studying literature on my own. (high achiever)

There is a clear difference in the number and quality of references that the high achievers made of their metacognitive strategies in comparison to the average achievers. The average achievers wrote less about these strategies. Similarly, while the high achievers wrote extensively and clearly about their own learning styles, the average achievers considered the topic much less. They also practiced much less self-evaluation and the following quote —which is a mix of self-evaluation, self-monitoring and planning—is one of the few references to such practice amongst average achievers.

> Now, I'm getting somewhere! It seems to take its time to learn to work in the correct way. I visit the other groups' discussion boards way too often – it is much more reasonable to finish one thing and then move to the next thing. (average achiever)

Most of the evidence of metacognitive strategies from the average achievers falls into the categories of self-monitoring and planning. Also, when it comes to self-monitoring, the issues that many of the participants mention is how hard it is to focus on one thing and how hard it is to find the real thread in all the learning material. The following quotes illustrate this tendency:

> It is relaxing to write after a hectic day. Thoughts stay in focus much better. Apparently, all the excess energy has been used and there are fewer distractions. I'll have to spend more time studying in the evenings. (average achiever)

> I decided that Sunday morning is a peaceful time to read the course books. I read for about two hours and caught myself several times thinking about something else. I could not concentrate properly. I did not think of it too much. (average achiever)

The low achievers rarely referred to the use of metacognitive learning strategies in their study journals. Again, it has to be remembered that as most of the low achievers discontinued their studies at some point over the year, there is a lot less material from them in general and thus less opportunities to find references to many of the issues under investigation. The following two quotes represent some self-evaluation and self-monitoring of the low achievers that show that some of them understood the importance of planning, but it was not clear whether they engaged in it or not; that is, it is not clear if their observations about themselves led to any self-corrective behaviour.

> I haven't dared to think of my scheduling yet, although I should – I've run distance courses myself and I know that time tends to run out.

> How do I always find myself leaving things for the last night? Perhaps it is the way I work – the best effort comes out when I've got a bit of stress on.

Resource Management

The category of resource management was the most fruitful category as far as finding applicable references to such strategies in the study journals. All three achievement groupings produced more material for the following analysis than they did for any of the other categories discussed above. As in the predictions provided by the Bayesian analysis of the APL questionnaire, the three achievement groupings showed clear differences in how and what kind of resource management strategies they used.

The high achievers made several references to their time management strategies, often in contexts where they were also exhibiting their planning strategies, but also very often in situations where they complain about their limited time. The biggest reasons why they felt that they had little time for their studies were work and family commitments. The following quote demonstrates the daily situation of one such learner.

> I cannot really get any work or studies done before 9PM. Sometimes I can, of course, have my children watch Moomin videos, but it is neither healthy nor fun for the child to be watching videos night after night. So, I try to work on my work planning and studies after I've put my child into bed. (high achiever)

The high achievers were also able to use what time they had available to work on their studies more efficiently than the other groupings. The following quotes demonstrate how

the learners were generally able to overcome the temptations in their environment (see an opposite quote under the discussion of effort strategies later on).

> The spring and the many garden chores have taken all the time left over from my work, but now I have time to orient myself to my studies, although the sun is shining beautifully and the weather is wonderful. (high achiever)

> Well, now my summer holidays – about three months in total – started. Working hard on studies and literature essays. Feels good and I trust that I'll get some results as well. (high achiever)

Several of the high achievers pondered the organisation of the studies and how they gave them a chance to work when and where they had time and opportunity to do so.

> I'm sure that the format of these studies were the best possible for me (guided as well as these were). I'm so busy with all my work and hobbies that I cannot sit at lectures in the evenings. This gave me a chance to take part during the hours when I had the time. What I found great was the fact that I had the possibility to access the Internet both at work and at home.

Overall, the high achievers were able to use the time that they had very efficiently. There were, of course, cases in which the learners complained that they did not have time to work on something as much as they would have liked, but there were no instances where the participants indicated they had been completely unable to find time for the studies, even when faced with family crises.

Time and its management was also one of the major topics in the study journals of the average achievers. The tone of their journals differs from those of the high achievers in that the average achievers' statements were somewhat less hopeful. Whereas the high achievers talked about their work and how little time it left for their studies and what kinds of rearrangements they had to make, many of the average achievers merely noted that they had been too busy to get to studying. The examples in the following quotes also demonstrate that studies were often not the first priority to these participants and also serve as examples of effort management strategies, which are discussed below.

> I have a hard time writing my essay, because I simply do not have the time. I spend my days at work and evenings elsewhere and I have no strength left to write in the small hours. (average achiever)

> My conscience apparently started knocking as I began to work on my assignment during the weekend and my family came to ask me when I'm going to spend time with them. I started thinking on that and I put away the papers and spent the weekend with them. It's difficult to find time at the moment and that's why my assignment is not finished yet. (average achiever)

> I began to work on my essay on one rainy day, so there's still hope to get it finished by the deadline. Somehow, I'd just like to enjoy these remaining sunny days outside and I feel reluctant to sit inside at my computer. Well, the autumn rains will start soon and then I'll not be eager to get my nose wet. Perhaps I'll then have time to work on the final essay. Or perhaps I'm just dreaming... (average achiever)

On the other hand, there are also examples of innovative ways to find time for studying, and a peaceful study environment amongst the average achievers.

> Luckily, I've been able to get into the books already, thanks to my children's sports hobby, since I can just wait for them in the car and use the time to read. This must be the only time when it is quiet enough to concentrate and no one comes to interrupt me. (average achiever)

Amongst the low achievers, comments about the lack of time were also numerous, but shorter and plainer than those written by the other learners. Most of the comments were simple statements, in the style of the first of the following examples, whereas others showed that their studies were of a low priority to the learners (the two latter examples).

> It's been very busy at work, although it was supposed to be a quiet spring. (low achiever)

> Somehow it feels like these courses are too short, or else, I've not given them enough of my time. I should probably look in the mirror now. (low achiever)

> Oh yeah, I should probably do something to pass this course now. It's made that much more difficult by the fact that I have no Internet connection from my home at the moment and when I'm at work, I do not have time to concentrate on my studies. (low achiever)

Overall, time and its management were popular topics in the learners' study journals and there was a clear distinction between the nature of the references between high achievers and the other achievement groupings.

The effort scale in the APLQ refers to the extent to which learners are able to work on something even if it sometimes feels dull or useless. As such, it is of course closely related

to time management and planning, since one is less likely to plan one's schedule or use the scheduled time efficiently if one feels that the work is dull and lets that feeling affect one's efforts.

Naturally, there was evidence of moments when studying felt dull in almost all of the study journals and examples of such can be found from high achievers as well as from low achievers. Many of the quotes above about time management and planning already contain some examples of presence or absence of effort management. One high achiever used the expression "tastes like wood" when he/she was starting to read the books of one particular course. Other similar feelings can be seen in, for example, the following quotes.

> I'm now in a phase in my studies when I feel a bit tired. But luckily these pre-assignments for the next course don't demand much time or writing. (high achiever)

> I imagined that I might be able to already start working on the final essay during the summer [. . .], but sunshine pulled me to the beaches, away from the computer, so I have to leave it until later in the autumn. (high achiever)

It should be noted, however, that these references in the high achievers' journals come from situations in which they had not, and did not, miss any deadlines, whereas the average and low achievers often describe situations in which they did miss the deadlines. Also, the references made by the average and low achievers showed more serious lack of control of one's efforts than those made by the high achievers. The following journal entry demonstrates the case.

> The topic of the first face-to-face meeting of the course was [. . .], but in our group we still talked about the essays of the previous course. (low achiever)

7.2.3 SUMMATION

In terms of learning strategies, the Bayesian analysis of the APLQ data predicted that the greatest differences between the achievement groupings would be found in the learners' cognitive strategies and resource management strategies while lesser differences would arise in their metacognitive strategies and in the learning by doing category. The

qualitative analysis did not focus on learning by doing category, and the study journals made no references to the concept since it was not part of the teaching methods, and thus it is not considered.

The qualitative analysis of the study journals gave some support to the findings of the APL questionnaire, but also revealed a lack of depth in the peer learning subscale, which needed a deeper analysis, and gave contradictory evidence about the difference of importance between cognitive and metacognitive learning strategies. Insofar as the importance of cognitive strategies is concerned, the qualitative analysis found strong evidence of the fact that the high achievers used a wide array of such strategies, whereas the low achievers made no mention of them. Naturally, as in many other categories analysed in this chapter, this lack of references may be an artefact of the research method, which did not directly ask the learners to write about their study techniques. However, since the study journals were meant as the learners' tool to describe their experiences, and as the high and average achievers did mention their use of cognitive strategies, it has to be assumed that the fact that low achievers did not is an indication of their lesser use of such strategies. This is in accordance with the findings of the Bayesian analysis, and also with earlier knowledge on the topic where the use of cognitive learning strategies is found to be connected with successful learning (e.g. Borkowski, Carr, & Pressley, 1987; Garner, 1990).

However, slightly against the prediction of the results of the APLQ, the high achievers also professed a high degree of use of all three metacognitive learning strategies covered by the APLQ. In addition, they practiced general self-observation, describing their learning styles, self-expression and their thoughts about interaction in the context of their studies. The average achievers, on the other hand, focussed more on self-monitoring and planning strategies, whereas the low achievers evinced even less use of metacognitive learning strategies. Again, this finding supports earlier theoretical knowledge on the topic, as, for example, Setiyadi, Holliday and Lewis (1999) found that successful learners use more metacognitive strategies than other learners.

Resource management strategies were a popular topic in the learners' study journals. The high achievers demonstrated a high degree of use of time and study environment management strategies and seemed to be able to find time for their studies even in difficult life situations. The average and low achievers, with some exceptions, demonstrated that

they had generally been unable to find time for their studies and other activities and situations, such as family and sunny weather, had taken them elsewhere. Also, despite the occasional feelings of dullness, the high achievers were better able to concentrate on their studies than the learners in the other achievement groupings. The high achievers' study journals clearly support Ruohotie's (2002a: 44) finding that the use of different resource management strategies helps the learner to adapt to her surroundings and to change the surroundings to suit his/her needs.

7.3 Collective Motivation and Learning Strategies

In the context of the present study, it was necessary to omit consideration of so-called peer learning strategies from section 7.2. Instead, the present section draws new categories of analysis from the research data, and the means to interpret them from the theoretical background on collective motivation and learning strategies, in order to analyse the participants' study journals in terms of their references to their cooperative group work and collective processes of learning. In most cases, the references were in the context of the small study groups and how they worked. Individual peer learning strategies were thus observable from the comments that the participants made about their own group work; what they liked, what they sought and what they benefited from it. The general finding that the high achievers thought and wrote about their learning more than the other achievement groupings holds true here as well: the number of coded passages in the high achievers' study journals about group work and peer learning was about 60 % of all the coded passages. Amongst the items pertaining only to peer learning strategies, the difference between high achievers and the other two groups is even greater.

The purpose of the following section both to complement the image that has been drawn of high achievers and their difference in comparison to average and low achievers in learning strategy and motivational scales, and to discover whether high achievers are also committed group workers (research problem 3). In order to achieve this, the section is divided into three subsections. The first examines collective motivation, the second

examines collective learning strategies, and the third draws together the analysis and answers to the above-mentioned research problem.

7.3.1 Collective Motivation

The theoretical background examined in chapter 3 suggested that the collective motivational scale would be comprised of the same subcategories as individual motivation. This means that, for example, individual goal orientation would be complemented (not replaced) by collective goal orientation, in the same way that self-efficacy beliefs would be complemented by collective efficacy beliefs. However, rather than impose these categories onto the research material, the present research approached the data qualitatively, finding categories that arose from the data itself. Only at that point did the author compare these categories with the suggested collective concepts and compose the final picture of the event horizon.

As described in Chapter 6, the five learner groups consisted of a random selection of individuals and thus the high achievers were spread between all five groups. Therefore, in order to find the answer to research problem 3 (What is the connection between motivational and strategic abilities and commitment to group work?), it is necessary to take a look at each of these groups and study how the high achievers acted in those groups and how this differed from average and low achievers in those groups.

When it comes to collective goal orientation, the qualitative data used in the present study does not provide the best means to differentiate between individual and collective goal orientation. Since all the research participants worked in a collective setting throughout their studies, their study journals do reflect both their own qualities as well as the effect of their respective groups. However, as has already become clear in the analysis of individual motivation and learning strategies in the earlier sub-sections (7.1 and 7.2), there were clear differences between high achievers, average achievers and low achievers. If we also take into consideration that the qualitative analysis and the Bayesian analysis of the APL questionnaire (which was presented to the learners early in their studies) were in relatively strong support of each other, it can be concluded that the individual characteristics of the

learners, as it comes to goal orientation, remained very much the same throughout the one-year-long period of their studies. Thus, according to the data, there seems to have been relatively little change in the goal orientation of the individual learners despite their interaction with the other members of their respective groups.

The same findings seem to hold true also in the case of the collective feelings of the meaningfulness of studies. Again, the values of individual learners seem to have been little affected by the groups in which they worked when it came to value attributions towards the topic of their studies.

However, if the findings presented above are complemented by the descriptions of the group development presented in Chapter 6, the changes inside some of the groups become more apparent. Especially the fourth course seems to have changed the way a lot of the groups worked and less active members (i.e. average and low achievers) seem to have found a sudden boost to their participation in group work. Taken as an example, both of the high achievers in Group 1 (subsection 6.1.1) described how they had worked hard to have the other members of their group participate more in the group work. Then, during the fourth course, the high achievers wrote how glad they were to see the other members of their group renewing their activity. This seems to suggest that the high achievers had, in the end, a positive effect on the goal orientation of the other group members. However, it has to be remembered that 1) the fourth course came after a long and slow summer that had seen a steep decline in the activity of all the groups, so that any change to the positive may have been viewed with increased enthusiasm, and 2) the teacher of the fourth course was widely acknowledged to be highly skilled in motivating learners and she took interest in their study journals and individual development. Therefore, it is difficult to say whether it was the high achievers' influence on the collective values of the group that was absorbed by the average or low achievers of the groups towards the end of the studies, or if it was one or both of the extrinsic influences described above.

These findings seem to be in a slight conflict with what was suggested in the theoretical background of this study (see especially section 3.5), but it must also be remembered that the theoretical background is primarily concerned with communities that have day-to-day interaction, whereas the participants of the present study met only occasionally and their most commonly used form of communication (online discussion) has only limited ability

to develop the groups into communities (see Chapter 4). This is evident in the fact that most of the groups reached the most productive stage of group development only during the fourth course, which was the last course involving cooperative learning methods.

In the case of control beliefs, it was mentioned above that the data from the study journals was very scarce when in came to learners expressing their belief that they were themselves responsible for their learning. This also holds true for collective control beliefs. However, when it comes to efficacy beliefs, individual influence may have had a larger effect on the group behaviour, and vice versa, than in the case of goal orientation and the meaningfulness of studies. **Collective self-efficacy beliefs** can take the form of a collective belief that the group will be able to achieve their goals, or a collective belief that the group will be able to work well despite difficulties. Thus, one of these aspects of collective self-efficacy is directed towards the learning goals, whereas the other is directed towards the group itself. In Chapter 6, it was concluded that at least two groups suffered from low belief in their own ability to function properly in the learning situation. In Group 2, one of the high achievers had a strong belief that the group should have had a clear leader and another member seemed to concur, mentioning that they all seemed to be waiting for someone else to start working on the problem that had been set in front of them. The high achiever repeated the distrust that he/she felt towards the group at the end of the studies, saying that they had "childish [. . .] expectations insofar as it came to the whole system and its permanence" (high achiever). Although it seems that all group members noticed these difficulties, they never tried any strategies to repair the situation but rather ignored it and waited until the program was finished. They seemed to be successful in this approach, however, because of their chosen learning strategies (cooperative division of labour rather than collaborative problem solving). A very similar lack of collective efficacy beliefs also threatened groups 3 and 4, but they were also able to overcome the worst of the problem later on. Especially the learners in Group 4 felt that some of the healing process was caused by the teacher of the fourth course, but also by the fact that the learners' own thinking had changed.

Many of the aforementioned problems of collective efficacy beliefs within the learner groups involved worries about the groups' ability to produce their group work in time to meet the deadline, or to perform at a certain level in their studies. Thus, it was partially their collective performance anxiety that made them also worry about their efficacy in

relation to the course standards and schedules. Even the high achievers in all of the groups expressed worry about the performance of their groups, and, in some cases, it was eventually the high achiever(s) who pulled the whole group ahead. For example, in the worst-case scenario of Group 5 it was the high achiever who first made all the group works virtually single-handedly as the other group members discontinued their studies one after the other or otherwise failed to finish their courses and in Group 1 the two high achievers managed to help the other members along so that they all finished the study module (although the high achievers also pointed out that they had benefited from the other group members' input into their group work).

It is, however, important to notice here that the above description of the collective motivation of the work groups and the high achievers' roles in them *does not comprise the full picture of what happened* and what is necessary for successful collective learning. In order to draw out the supportive structures that all of the learners engaged in more or less enthusiastically, it is important to turn our attention to the social layers of motivation. The following two components are here included under the consideration of collective motivation, because their influence is mostly supportive in the same manner that motivation in general is supportive to the use of learning strategies and persistence in studies. Similarly, **social groundwork** and **social support** are important in the sense that they, together with collective efficacy beliefs, support the collective learning processes that are necessary for learning (examined in sub-section 7.3.2). They provide the mutual understanding that is needed for collective group work and the social support that is needed for the groups to continue functioning even when facing difficulties.

From the social cognitive constructive point of view, raising collective motivation to the same level as values (goal orientation, meaningfulness of studies) and expectancies (self-efficacy and control beliefs) is justified since it is the social environment, or context, that often determines the intrinsic and extrinsic goals of individuals in the first place (e.g. learning to fight only becomes a goal if the social context makes it necessary for survival), as well as the determinants of self-efficacy (e.g. the criteria of success is determined by the social context—how else would one determine one's ability to learn to fight if one had not observed the behaviour previously or did not engage in mock battles with other trainees?). These social determinants of and influences on individual and social behaviour exist in the background of everything that individuals do and experience. There are, however, social

processes that are more on a par with individual values and expectancies. The two such concepts that arose in the present study are social groundwork and social support.

Social groundwork is a category that arose in the qualitative analysis of the study journals and includes the statements in which the learners make it known that they sought to understand each other as people in order to understand and respect their points of view while engaging in their group efforts. Social groundwork will be also evinced later in the discussion of collective learning strategies, in the respect that the learners express toward each others' points of views and opinions, but it is also apparent in statements such as the following. The first two quotes point out the need for social groundwork as these particular learners realise a lack of mutual understanding in their groups, while the third quote refers to a situation where the groundwork has been achieved and collaborative learning may begin. The fourth quote is from a learner who noted that the social groundwork is important for the group to function efficiently.

> Thinking about the last time we interacted together it feels to me that our group is not really on the same wavelength. We have to practice more and perhaps we can talk about his during the next face-to-face meeting. (high achiever)

> The group members seemed to be unable to engage in a stimulating discussion with each other, although we all visited the other groups' work areas very enthusiastically :) There was likely something wrong in our mutual stimulation. (high achiever)

> It is nice to see in the group work that although the discussion on the forums of the new course is not yet very active, it is still clearly more relaxed after the face-to-face meeting. The tongues have been loosened and mutual creation may begin. (high achiever)

> This kind of study organisation is the best for me: there are enough face-to-face meetings and any more would be too much considering the time I have in my hands. I still want there to be face-to-face days, because I don't believe that the group would work as well without them as it does now. We know each other pretty well by now, also those who don't belong to our small group. (high achiever)

The social groundwork category showed the greatest differences between the high achievers and the average achievers. The study journal entries presented more either negative comments about the learners' interest towards their fellow learners or indicators that the learners did not always manage to listen to or respect each others' opinions, than they do positive comments. The following quotes provide illustrate this tendency amongst

the average learners, but there were stronger opinions in the study journals that remain unpublished.

> I think we should keep the discussion more on a theoretical level, because the daily topic of one learner may not interest the others (at least not me). (average learner)

> Now I don't really have any motivation, because the topic doesn't interest me that much. I would very much liked to make the group work on [. . .], but I guess I have to do as the group desires, since I was away and could not affect the decision. (average learner)

On the other hand, this attitude was not shared with all the learners in this grouping, and the attitudes of individual people sometimes changed between courses.

> All in all, these studies have taught me more than ordinary education would have. This way, one has to adapt to different people and teaching methods, as well as schedules. We have had lots of fun together. (average learner)

> The last contact day was again very illuminating and opened new avenues for thought for me. It has been great to work with different people from different fields. It felt like the discussions were more fruitful also because we had not all worked as teachers. (average achiever)

When it comes to the low achievers the data is very limited, but some general tendencies in the differences between the high achievers and average achievers continue to show up in the low achievers' study journals. Some low achievers' interest and activity on the discussion forum boards was negligible, as is illustrated by the following quote. The use of the word 'boring' in itself shows how interested the participant was in collaboration with the other group members. The quote also shows that the learners were not ready to invest themselves in social groundwork to get to know and respect each other.

> I visited the discussion page quickly to state something boring to see if anything would happen, if anyone posts any proposals or responds in any other kind. Well, they didn't. Our group is unable to take collective responsibility for the group work. A leader would be in order, but for now, as we agreed, I'm more than happy to write my own work under the general theme that we decided to go for. (low achiever)

In another case, two members from Group 5, the group that only had one learner who finished her studies, note how three of them tended to discuss the studies at their workplace and how that part of their collaboration did not show up on the online learning

environment. They thus failed to notice that they were effectively cutting off two members of their group and, instead, considered the two forms of communication (online and face-to-face at the work place) as complementary to each other.

Social support is a category that arose in the qualitative analysis of the study journals and includes statements that reveal that the learners supported each other socially, and received support from others that helped them keep up in their studies. The high achievers all recognised the need for social support, although some of them were more willing to sacrifice their own time to support their peers than others. The following quotes describe a general feeling amongst the high achievers.

> The value of the contact work days is most apparent when you are unable to take part in them. Not only the teaching of the subject matter, but also the encouragement and the maintenance of the zeal for studying, takes place mainly during the face-to-face meetings. My enthusiasm has always grown when I've met the gang and been able to talk with them face-to-face. (high achiever)

> I, at least, am motivated in my individual studies by the feeling that I 'belong to a group' and that I'm not a lonely, isolated student. (high achiever)

In the case of the average achievers, the category of social support showed that the learners generally valued the social support that they received from their peers and that they, in some cases, saw it as invaluable to their own success in the studies. It is thus evident that most learners, whether high achievers or low achievers, saw social support as an important aspect of collective learning environments.

> In these studies, the support of the group has been invaluable to me. There are five members in our group and it has been a delight to see how the two stronger and more hard-working learners have encouraged the others. (average achiever)

> I used to think that in large groups no one would dare to open their mouth, or at least reveal their differing opinions. We supported one another and gave everyone a chance to be heard. (average achiever)

> As I read through my study journals, I paid attention to how my studies have progressed. Although I like working alone, I feel that I also need the support of the group. (average achiever)

The low achiever grouping also included those who, similarly to the high and average achievers, were enthusiastic about the form of the studies and saw that the group support

helped them in their progress. One participant even analysed the way his/her group worked, noticing that the kind of social support that peers can offer is not always enough to help someone who has issues with their general life management skills, or some unsolved issues in their lives. The more motivated learners in the low achiever grouping often discontinued their studies because of great changes in their lives, such as unemployment. The less motivated learners in this grouping rarely even wrote into their study journals, which makes it impossible to study the forces that affected their motivation and, in many cases, their learning strategies.

7.3.2 Collective Learning Strategies

As discussed in subsection 7.2 concerning the learners' individual learning strategies, it was necessary, in the context of the present study, to expand consideration of what the APL questionnaire refers to as peer learning, under resource management strategies, into a new category called **collective learning strategies**. The argument here, based on social cognitive constructivist learning theory, is that, rather than being treated as part of the resource management strategies, these social aspects of learning need to be given a more prominent role in the consideration of learning strategies.

Learning naturally takes place within individuals. Even in communities (e.g. work teams) learning essentially takes place within the individuals who form that community. Thus individual cognitive and metacognitive strategies are the foundation for consideration of learning—one cannot acquire new knowledge without thinking critically of one's experiences and thus transforming them into knowledge. Even modelling one's behaviour on someone else's does not happen without critical analysis of the other's behaviour. However, learning, and the use of learning strategies, is also significantly affected by the social context in which the individual exists. One does not necessarily learn to plan and self-monitor, let alone self-evaluate one's work, if the social context does not demonstrate those strategies to be useful. Similarly, most of the skills and information that individuals set out to learn have already been processed and constructed by the social environment. Thus, social context is not merely a resource to be taken advantage of—how could it be

when it is that very social context that sets a person out to learn in the first place?—but an intrinsic aspect of the learning process itself.

The importance of collective learning is also evident when one considers self-regulatory strategies. Cognitive learning theories suggest that individuals self-regulate to the extent that they manage their own behaviour and, thus their learning. A social constructive approach to this would suggest that there is also collective regulation that additionally regulates the behaviour of individuals who belong to various social communities, from sports clubs to organisations to nation states to humanity in general.

On some levels, collective learning strategies and individual learning strategies coincide. Cognitive learning strategies, for example, work in much the same way whether individuals perform them individually or in groups. However, in groups, it is more likely that cognitive strategies will be accompanied by the use of metacognitive strategies. The basic functions of collective activity include the planning, monitoring and evaluation of the group's activities. Thus, individual learners need to explain their decisions and their logic to their group peers, which, in turn, forces the whole group to monitor and evaluate this new information and try to combine it with what the group has done and learned previously. Whereas individual learners may forget to self-monitor and self-evaluate their learning, resorting to mere to rote learning and only realising the inadequacy of their learning when they take a standardised test on the topic, learning groups automatically evaluate and assess every bit of new information, and plan the acquisition of new facts, as they process their learning tasks. This makes it necessary for individual learners to consider the information that they bring to the group beforehand and thus engage in metacognition.

The greatest obstacles for collective learning strategies arise from deficiencies in individual learners' learning strategies. Learners who have not previously practiced planning, self-monitoring and self-evaluation may find it intimidating and painstaking when they realise that they have to go through those steps before they face the other members of their group. Thus, these learners easily withdraw from group situations and remain silent, denying the group the input and experience that might have been useful in the processing of the learning tasks. The collective motivational factors discussed in the previous subsection help to offset some of these difficulties, but, as the present study

shows, they are not always sufficient to sustain everyone. These issues will be discussed in more detail in the next subsection (7.3.3), but it should be briefly stated here that whereas, for example, Group 1 was successful in eventually engaging in collective learning strategies in which all the members took part (to some extent), some other groups lost members along the way due to a variety of reasons, some of which were connected to poor social support and groundwork.

With respect to **collective resource management strategies**, the online working environment was problematic for most of the groups. The members of Group 3 seemed to be unable to arrange a time for all the members to meet and discuss their studies online on equal footing and thus one of the members expressed worry that she entered the forums every day when everyone else had already been there, which made it harder for her to enter into the discussion. Thus the time and place (environment) for the studying was not convenient for all the members. Similarly, Group 4 expressed that they had difficulties getting their work started and two of its members found their own time and environment for their studies at their workplace, thus creating a gap between themselves and the rest of the group. In Group 5 there was a similar situation in which three of the group members abandoned the online learning environment, apparently discussing their studies with each other at their shared workplace. Thus, despite the early introduction to online learning strategies, some of the learners seemed to have trouble seeing the online discussion boards as the "environment" where they were supposed to be studying. On the other hand, Group 4, which also found the discussion boards to be a less than ideal environment for their work methods, resolved the problem by using another one of the virtual tools (the file area) at their disposal as an alternative venue where they could "discuss" by editing the same text documents.

In a similar manner, many of the groups faced difficulties in their collective effort to carry through with their group assignments. In Group 3, where the four members were divided into two pairs, the division was the result of the fact that one of the pairs found the selected assignment for the group to be uninteresting and thus they put less effort into the group work than the pair that had been able to select the assignment for the group and found it interesting. As a result, the group members started to view their group as two pairs rather than one group, which again hurt their collective learning strategies because from that point onwards tasks were divided between the pairs rather than worked on together.

In the analysis of the references that the learners made to collective learning strategies, the author settled on the following categorisation. It should be noted, however, that the categories are in some sense overlapping. Cooperative/collaborative learning is a general term that usually covers knowledge sharing, feedback and modelling strategies, but they are separated here in order to focus on the individual aspects of these processes and the benefits that the participants looked for and received in their group work.

1) Knowledge sharing. This category included the participants' statements about cooperation and its benefits for them, with a focus on their willingness to share their own knowledge.
2) Modelling. This included references to situations in which the participants compared their own understanding to that of others, and particularly where they stated that they sought to do so (i.e. purposefully read and studied other people's ideas) in order to expand their own perspective or to validate their own understanding.
3) Feedback seeking. This included references to situations in which the participants put out their ideas or essays for others to comment on in order to receive feedback and to improve their own understanding and performance. It also includes references to direct help seeking strategies.

Overall, the high achievers professed a high degree of group working skills and willingness to cooperate. All of the high achievers were willing to **share their knowledge** and they attempted to engage into cooperative knowledge construction in their groups. The following quotes show how they valued this exchange of knowledge and ideas:

> Wonderful, educational and dialogical discussion online! It's great especially when we get deep into the topics and learn from each other through concrete examples. (high achiever)

> Discussions about the assignment with others have given me a lot. As a piece of self-evaluation, I'd say that I've not yet experienced as concrete learning on this platform as I did with this assignment. (high achiever)

> Discussion is mostly about exchanging opinions, based on one's own experiences. However, I still find it fruitful, because people of our age have a long work and life

> experience. Also the fact that we come from different parts of Finland and from different organisations is richness in these discussions. (high achiever)

Unfortunately, in all cases the high achievers worked in groups that did not succeed in achieving a good state of shared work, and in most cases remained at the level of divided responsibilities, as is evinced by the following quote:

> Our group's group work doesn't really work. It feels as if only me and [. . .] think about the whole group. For example, we've searched information for their part of the assignment but we have received nothing in return. (high achiever)

On the other hand, high achievers whose own group did not work well often looked for ways to cooperate with the members of other groups, as illustrated by the following quote.

> I think the collaborative learning worked best in the discussions between all the learners. Through the active participants I learned and we worked together on assessing some mid-course assignments. (high achiever)

With respect to the **modelling** strategy, it stands out in the high achievers' study journals that they were generally eager to review other participants' essays and their responses to assignments. They did not do this in a competitive manner, to see how well they were doing in comparison to others, but in order to compare their own understanding with that of others, develop their own understanding, and gain confidence in their own understanding of the topic of the essay or assignment. It was not a requirement of any of the courses for participants to give their final course essays to the others to read, but once one high achiever had done so, the others quickly saw it as a good idea and followed suit (see quotes below). It should be noted that these examples also show how willing the high achievers were to collaborate and to share their knowledge.

> It was great that [. . .] put her work out for the others to assess. We are often too shy to show our work to other people. I've already finished my own work, but after reading her text I got new ideas about the topic. New points of view opened up for me. (high achiever)

> The final works of the other students on the file area were a positive surprise! Younger students are often afraid that their hard work will be "stolen" but this shows how adults cheer each other on. I mostly gained confidence that I'm roughly on the right path and it is a joy to continue :) (high achiever)

> I like this kind of collaborative study of new issues. One's own point of view may be very one-sided so the other opinions provided by other learners may broaden one's perspective" (high achiever)

The third category that arose from the study journals was **feedback seeking** strategies. The high achievers provided each other with direct feedback concerning their essays, and accepted the feedback provided by others.

> [. . .]'s opening to have her work read by the other students was great! And the improvement for the better when she had fleshed her work out was an excellent proof of collaborative learning on the 'net and the importance of feedback and assessment in quality work! (high achiever)

The learner who was the first to willingly subject her work to group scrutiny, commented that:

> The feedback from others gave me a lot. I got a general idea of what had been understood and where I had only scratched the surface of some issue. (high achiever)

Amongst the average achievers, the study journals provided less data than those of the high achievers, but they did provide support for the above-described categories. The average achievers showed similar interest towards cooperative work and **knowledge sharing** as the high achievers, as is evident in the following quotes. It should be noted, however, that these quotes do not indicate the same enthusiasm as the quotes from the high achievers.

> The "great day" is continuing. After some initial difficulties we got into the topic, which means that the interactive discussion results in knowledge exchange. There are many participants and opinions "abound". (average achiever)

> The group discussion in the online environment has been fruitful and the issues are becoming clearer and I start to get my hands into the theme. It has been great to see that these internet discussions have been helpful – if I had worked alone with this, I would have been tripped on my own feet. (average achiever)

> For me, the online discussions have been a pleasant surprise. At first, I thought that I wouldn't be too enthusiastic about them, but now my husband needs to remind me that there's work to do around the house. (average achiever)

The average achievers demonstrated more use of **modelling strategies** relative to other collective learning strategies than the high achievers. In the first quote, the learner

compares his own achievement to that of the other group members, and in the second one, the learner is intimidated by the quality of work that some of the other learners have produced (in the quote, she is responding to a note written to her by a teacher).

> My written assignment is average in our group. Or I could say that [names two group mates] are on their own level and we others come after a small gap. (average achiever)

> Thanks for the relieving words. I was really feeling pressure after seeing the works that others have written because I think they have been very good. And that, if anything, causes stress when you wouldn't want to make a poor assignment, but, on the other hand, you are afraid that you could not make a good one. (average achiever)

Similarly, some learners in this grouping said that they were worried about their own performance in a group consisting of so many obviously skilled learners. Overall, the comments in this category show that the average achievers compared their own performance to the other learners, whereas the high achievers used comparing strategies to complement and develop their own understanding, or to gain confidence in their own point of view.

According to the analysis of the study journals, the average achievers did not express a strong drive to **seek feedback** for their own work. Whereas the high achievers quickly assumed the practice of sharing their work with others and providing and asking for feedback, the average achievers did not generally embrace this strategy. The following quote shows one example in which an average learner gave his/her essay to others to assess, but the quote does not show the same level of enthusiasm that many of the high achievers expressed in a similar situation.

> I put my work on the file area for others to assess. It's a completely different feeling from the one you have when you leave your work to the teacher for the final assessment. When you read others' work, you see where you are going yourself. (average achiever)

Most of the quotations that fell into the feedback seeking category amongst the average achievers were more direct attempts to seek help from the other group members than those made by the high achievers.

> Group work has been essential in these studies [. . .]. I have received invaluable help from my colleagues on my questions pertaining to the various topics and assignments... (average achiever)

> Tomorrow is the next discussion day. We'd need to get a bit deeper and focus on the issue. I'm still a bit unclear on what we are supposed to be doing, but I'm sure it will come clear to me tomorrow with the help of the other group members. (average achiever)

When it comes to the low achievers, their comments about their learning strategies were rare. The few comments that they made conform to those of the average achievers, but, for the most part, the low achievers wrote very little in their study journals.

7.3.3 High Achievers as Group Workers

The discussion in this chapter has shown many differences in the motivation and learning strategies of high achievers compared to average and low achievers. High achievers were not only found to be more willing to write about their studies in general, but were also found to be more intrinsically goal oriented, to see their studies as meaningful, to believe in their own control over their success or failure and to have high self-efficacy beliefs. Also, high achievers used more cognitive and metacognitive learning strategies than average and low achievers. They also planned their use of time and managed their study environment more efficiently than the learners in the other achievement categories.

In the present section (7.3), one of the goals has been to explore the group working skills and motivation of the learners and find out whether high achievers are also motivated and efficient group workers. This analysis was done through a detailed study of the references of the participants' study journals and their references to their feelings towards their group and their thoughts about the group's work. This analysis revealed several differences in the attitude of high achievers compared to other participants, both on the motivational scale and on the learning strategy scale.

When considering the way the high achievers worked in their individual groups, it is useful to recall the descriptions of the groups presented in Chapter 6. Simply taking a look at the number of messages the high achievers posted on the discussion board, it becomes clear

that they were generally amongst the most prolific group workers in terms of the number of messages posted. A total of four of the eight learners categorised as high achievers wrote well over twice as many messages as the average. Only a single high achiever wrote fewer messages than the average, but that may be the result of the fact that the group used also the file area for their discussion in addition to the discussion board.

As the descriptions of the learner groups in Chapter 6 show, the individual groups succeeded to different degrees in their studies. Whereas in Group 1 the high achievers helped the other members and the final entries from the last course show that the group started to work well together, the situation was not as good in some of the other groups. Whereas the motivational social support and groundwork in Group 1 was strong enough to persuade all the members to eventually take part in collective learning tasks and engage in collective learning strategies, all the other groups lost some members along the way. Of course, in some cases the learners quit despite good peer support, but, in others cases it may be that more support might have saved the group. One of the high achievers in Group 1 commented that he made telephone calls to the other members of the group when they had not visited the forum for a while and it is evident that the high achievers in that group supported the other members in their studies all the way. On the other hand, when Group 3 lost one of their members, it took a long while before the other members in the group reacted, and when they did they turned to the organisers of the course to ask what had happened rather than engage in their own corrective strategies.

These findings about the development of the individual groups already reveal that whereas high achievers were generally active group workers, not all of them went to the lengths that the high achiever in Group 1 did. In other words, although the collective learning strategies of the high achievers were highly developed, they were not always as highly motivated collectively. Also, as a quote from a high achiever in group 4 (repeated below from subsection 6.1.4) shows that even some of the high achievers saw a need to correct their attitude towards collective work during their studies and did not always enter the program as ready-made highly motivated group workers (quote is from the study journal entries written during the fifth course, while the learner was looking back at her own development).

> My attitudes changed somewhat, I understood that as a learner I have to invest more of myself, especially when I'm part of a group. It is easy to activate others when you try, otherwise the whole group will fall silent. (high achiever)

Overall, five new categories for collective learning were discovered in the analysis of the learners' study journals. Two of these, social groundwork and social support, were categorised under motivational abilities, while three were categorised under learning strategies: 1) knowledge sharing, 2) modelling, and 3) feedback seeking (See Table 7.1 below). In the analysis of the research data, it was discovered that the high achievers were generally strong in all these categories, although there were individuals who were not always willing to work very much on social groundwork and support. The average achievers showed slightly weaker enthusiasm for knowledge sharing and cooperation and were more eager to use peer learning strategies, particularly when their aim was to compare their own performance to others rather than learn from them. Similarly, the average achievers were not strong seekers of feedback on their work, and concentrated more on direct help seeking. The average achievers were generally also more negative towards social groundwork, the construction of a shared framework upon which to build. On the other hand, although they do not write as much about offering social support to others in return, the average achievers saw the social support that they received from others as very important to their own achievement. The majority of the low achievers showed less enthusiasm to understand their group peers, to engage in social groundwork or to engage into collective processing with others.

Table 7.1: Table of Motivation and Learning Strategies in Online Learning Environments

Motivational Aspects	**Learning Strategy Aspects**
1 Value Section 1.1 Intrinsic Goal Orientation 1.2 Extrinsic Goal Orientation 1.3 Meaningfulness of Studies	*1 Cognitive Strategies* 1.1 Rehearsal 1.2 Elaboration 1.3 Organisation 1.4 Critical Thinking
2 Expectancy Section 2.1 Control Beliefs 2.2 Self-Efficacy	*2 Metacognitive Strategies* 2.1 Planning and Self-Monitoring 2.2 Self-Evaluation
3 Affective Section 3.1 Performance Anxiety	*3 Resource Management* 3.1 Time and Study Environment 3.2 Effort
4 Social Motivation 4.1 Social Groundwork 4.2 Social Support	*4 Social Learning* 4.1 Knowledge Sharing 4.2 Peer Learning 4.3 Feedback Seeking

Thus, in terms of the research problem—"What is the connection between motivational and strategic abilities and commitment to group work?"—it was found that motivated learners, who are highly motivated intrinsically, find their studies meaningful and believe in their own abilities, generally also possess high motivation for group work. As noted above, the learners who possessed high motivational abilities also possessed well developed learning strategies, and thus these two characteristics describe the basic nature of the type of learner that we have been calling a high achiever in the present study. These high achievers worked actively in their groups and also beyond the group borders with all the other learners. They supported participants in other groups who seemed to be having difficulties in their own group.

It should be noted, though, that, even if high achievers may generally be highly active group workers, there is considerable variation amongst highly motivated learners with respect to how much they are willing to invest in supporting others. Although, in general, the high achievers showed a higher level of social commitment and tendency to personal engagement with their colleagues, there were those amongst them remained more formal and distant. The present study includes an example of a high achiever in Group 1 who earned praise from other group members for work done to support the others, but also includes high achievers who remained more socially aloof in the group context socially, even though they took active part in the collective processing of the learning tasks. For example, in Group 2 the social problems that group members referred to in their journals were apparently ignored and group energy was focussed on 'professional' execution of the learning tasks.

8 MODEL OF COLLECTIVE ONLINE LEARNING

If we knew what it was we were doing, it would not be called research, would it?
Albert Einstein (1879 - 1955)

The previous chapters have provided a wealth of information about the development and cooperation of the adult learner groups taking part in the research. They have also taken a look at the differences between high achievers and other learners with respect to motivation and learning strategies, including the collective aspects of these strategies. In addition, the correlation of motivation and learning strategies with participants' commitment to group work and their overall achievement was examined.

In the unadorned description and analysis of Chapter 6, it was revealed that although the learner groups had problems with cooperation during the studies, they also had high points during which they peaked in their performance, and many of the failings of the individual groups were alleviated by the cooperation over and across the group borders.

Chapter 7 provided a more in-depth analysis of the participants' motivational and strategic capabilities through two methods, a Likert scale APL questionnaire analysis using Bayesian methods, and a qualitative analysis of the learners' study journals. It was shown that the data derived from the journals generally supported the indications of the Bayesian analysis and it was possible to present an analysis of the qualitative variation in the learners' motivational and strategic capabilities. The main findings about learner motivation included the facts that high achievers were highly intrinsically oriented and had high control and self-efficacy beliefs. Also, the learners who discontinued their studies, or failed to complete them, generally saw their studies as less meaningful to themselves than did the other participants. Similarly, the main findings about learning strategies on the basis of APLQ showed that high achievers had stronger cognitive and resource

management strategies than the other learners. The study journals supported this finding, but also indicated that the high achievers used a wider array of metacognitive strategies than the other participants.

In addition to the importance of individual motivational and strategic abilities, Chapter 7 provided evidence to suggest that the collective aspects of motivation and learning strategies are equally important, if not more so, when the learners are using an online group learning environment. It was found that social support and social groundwork (the construction of social relations) are important to the continuing motivation of group members. In both of these areas, high achievers were generally stronger than their less accomplished colleagues, but the greatest differences between the high achievers and other learners was found in their approach to collective learning strategies. On the basis of the qualitative analysis of study journals, the author identified three main categories of collective learning strategies—knowledge sharing, modelling and feedback seeking—and demonstrated significant differences in the ways in which the different achievement groupings performed in respect to these strategies.

It is on the basis of the findings about high achievers and their differences to the other learners that a model of collective online learning will be constructed in this chapter (research question 4). More specifically, this model will explore the motivational and learning strategies that lead to, or support, learning in a collective context, and the factors that contribute to effective group work. Most importantly, from the point of view of the results of the present research, this model will present the collective aspects of motivation and learning strategies that lead to, or support, successful learning in online environments. The model is not intended to be comprehensive, but to focus on the type of learning that takes place in a collective online environment. The perspective that the author will bring to development of the model of learning was explained in the theoretical background (i.e., constructivist social cognitivism). Therefore, the purpose of the model is to draw out the specific factors that affect the quality of learning in online environments. However, before the model itself is presented, it is important to take one more look at the major factors that affect learning in a collective environment.

8.1 Factors that Affect Learning in a Group Setting

Drawing together the factors of collective learning presented in this analysis and the theoretical background presented in Chapter 3, it can be seen that the study brings together the most important aspects of individual learning, presented in section 3.4, and complements this theory with a new layer, partially based on issues presented in section 3.5 but more fully explored in the present research. The widely accepted view (see subsection 3.4.1) is that cognitive strategies are used by all learners and, according to one categorisation (Prokop, 1989) these include deep-level and surface-level strategies, demanding more or less complex mental processes (Bloom, 1956). In the APLQ portion of the present research, it was found that there was a statistical difference between low achievers and average and high achievers in the use of cognitive strategies. The qualitative analysis was based on the learners' study journals and thus it was limited in its ability to study the differences in the use of cognitive strategies. However, there was a marked difference in the fact that the low achievers neither used the study journals to write about what they had learned (note taking and repetition), nor mentioned the use of other cognitive learning strategies.

Holliday and Lewis (1999) found in their studies that effective learners used more metacognitive strategies than others and this finding was confirmed by the present study. High achievers used a wider array of metacognitive strategies and they used them far more often than other participants. Similarly, resource management strategies have been found to be used by successful learners (e.g. Ruohotie 2002a: 41) and the present research confirmed this view. Both the Bayesian analysis and the qualitative analysis showed clear differences in the way high achievers were able to manage their time, space and other resources during their studies.

The motivational capabilities of the learners were also found to be important, as was expected on the basis of the theoretical background research (subsection 3.4.2). The present research showed goal orientation, especially intrinsic goal orientation, to be a major factor in explaining the success of high achievers. Similarly, self-efficacy beliefs were a decisive factor, as was suggested by the background theory. Schunk (2001) found

that efficacy beliefs affected learners' choice of tasks and persistence at them as well as their effort and eventual achievement. In the present study, high achievers showed a clearly more developed set of efficacy beliefs than the other achievement groupings. Likewise, the attributions of the learners played an important part in their success. The scales of meaningfulness of studies and control beliefs both reveal this aspect of learners' motivational capabilities and, especially in the case of the meaningfulness category, it was found that the high achievers had more positive attributions than the other learners. Control beliefs seemed to be more equally distributed amongst the learners, both in the Bayesian and in the qualitative analysis.

The background theory presented in subsection 3.5 suggested that cooperation and collaboration is only possible if the learners in the group all have a good individual foundation for learning (Johnson & Johnson, 1994). This includes the ability to share knowledge and ideas, and accept criticism and feedback. In the present study, this was found to be a solid assumption and the difficulties and failures present in most learner groups arose from the fact that, in natural learner groups, all learners rarely possess such a strong foundation. Accordingly, Ruohotie (1999: 43-44) states that "professionalism is often confused with perfection or even omnipotence," which indicates that even experts may be reluctant to reveal gaps in their knowledge and become defensive when their views are challenged. Such human factors form a strong obstacle for idealised collaboration and cooperation in all groups, not only amongst students. Thus, in this context, any success can be viewed as a victory. In the present research, this background translated into two of the factors of the collective motivation category: social groundwork and social support. The background theory also proposed that learner groups share some of the same characteristics with individual learners (subsection 3.5.2). Both individual learners and learner groups are dependent on their goal orientation and efficacy beliefs. In the present research, these aspects of motivation became the basis for the third category of collective motivation, collective efficacy beliefs, which proved to be an important determinant of the success of the group on two levels: their inner stability and ability for cooperation, and their efficiency in the studies in general. The categories of collective learning strategies were formed entirely on the basis of the qualitative research of the learners' study journals, but they confirmed the importance of the procedural aspects of cooperation and collaboration that have been found earlier (e.g. subsection 3.5.3), which are knowledge sharing, feedback seeking and modelling strategies.

8.2 Model of Collective Learning

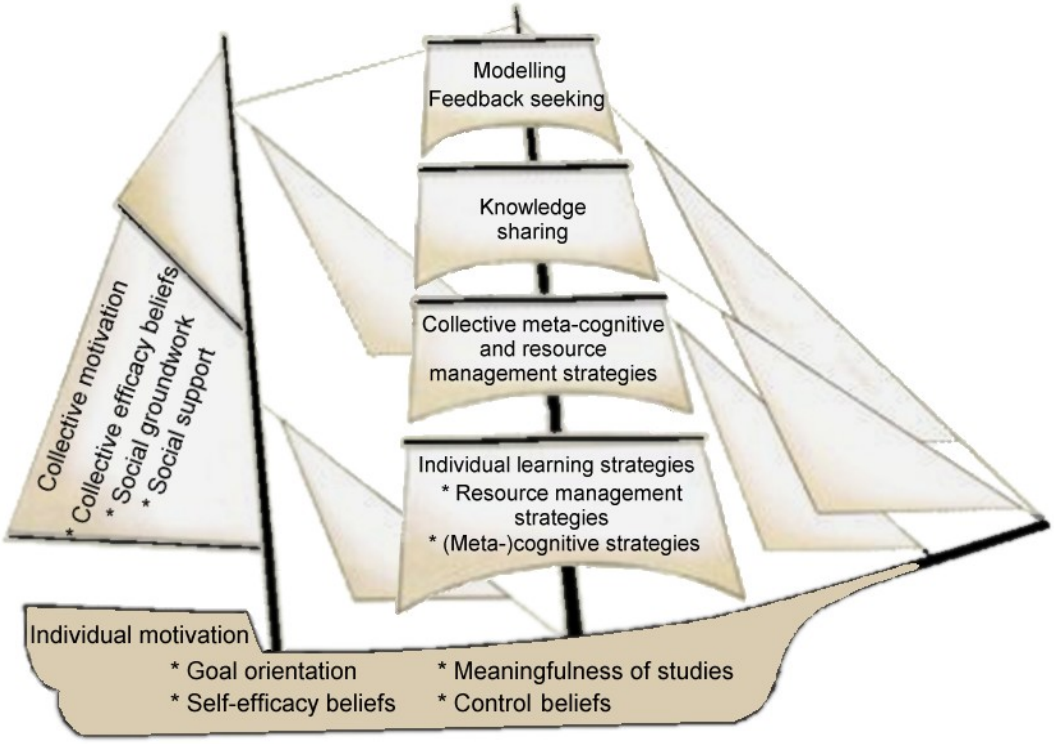

Figure 8.1: Model of collective online learning.

The above figure (Figure 8.1) combines all the motivation and learning strategies that were found to be important in the present study. In order to portray the conjoined nature of these concepts—the fact that all of these areas are needed for successful learning—they can be thought metaphorically as parts of a sailing ship (or, rather, a barque in this case). A ship needs all of its masts and sails in order to move forward and the hull alone would not move anywhere without their presence, it would merely be adrift. Following this metaphor, the individual motivation (goal orientation, self-efficacy beliefs, control beliefs and the feeling of the meaningfulness of the studies) form the hull of the ship, whereas learning strategies, both individual and collective, lie along the main mast. Thus, the model represents the idea that individual motivation alone is only a strong foundation for learning, but needs tools,

i.e. learning strategies, in order to lead to learning and, vice versa, even good learning strategies may fail if individual motivation is not strong. The learning strategies are located on the sails of the main mast, which is the main means that propel a ship forward when the weather is favourable. Collective motivation, on the other hand, lies along the mizzen mast, helping the ship sail against the wind (close hauled). Social support and groundwork, as well as the group member's belief in the group, are necessary when the learner group is faced with difficulties (wind). The following few paragraphs will further explain how this model works and how the different parts of the model are interdependent, or support each other.

Individual motivation, or the hull of the ship, forms the mainstay of learning. Goal orientation, more specifically intrinsic goal orientation, is one of the factors that sets high achievers apart from other learners. High achievers wish to learn for their own development, rather than extrinsic reasons. Referring back to Linnenbrink and Pintrich's (2000) division of mastery approach and avoidance states (see section 3.2), the high achievers in the present study were generally interested in learning and understanding, which conforms with the approach mastery state of goal orientation. However, it has to be noted that neither the APLQ nor the qualitative analysis purposefully differentiated between these approach and avoidance orientations. Another important factor of successful learning is the concept of self-efficacy beliefs. High achievement is joined at the hip with trust in one's abilities to perform at the required level in learning, while high achievers are also further motivated by their own success in their studies. A further integral part of individual motivation is the feeling of the meaningfulness of the studies. Learners who attribute their studies positively will be more motivated in their learning. The present study also lent support to the view that the learners' control beliefs are important to their success, but this factor was not as strongly apparent in the qualitative analysis of the study journals.

All in all, individual motivation, is the core and basis of learning, upon which learning strategies and other factors build. Thus, motivation alone cannot make learning happen and a motivated individual needs personal tools and social support in order to achieve his/her learning goals. In the case of the ship metaphor, these tools and help are represented by the ship's sails. The metaphor also works perfectly to show that neither the sails nor the hull can progress alone. Learning strategies naturally need a motivated individual to use them: an unmotivated learner will neither use learning strategies nor seek information elsewhere.

Individual learning strategies, or the main course sail of the ship, are the basic tools that a learner needs in addition to motivation in order to learn. In the present research both cognitive and metacognitive strategies proved to be important indicators of difference between high achievers and other learners. High achievers used a wider array of cognitive, as well as metacognitive, learning strategies than the other learners. Similarly, high achievers are generally able to find a time and place for their studies even when their personal lives are in difficulty. Together, the mainsail and the hull of the ship in the above figure combine to create a model of learning from the constructive cognitive point of view, which omits the social dimension of learning. The present study has shown that in an online learning environment it is important to also consider this social dimension.

Collective motivation, or the spanker on the mizzen mast of the ship, forms the next most important area of online learning. Similarly to the relationship between individual motivation and learning strategies, group activities and shared learning requires strong collective motivation but collective motivation is of little use if the individual members of a group do not possess the skills needed for learning. It is important that all the group members trust in their group and its ability to solve the learning problems that they encounter. However, the present study showed that it is perhaps even more important that the group members believe in the group's ability to work together. Both shared trust in the group's abilities to work together and the ability of its members to learn together are aspects of collective self-efficacy beliefs. However, in addition to beliefs and trust, group members need to be willing to build their group socially (social groundwork) and to support each other (social support). Efficacy beliefs are insufficient without the skills and the will to work on the group's social structure, but these three areas support and develop each other when they do exist. When a group has members who are willing to work with the group and work on getting the group members to work together and support them when needed, their self-efficacy beliefs will increase, which, in turn supports further motivation to work on the social relationships in the group. Social groundwork and support also translate into the development of trust between the group members, which is an important basis for collective learning strategies, especially the willingness to share one's knowledge and one's questions.

Collective learning strategies—or the main top sail, top gallant sail and royal sail—are the main tools an online learner group requires to learn together. The order of these strategies on the sails represents the order of importance they have in a group learning situation. The most important skills are the collective metacognitive strategies, the ability to collectively monitor and adjust the working methods and learning methods of the group, and resource management strategies, the ability to arrange for time for the studies with the other group members and to use the resources of the online/virtual learning environment. It is important that these collective metacognitive and resource management strategies are established as the basis of collective work. If they are not, the strategies listed in the sails above them will not work the way they should. Without this basis, feedback seeking and modelling will easily revert into simple help seeking and comparison of one's performance against others. For a high achiever, feedback seeking and modelling are active, positive strategies, aiming to increase one's own understanding. Knowledge sharing, on the other hand, refers to the learners' ability (and willingness) to share their own knowledge with the other group members and to use this knowledge, and that of others' to construct new knowledge.

Whereas collective metacognitive strategies and resource management strategies form the basis for collective learning, and feedback seeking and modelling are necessary strategies for learning in a collective setting, the ability to share one's own knowledge openly is one of the most important strategies to make collective learning work. Selfish learners, or learners who are too timid to reveal the weaknesses or holes in their knowledge, hinder learning in a collective setting and upset the balance of work in a group setting. As was discussed above, collective motivation and social support and groundwork help build the mutual trust needed to share one's knowledge with others. Thus, collective motivation is of the foundation for all collective learning strategies and supports them in the same way an individual's motivation supports his/her learning strategies.

Although the present research has focussed primarily on factors that are intrinsic to the individual and the group in a collective learning setting, it is important also to take a look at the factors that are extrinsic to the group, which also affect the group and its ability to learn. The most important of these factors are, naturally, the teachers of the courses and the online/virtual learning environment. As the analysis of the group work in Chapter 6 indicated both of these factors affected the groups in their work. The teacher's effect was

clearly evinced by the fourth course, about which many learners commented that the teacher had motivated them to work again and even those who had fallen silent before were reactivated and took part in the learning activities. Thus, it is clear that sometimes in practical situations good, well-planned outside support may do more for a group than the group themselves can. Similarly, the design of the online/virtual learning environment that the learners use can either support or hinder their collaborative group work. In the case of the present research, the VLE caused some difficulties, mainly because of the old-fashioned and difficult-to-follow discussion board, slow database retrievals, and the very unintuitive file upload and download area. However, none of the learners actually quit their studies, or failed in them, because of the learning environment, although it caused them some grey hairs on a few occasions. The next chapter (Chapter 9) will further explore some of these issues, as well as the reliability of the present research.

9 DISCUSSION

> 'I wish life was not so short,' he thought. 'Languages take such a time, and so do all the things one wants to know about.'
>
> J. R. R. Tolkien, The Lost Road

The present study aimed to create a model of learning in online learning environments, focussing specifically on adult learners and learning methods that involve group work. This learning model was created based on data that came from the learners themselves and the main research methods involved both qualitative and quantitative analysis. In order to construct this model, the study analysed the differences in the cooperative effort of the learner groups over the course of their studies. This analysis was the basis for the next step, in which the strategic and motivational learning abilities of the high, average and low achievers were compared and contrasted. These findings then formed the basis for the learning model, alongside the analysis of high achievers' commitment to group work. The learning model itself presented the individual and collective motivational and learning strategies that support learning in a collective context, all of them together factors that are important to learning in a collective online learning environment.

The main result of the study was the model of learning in online learning environments for adult learners and group learning setting. This model combined earlier research on individual motivation and learning strategies and added to it a new level of collective motivation and learning strategies. Individual motivation and learning strategies had been previously widely researched with quantitative methods and, thus, in order to combine these factors with the collective approach, the present study also relied partly on quantitative methods, although primarily on qualitative for the purpose of new theory formation. This model of learning is useful when one attempts to understand the intrinsic processes of adult learner groups and their motivation and learning strategies. This

knowledge can also be useful when trying to solve social problems in learner groups, or to find reasons for success or failure in the formation and functioning of learner groups.

Another result of the present study was the data on the qualitative variation of both individual and collective factors of motivation and learning strategies. These results support better understanding of the factors that are already in use in, for example, the APL questionnaire as well as the MSLQ. Furthermore, the new research on collective motivation and learning strategies will provide a basis for the extension of these earlier questionnaires.

From the author's point of view, the study succeeded in answering the research questions. An attempt was made to keep the description of the research setting and the functioning of the learner groups as close to reality as possible for an observer who aims for objectivity, while also trying to understand the learners and their individual characteristics. It was also an aim to not make it seem that the learner groups, or the cooperative/collaborative work, were more successful than they really were. After all, the research participants were all human beings and nothing that human beings do can succeed perfectly. It is thus important to study the failures as much as the successes, and never ignore or obscure either, since such attempts will only lead to the distortion of the research and diminish its potential value.

The research methods were suitable for the present aims, but it must be admitted that further delving into the various areas under study might have been possible through the use of in-depth interviews with the learners. This might be one of the possible next steps to enhance the reliability of the categorisations of collective motivation and learning strategies. The data would also have allowed for a deeper study of the learner interaction on the discussion forums of the virtual learning environment. This kind of a discourse analysis might also have led to a deeper understanding of the functionality of the learner groups. However, as the aim of the present study was to examine the impressions and thoughts of the learners themselves, this methodology was not included. A third weakness of the research method was the number of research participants. Although a larger group would have produced even more material and might have led the researcher to pick and choose which study journals to study more carefully, it would also have given the Bayesian analysis of the APLQ more material to work on. As it was, there were aspects of this

analysis that would have provided more decisive results with a larger number of respondents.

Furthermore, one could have considered such factors as personal life situations, work schedules and so on in the creation of the model. Yet, it should be noted that, in a way, all these external considerations have already been implicitly taken into account in the present research. It was not necessary to study the effects of the learning environment or the teacher-learner interaction in order to build the model of collaborative online learning, because all these factors, or the ones that could be controlled in the research setting, affected all of the learners in similar ways. All the learners attended the same courses, were taught by the same teachers and worked in the same online learning environment. The external factors that did chance were the personal life situations and employment of some learners, but the effects of these events on the final model were minimized by the decision to group the learners into three achievement groupings.

In the opinion of the author, the data gathering methods used in the present research led to a reliable set of data, which, in turn, led to reliable and trustworthy analysis and results. The data, which consisted of the research participants' written journals, was deemed more reliable than interviews, because by using the written format participants were required to actively think of what they wrote, which ensures that the accounts reflected their opinions and beliefs. In spoken interviews, the interview situation often makes people more timid about what they say and only accesses emotions and thoughts that are active at that very moment, whereas written accounts, because of the fact that they are written over a long span of time, reflect more reliably what the research participants generally think. This leads to a more reliable body of data, which potentially makes the analysis and the results more reliable as well.

The analysis methods in the present research included quantitative phenomenographically oriented study of the learners' journals as well as Bayesian analysis of the APL questionnaire. The phenomenographic categorisation of the topics and issues that the participants brought up in their texts was done before the data provided by the APLQ was run through the Bayesian analysis programmes and analysed. The categorisation was also done before the author turned his attention to the previous categorisation of learners' motivation and learning strategy categories. This approach forced the author to concentrate

on the data itself and not use pre-determined categories to reflect the data. When the qualitative categories were finally compared to the categories used in, for example, APLQ, this was done without doing damage to the data itself. Again, all steps to ensure the reliability of the analysis were taken by describing the research process in as detailed a way as it was possible in Chapter 5.

It is the point of view of the author that the results and findings of the present study can be generalised to the extent that the same type of findings can probably be found from any group of adult learners, most likely even if they worked in natural face-to-face settings. Therefore, the model of adult learners in online learning environments will be transferable to other situations, as long as it is recognised that face-to-face groups develop faster than groups that meet only online or only rarely physically. It is also the opinion of the author, that the model adequately describes the kind of processes that affect group learning and correctly considers motivational factors as being most important for both individual learning and for collective learning. The descriptions of the qualitative variation, and their usability in the further development of, for example, the APL questionnaire cannot be judged at this point, but it is the author's view that the descriptions should be valuable when developing statements for the questionnaires in the areas of collective motivation and learning.

The present study provides ample grounds for further research. It has already been mentioned that in order to dig deeper into the phenomena of cooperation and collaboration, the author could have performed discourse analysis on the messages posted on the message boards. This material still exists and could be used in another study. Also, it was already mentioned that individual interviews of specific learners might have provided valuable new, or deeper, information. This is also a road that is open as all the research participants can still be contacted.

In addition to these simple extensions to the present research, the results also beg for some further research to find out if the categorisations of collective motivation and learning strategies proposed can be turned into statements in a quantitative questionnaire and, through further statistical analysis, confirmed. The proposed model of collective online learning would also deserve more research, both from other points of views, as well as by deepening certain aspects of the present study, such as the collective motivation and

learning strategies. These aspects were introduced by the construction of the model, but based only on a single study, their exact definition and in-depth analysis were not possible, or, rather, such definitions would have lacked a strong foundation. Further research into these collective areas of motivation and learning strategies would be a welcome addition to the theoretical understanding of motivation and learning strategies.

When the results of the present study are viewed from a wider perspective, they can be seen as highly important to not only the research of motivation and learning strategies, but also to online teachers and developers. For these groups, a deeper understanding of the forces that are at play in a collective learning situation is necessary if they want to support the learners in their online work, and to design assignments and online activities that support the growth of the learning groups, so that the learners start to respect the qualities of their group members and learn to support each other in learning. These findings are similarly important to administrators, who will perhaps more fully realise what the present changes in the information society, and the ways to learn and provide education, mean to the practical work of the teaching staff. In order to successfully foster motivation and learning in online learning environments, it is necessary to properly educate the teachers in the use of this specialised working environment. Additionally, the online learning environments should be designed in a way that make their use as easy as possible, taking into account the differing skill sets of the potential learners, as well as their differing means to access such online work environments. Both of these aspects require changes in the way administrators view the act of providing education and its costs and benefits.

Another aspect that requires attention is the continuously developing technology. Even as we speak, technology is providing us with more advanced means to work together in online environments. Some of these advancements will not be practically usable before they are accessible to the majority of potential students and learners, but we should start thinking of the significance of these changes now, rather than later. As it is, online learning environments were taken into use well before there was a good theoretical understanding of how they affect learning and teaching. And this understanding is still incomplete. Thus, rather than wait until the new technologies are in everyday use, we should start studying how the use of real virtual environments (with the advances in computer graphics, 3D modelling, and interface equipment, such as virtual gloves and Heads-Up Displays) will change the learning situations, how they will change the learning environment and the

ways to provide education. It would be especially interesting to study how virtual interaction (using 3D glasses and virtually realised 3D environments) will bring distance learners closer together and whether these advancements in technology will bridge the gab between face-to-face interaction and virtual interaction. To what extent these new environments would allow us to still maintain the degree of anonymity that the present environments do and if these environments, where you actually see your peers and your teacher, will make it harder for some students to merely lurk in the environment and provide the social pressure for them to take part in the group work.

It is the present authors view that these future advancements will not take away the need for further understanding of motivation and learning strategies, nor their collective aspects, but they do make it necessary to better understand the contexts in which motivation and learning strategies develop and how they can be supported. Thus, it is important to realise that learning environments have a real and immediate effect on the learning process, even if the fundamental learning processes inside the learners' minds remain the same.

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APPENDICES

Appendix 1: The Items in APL Questionnaire

Part A Learning Experiences and Motivation

1. I prefer to study theoretical subjects and work on tasks which are demanding and from which I can learn something new.
2. I am able to learn even the most difficult subjects if I use good study methods.
3. During an exam I wonder how I am performing in comparison to other students.
4. In my opinion professional skills can be acquired through practice without theory lessons.
5. I believe that theory lessons will prove useful in practical training and later in working life.
6. I expect to get excellent grades in my vocational/occupational studies.
7. I am confident that I understand even the most difficult aspects of my studies.
8. I want to receive as high grades as possible.
9. While answering essay questions I am concerned about other questions on the test that I cannot answer.
10. It is my own fault if I fail to learn theory.
11. It is important for me to learn theory related to my profession.
12. I am confident that I will learn the skills related to my field.
13. I am only interested in mastering learning tasks that are required in real working life.
14. Nervousness during exams affects my performance.
15. Studying often feels burdensome and/or frustrating to me.
16. When taking part in a practical examination I am concerned about failing and what will happen as a result
17. I am confident that I will learn even the most difficult theoretical subjects and work tasks.
18. I prefer to study theoretical subjects that interest me even if I find them difficult.
19. I am very interested in my field of study as well as in the new information related to it.
20. I will acquire the required professional skills if I work hard enough.
21. I am really nervous in all test situations.
22. I am confident that I will do well in my studies.
23. I find it most rewarding when I can research a subject as thoroughly as possible.
24. I believe that my vocational/occupational benefits (studies?) will be of practical benefit to me.

25. When given an opportunity I choose exercises and literature from which I can learn something new even if it means receiving lower grades than I could get by choosing those that I already know something about.
26. If I do not understand theory, it is because I am not trying hard enough.
27. It is important for me to do well in my studies and show others (my family, friends, colleagues) what I am capable of.
28. It is essential for me to understand the topics contained in my vocational/occupational studies.

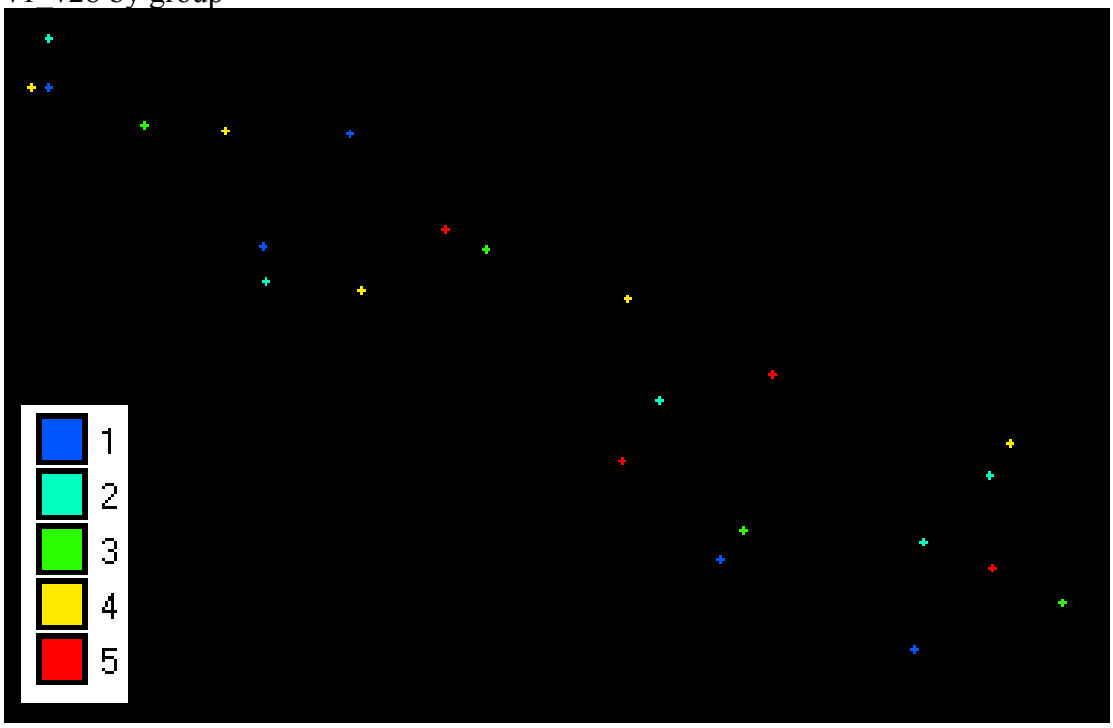
Part B Study Habits

29. I follow a certain schedule in studying.
30. Many important topics remain unclear to me because my thoughts are occupied by other things during lessons.
31. I often tell others what I have learnt.
32. I clarify things that I am learning during lessons by asking questions and participating actively in discussions.
33. I attend lessons regularly.
34. I often feel so lazy and bored with reading that I discontinue studying.
35. I often ask myself questions about what I have heard or read in order to check the validity of the information.
36. I practise theory-related matters by explaining them to myself repeatedly.
37. I try to deal with things by myself without help from others.
38. If something is unclear to me when reading, I go back to what has already been read and try to understand the issue.
39. When reading professional literature I aim to distinguish the essential from the less important.
40. I use the time reserved for studying efficiently.
41. I set goals for learning in order to direct the course of my studies.
42. I try to collaborate with other students in doing exercises and studying for exams.
43. I am able to utilise my work experience in my vocational/occupational studies.
44. When I encounter a theory, explanation or conclusion of a certain phenomenon during a lesson or in literature, I try to find evidence to support it.
45. I work hard in order to pass my courses even if I do not like all the readings and exercises.
46. I prefer to study those theoretical subjects that interest me even if they are difficult.
47. I often discuss my work practice related experiences with other students.

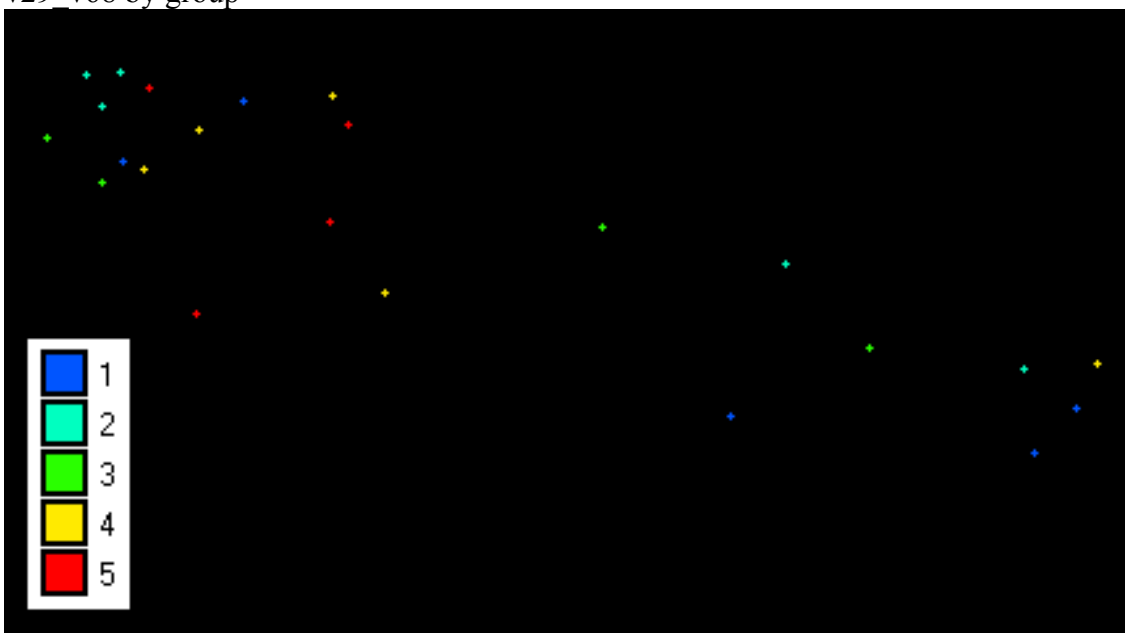
48. I analyse my experiences gained during practical work a great deal.
49. I learn best through practice.
50. When reading professional literature I combine information from various sources (such as notes, textbooks, discussions, work experience, etc.).
51. Before reading a new text I first glance through it to see how it is structured.
52. During work practice I ask myself questions and think about the relationship between theory and work experience.
53. I try to adapt my learning strategies to fit each teacher's expectations and style of teaching.
54. Before performing a certain work task I go through the different stages of the task in my mind.
55. I seldom have time to go through notes and review literature before an exam.
56. I memorise key words, which helps me to retrieve important concepts and associations.
57. I often give in when studying difficult subjects and concentrate on easier aspects.
58. When reviewing literature I first try to outline the whole subject matter and then decide what I will concentrate on in my studying.
59. I like to think further about things I have learned and what I have really acquired in relation to my future profession.
60. I make notes when reviewing literature.
61. I learn most from practical training.
62. I often wonder how to apply education-related knowledge and experience to my future profession.
63. I try to elaborate on my own thoughts based on what I have been taught.
64. I have no difficulties in following things through even if I find them uninteresting.
65. I find practical experience beneficial in acquiring professional skills.
66. I often compare my own performance/achievements with those of other students.
67. When completing work practice I often wonder how I performed and how I could improve my performance.
68. I want to receive performance-related feedback from my teachers.

Appendix 2: Bayesian Unsupervised Visualization

Motivation in APLQ
v1_v28 by group

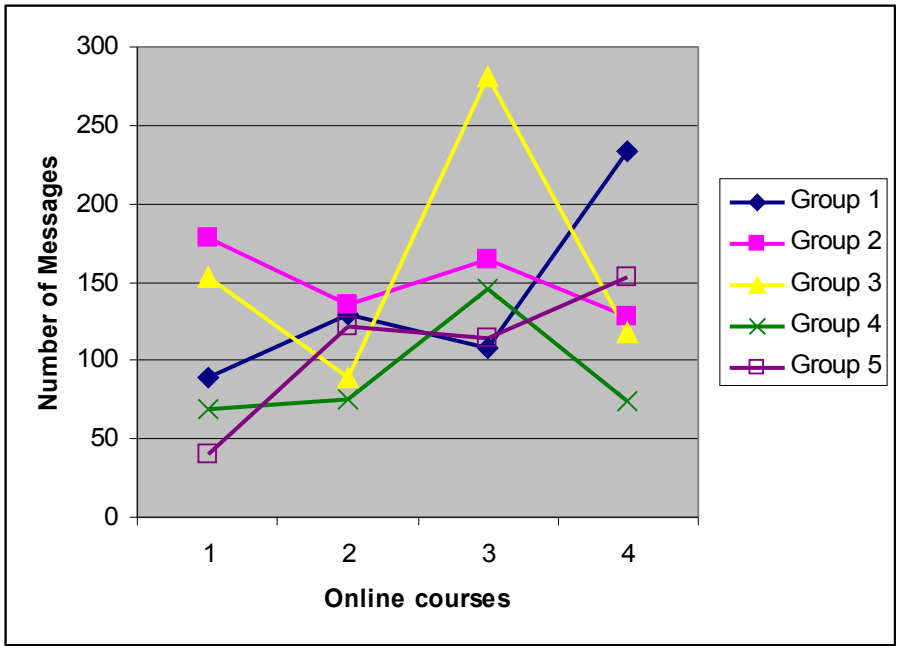


Learning Strategies in APLQ
v29_v68 by group



Appendix 3: Learner Activity in the Online Learning Environment

Number of Messages each Group Wrote during the Four Courses



Average Number of Messages Written by Learners, Grouped by Age