Chapter 5 Summary, discussion, recommendations and conclusion

5.1 Introduction

This chapter starts with a summary of this research in paragraph 5.2 followed by a discussion and reflection about the theoretical and practical contribution of this research in paragraph 5.3. The final paragraph 5.4 contains recommendations for policy and practice as well as for further research.

5.2 Summary

Research has been done about the influence of ICT and the information society on the labour environment of employees in general, but limited research has been done to the influence of ICT and the information society specifically for managers, whereas a need for such research exists (Yukl, 2006). Furthermore, research about the influence of the information society and ICT on the labour of employees is often conducted with the focus on one of a limited number of aspects that are considered new ways of working in the information society. In this research an attempt was made to obtain a global overview of all the aspects that are related to this topic for the officers in the Netherlands Defence Organization (NLDO) with a focus of the implications thereof for the development needs of the officers. Educational research founded in practice and translated to education is encouraged by Reeves e.a. (2005). Hence this research appears to have relevance both for the development of theory as well as for practical implementation in the Netherlands Defence Academy (NLDA).

The theoretical purpose of this research was to contribute to the knowledge field of management and ICT by obtaining insight in the influence of ICT and the information society on the labour environment of managers in general and officers in the NLDO specifically, by answering the first part of the main research question:

What is the influence of ICT and the information society on the labour situation of officers in the Netherlands Defence Organization?

as well as the second research question:

What are the information, communication and technological competencies required by managers in the information society?

The first part of the main research question is answered by answering the following sub-questions:

- How do officers in the NLDO use ICT in their work situation?
- What is the influence of ICT regarding info-stress, mobility, productivity and confidence of the officers in the NLDO in their work environment?
- What are the software applications that officers in the NLDO use in their work environment?
- What are the ICT- competencies required by officers in the NLDO?
- How competent are the officers of the NLDO in their own opinion regarding some of the ICT-competencies?
- What are the ICT-related competencies required by officers in the NLDO?
- How competent are the officers in the NLDO in their own opinion regarding the identified ICT-related competencies?

The second research question is answered by analyzing the results of the questionnaire in order to evaluate if support is found for a general model for a general model for information, communication and technological competencies required by managers in the information society.

The practical purpose of this research was to contribute to the innovation practice of the implementation of a digital learning environment in the Netherlands Defence Academy (NLDA) by considering the implications of the changed labour environment, changed ways of working and required competencies in relation to the training need of officers by answering the second part of the research question:

What are the implications of the influence of ICT and the information society on the labour situation of officers in the Netherlands Defence Organization for a digital learning environment of the officers in the Netherlands defence academy?

By answering the following sub-questions:

- What are the ICT- and ICT-related competencies that need to be developed during the initial training of the officers in the NLDA?
- How can a digital learning environment be used to support the development of the ICT- and ICT-related competencies of officers in their initial training in the NLDA?
- How can a digital learning environment be used to support the development of the ICT- and ICT-related competencies currently working in the NLDO?

The research was conducted in the NLDO by having twenty in-depth interviews with experienced officers from a variety of function areas in order to obtain a expert perspective from the working field, followed by a questionnaire that was send to an a-select random sample of 700 officers in order to obtain an overall perspective from the working field. The questionnaire was completed by 246 respondents. A discussion group consisting of nine students concluded the collection of research data in order to obtain a perspective from newcomers in the working field. The research results were analyzed using a combination of qualitative and quantitative techniques.

5.2.1 How officers in the NLDO use ICT in their work situation

The implementation of ICT has brought about considerable changes in the labour situation of most of the officers in the NLDO and the officers expect that their labour situation will continue to change as a result of changes in ICT in the future. Dealing effectively with information has always been important in the NLDO, but the way in which the organization deals with the information has changed considerably as a result of the implementation of ICT technology. Communication has also changed as a result of using ICT in the work environment and effective communication using ICT is increasingly important in the NLDO.

Most of the officers in the NLDO spend a substantial proportion of their time using the PC; on average between 20 and 21.9 hours per week. Differences do however exist between the average use of the PC and the main function area of the officers. Officers use on average between 1.6 and 2.3 hours per week on the Internet and between 3.2

and 4.3 hours per week on the Intranet of the NLDO. Officers receive on average between 17 and 20 e-mails per day, although this amount varies considerably.

Officers working in the operational units often experience frustration because ICT-facilities are in their opinion sometimes insufficient to their needs and inferior to the facilities that are available to their colleagues that are in office functions. They find this especially frustrating since they regard their work as 'core business' and the work of their colleagues in the offices as supportive of operational units. However, without the administrative support of the colleagues in the offices the operational units would not be able to operate effectively.

5.2.2 The influence of ICT regarding info-stress, mobility, productivity and confidence on the officers in the NLDO

In table 5.1 the results in the respective scales measuring info-stress, productivity and confidence are illustrated.

Table 5.1 The results of the scales measuring info-stress, productivity and confidence

ICT-related competence Scale	Central tendency	95% confidence interval for mean		Cronbach's alpha
		Lower bound	Upper bound	
Info-stress	Applies seldomly	2.2	2.3	0.64
Productivity	Applies partly	3.3	3.5	0.7
Confidence	Applies*	3.4	3.6	0.8

*between 'applies partly' and 'applies mainly'

Despite the changed ways of dealing with information in the organization using the available technology and applications, most officers do not experience serious info-stress, although some officers do experience stress since they are not able to work effectively with the available technology and applications. Furthermore, the amount of information and e-mail that officers receive as well as ICT problems cause info-stress.

Working from home instead of the office is not common practice for officers in the NLDO, although a few officers do work from home. The officers find working at home in general productive. Officers work on average between 2 and 2.9 hours per week overtime at home in addition to their regular office hours. Officers working in the Royal Military Police work on average 4.8 hours overtime which corresponds with other results in this research whereby officers working in this sub-organization indicate that they have a very high workload. During the day they are mostly busy with fieldwork and the administration is often done at home during the evening hours.

More than half of the officers communicate via e-mail internationally and communicate with other professionals about their work. Most officers experience a need to receive information immediately as it becomes available and regard mobile technology as an opportunity to facilitate this. Mobile technology is thus regarded as important in the working environment, especially during missions and officers are in general aware of the security risks in this regard. Some officers use mobile technology to use their travel time effectively, for example when they travel by train. Video-teleconferencing and online conferencing is not generally seen as an alternative to face-to-face meetings, which is surprising since the organization is dispersed over many locations across the Netherlands and both time and expenses could be saved when such methods are used instead of face-to-face meetings. However about a third of the officers does see the advantages of this means of conferencing. Mobile technology is also seen as a means to instruct subordinates and coordinate activities and e-mail is regularly used. When the officers take part in a mission they are always contactable, therefore some officers prefer working office hours only when they are not away on a mission and do not want to be permanently available.

Most officers have the opinion that ICT in their labour environment has made them more productive, although about a third of the officers lose production time because they are not familiar enough with the software applications they are required to use. A number of respondents have indicated that in their opinion the perceived slow connection to the Internet influences their productivity negatively. A number of officers indicated that they find it difficult to find the required information on the Intranet of the NLDO and especially

the search engine used on the Intranet was indicated as an important negative factor in this regard.

Most officers are fairly confident in using ICT in their labour environment; however there are a substantial number of officers that are not confident in using ICT. The lack of confidence is often caused by a lack of knowledge about ICT and not being able to find required information using the Internet. Interesting to note is that male officers are slightly more confident in using ICT compared to their female colleagues. Furthermore, there exists a positive correlation between the private use of the PC by the officers and the confidence in using ICT in the labour environment.

In table 5.2 is shown what the results are of using factor analysis on the scales for info-stress, productivity and confidence. Knowledge about ICT appears to be an important factor in all three the scales.

Table 5.2 Principal components extracted from the scales measuring info-stress, productivity and confidence

Scale	**Principal components**	**Explained variance**	**Number of items**
Info-stress (65% of variance explained)	Amount of information and e-mail as well as e-mail not relevant for work	26%	3
	ICT-problems	21%	2
	Lack of knowledge	18%	2
Productivity (41% of variance explained)	Lack of knowledge	41%	4
Confidence (57% of variance explained)	Knowledge about ICT	26%	5
	Finding information using the Internet	16%	2
	Organizing information, e-mail and the Intranet of the NLDO	16%	3

5.2.3 Software applications that officers use in their work environment

In general it can be said, based on the results from the interviews, that applications change with time, are dependent on the choices that are made by the top in the organization and that the need for applications is dependent on the main function area of the officer. It is interesting to note however that the results of the quantitative research only showed a few minor significant differences in the use of general applications related to the main function area of the officer. The perceived importance of some of the applications in the labour situation does however seem to relate to the rank of the officer.

5.2.4 ICT-competencies required by the officers in the NLDO

Officers need to be able to think systematically in terms of the information processes and translate this into relevant information products. Officers indicate that those processes and products are different in different function areas.

In general it can be concluded from the research results that most officers need to be able to use the MS Office applications to an advanced level, although MS Access is not required by all officers. Working effectively with the electronic agenda that is included in MS Outlook is also regarded as important. Dealing effectively with archiving e-mail and other documents as well as dealing effectively with shared documents is also found to be important. Furthermore, the officer needs to communicate in a socially acceptable way using e-mail dependent on the role, position, the situation and the topic and the officers need to be able to communicate effectively using the technology, for example in presenting management information in a correct format.

The Internet as well as the Intranet of the NLDO are seen as important sources of information and being able to search effectively is regarded as an important ICT-competency.

Information management systems, including management information systems are seen to be either important or very important by a large number of officers in the working situation, although about a third of the respondents to the questionnaire do not use those systems. MS Excel is often used to present management information and officers need to be able to analyze information presented by others using applications like MS Excel as well as being able to present management information in an appropriate format avoiding unnecessary information. It is also seen as important that officers are able to give clear instructions to subordinates regarding information needs as well as the required format in which the information needs to be presented.

Project planning applications are not widely used, although the officers that do use those systems regard it as an important tool in the NLDO since they are of the opinion that most officers have an important role as project manager.

Electronic cooperation systems, competency management systems and tools to organize the thoughts like Mind Manager, are not widely used yet. A number of officers indicated that they were unfamiliar with these systems. The officers who used these systems regarded them as important and some indicated that they would have liked to know earlier in their working life that they existed.

Furthermore, a conceptual insight in generic functionalities of applications and exchange of data between applications was seen to be important although some officers thought that this aspect should be covered by experts. Officers that were not able to use some of the applications effectively experienced a sense of inadequacy in their working environment because the implication is that they cannot make decisions independently when necessary. Some officers said that the officer is often confronted with unknown applications when participating in an operational mission and that there is limited time to learn those applications. This aspect enhances the need for conceptual insight in generic functionalities so that it is easier to learn to use applications effectively. During operational missions officers need to be able to work effectively with command and control as well as battle management applications. One officer emphasized the importance of a digital care system in which medical and personal information is recorded and which is used by officers during missions.

5.2.5 Competence of the officers regarding some ICT-competencies

It needs to be noted that in this section competence is not measured against specific performance criteria, but is an indication of commitment (attitude), knowledge about as well as skills and behaviour using ICT in the labour environment in the opinion of the officer of the NLDO.

5.2.5.1 Operational ICT-competence

In general officers have the opinion that they are fairly competent in using the applications effectively and that they have enough insight to deal effectively with ICT in their working environment, although there are a substantial number of officers (at least 30%) that have indicated that they are often not sure how to use ICT, including applications in their labour environment effectively. It is not investigated to the level of specific applications. Male officers evaluate themselves more competent in using ICT than their female colleagues do.

There is a positive correlation between the private use of the computer and operational ICT competence.

5.2.5.2 Structural ICT-competence

Remarkable is that more than half of the respondents have indicated that they are not competent to find the quality information that they require for their work when needed, using the Internet and Intranet of the NLDO.

There is a positive correlation between the private use of the computer and structural ICT competence.

In table 5.3 is shown what the results are of using factor analysis on the scales for ICT-competence. Knowledge about ICT, using software effectively and being able to find information effectively are identified as important components.

Table 5.3 Principal components extracted from the scales measuring ICT-competence

Scale	Principal components	Explained variance	Number of items
Operational ICT-competence	Using software effectively	33%	3
	Knowledge about ICT (software, networks and hardware)	33%	3
Structural ICT-competence	Finding information on the Internet	27%	4
	Need to learn about finding information on the Internet	23%	2
	Finding information on the Intranet of the NLDO	18%	2

5.2.5.3 Strategic ICT-competence

About half of the officers are in their opinion able to evaluate the credibility of information on the Internet and are able to identify and recognize important information. However a relatively large proportion of officers experience difficulty in this regard.

Female officers have a lower score for the questions in this section compared to their male colleagues.

5.2.6 ICT-related competencies required by the officers in the NLDO

ICT-related competencies are stipulated in this research as competencies (indicated by a combination of knowledge and insight, skills and behaviour as well as attitude) related to changed ways of working as a result of the changes brought about by the information society, especially in dealing with new opportunities and challenges that are created by the information and communication technology and globalization. These competencies include a leadership component.

Changed ways of working in the organization are identified in the following areas:

- Creating and participating in a learning organization, including knowledge management and communities of practice
- Competency management
- ICT-security awareness management
- Management of change
- Management of innovation

It is recognized that the mentioned items have played a role in organizations before the introduction of information and communication technology, but especially since the creation of networks and mobile technology the importance of dealing with those aspects digitally and often with a changed focus is emphasized. The role of the officer in influencing the strategy, implementing the strategy and influencing their subordinates in participating in the new ways of working was investigated as well as their role in managing change and innovation. From the interviews however, it became clear that the strategic top of the organization, often from the rank of Colonel and higher take the important strategic decisions and are responsible in selecting suitable applications and technology for the organization. Project groups are often involved in advising on those issues and some of the officers have the opportunity in influencing the strategy through participating in those project groups. However the officers from the research population have indicated that they have limited influence on a number of important decisions in this regard. Some officers find that more consultation before decision-making would be an improvement, since the officers are familiar with the situation on the work floor and they play an important role in implementing the strategic changes.
The officers do have influence on the strategy on a smaller scale in the section of the organization where they are working. When no formal applications are offered by the organization, they sometimes create or initiate the creation of their own applications using the facilities available, for example using MS Excel or MS Access.

The NLDO is in a continuing process of change and many changes are occurring simultaneously. Previously, separate defence organizations were joined into one defence organization and are increasingly working together, which also means harmonizing the applications and technologies that are used. International cooperation is increasing which also has implications for the choice of information and

communication technologies. The situation is furthermore complicated since the defence budget is under pressure and serious personnel reductions have taken place over the last few years, which has as a consequence that more needs to be done by fewer people.

In general it became clear from the interviews and the comments written on the questionnaires that the officers understand the importance of the new ways of working and are dedicated to creating and participating in a learning organization. Life-long learning is seen as an important aspect with benefits for the organization but also for their own careers and the careers of their subordinates both in the organization as having the opportunity to find employment outside the NLDO. However there are also a number of obstacles varying from cultural issues like that it is better for the career not to share lessons learnt and thereby indicating that mistakes have been made or the knowledge that they have obtained gives the officer perceived power and they do not want to make themselves redundant. Some officers also have limited time to improve the way that is dealt with the information they are responsible for. This is also sometimes seen as an administrative issue and not 'core business'. The Intranet of the NLDO is seen by some officers as a means to store and distribute organizational knowledge, but some officers are also using a communal database to share information and best practices and manage the knowledge of the organizational unit they are responsible for. A number of knowledge management systems are in use whereby best practices are shared, and some communities of practice are established. Generally it was agreed that knowledge management is crucial for the NLDO. When knowledge is not stored effectively it can be seen as a threat to the NLDO.

Furthermore, the importance of a pro-active approach of the strategic top of the organization was emphasized by the officers in that applications that could be used in this regard are selected and made timely available to the officers so that it is not necessary for the officers or their employees to develop applications themselves.

From the interviews and the comments written on the questionnaires it can be concluded that although competency management is given a high priority in the organization, a number of officers are of the opinion that improvements are necessary in order to obtain

an effective digital implementation in this regard. The officers have indicated that the officer plays an important role in competency management.

In general it can be said that officers regard dealing effectively with the security of information as essential in the NLDO and that the officer plays an important role in managing ICT-security awareness.

Since many changes occur simultaneously in the NLDO and the expectation of officers is that this will continue to happen, the officers find change management an important competency for officers.

Participation in innovation is encouraged in the organization and subordinates are given autonomy where possible in an environment where it is accepted that mistakes are sometimes made. In general it can be said that the officers are aware of the importance of innovations and see therein a role for themselves in terms of creating and implementing improvements especially in the flow of information they are (partly) responsible for.

5.2.7 Competence of the officers regarding ICT-related competencies

In table 5.4 the results in the respective scales measuring ICT-related competence are illustrated.

Table 5.4 The results of the scales measuring ICT-related competence

ICT-related competence Scale	Central tendency	95% confidence interval for mean		Cronbach's alpha
		Lower bound	Upper bound	
Creating and participating in a learning organization	Applies partly	2.8	2.9	0.9
Competency management	Applies mainly	3.7	3.9	0.7
ICT-security awareness	Applies mainly	3.5	3.7	0.8
Change management	Applies mainly	3.8	4.0	0.7
Innovation management	Applies mainly	3.6	3.7	0.64

Remarkable is that although officers are aware that it is important that the NLDO becomes an effective learning organization, they score on average relatively low on the scale for ‘creating and participating in a learning organization’ with the central tendency being ‘applies partly’.

Another remarkable result is that male officers evaluate themselves more competent in the scales than their female colleagues do. The differences are significant, which means that with 95% certainty could be said that similar results will be found in the research population.

Officers working in the function area ‘information and communication systems’ score significantly higher on the scale ‘creating and participating in a learning organization’ compared to the officers working in the function areas ‘personnel’, ‘logistics’, ‘education and training’ as well as ‘military operational’, which could indicate that the specialized training that they have received has prepared the officers better for participation in this regard.
Officers in the higher ranks, categorized as ‘head officer’, score slightly higher in the scales ‘competency management’ and ‘change management' compared to the officers in the lower ranks categorized as ‘subaltern officer’. Although those differences are significant, they are relatively small.

Furthermore, a positive correlation is found between the private use of the PC and the scales ‘creating and participating in a learning organization’ and ‘ICT-security awareness’.

In table 5.5 is shown what the results are of using factor analysis on the scales for ICT-related competence.

Table 5.5 Principal components extracted from the scales measuring ICT-related competence

Scale	Principal components	Explained variance	Number of items
Creating and participating in a learning organization	Knowledge management (understanding the importance resulting in participating)	26%	11
	Communities of practice	11%	4
	Opportunity to learn during working hours	8%	2
	Attitude towards learning	7%	2
	Understanding the importance of the Intranet of the NLDO	6%	3
Competency management	Competency management	53%	4
ICT-security awareness	ICT-security awareness	59%	4
Change management	Change management	55%	4
Innovation management	Innovation management (including the perception that the work environment is conductive to innovation)	31%	5
	Allowing autonomy to subordinates	21%	2

5.2.8 ICT- and ICT-related competencies that need to be developed during the initial training of officers in the NLDA

From the research results it has become clear that it is important to develop a number of ICT- and ICT-related competencies during the initial training of the officers. However there is no agreement about all the different items, neither the level of training. An understanding of the functionalities and possibilities of applications, networks, mobile technology as well as an understanding of the importance of knowledge management

appear to be important competencies for all the officers. Furthermore, a training need does exist for officers currently employed in the NLDO.

From the research results the following items appear also to be important to include in an initial training programme for officers in the NLDO:

- MS Office applications

  The expectation is that these skills are sufficiently mastered during high school; however it is important to make sure that the students have mastered those applications sufficiently. A list of specific performance criteria in each of the applications could be compiled and the competence of each student regarding those items should be evaluated during the course of the study.
- Searching and evaluation skills using the Internet

  Students need to learn to find and evaluate critically the information relevant to their work.
- Management of information and information management systems

  Students should have insight in the difference between data and management information and being able to present the information that they are responsible for in a suitable format as well as interpret information presented effectively. Furthermore, students should be able to deal effectively with information management systems and they should master those systems as a tool in managing and coordinating information.
- Communication on various levels using e-mail

  This aspect is emphasized by a number of interviewees who are of the opinion that students need to learn how to communicate appropriately using digital media.
- Archiving of documents and e-mail
- Commando supporting systems or Commando & control information system

  Students could practice these systems during their initial training and develop a basic understanding about the underlying principles.
- Effective project management
- Effective management of information and knowledge in organizations
- Change management
- Effective management of ICT-security awareness

- Knowledge about the influence of ICT on employees
- The students need to be kept informed about the developments in ICT. Not only within the NLDO but also outside the organization.
- Attention needs to be given to aspects regarding the influence of ICT on employees.

5.2.9 Using a digital learning environment to support the development of ICT- and ICT-related competencies of officers in their initial training of the officers in the NLDA

It is emphasized by the interviewees that a digital learning environment should be user-friendly and provide added value to the education. It should also provide advantages to the student as well as the lecturers.

In general, interviewees indicated that the different ICT- and ICT-related competencies need to be developed integrally in the context of the various subjects and the role of the leader needs to be emphasized throughout. ICT needs to be seen as a tool to achieve effective leadership especially with regard to dealing with information and communication.

A need for distance training provided by the NLDA is identified, especially for employees that follow a shorter version of the officer's training and would like to study part-time and continue with their current work.

Using the literature review, insight is obtained in factors that have an influence on learning and teaching in a digital learning environment and it can be concluded that teachers in a digital learning environment require different competencies than they require in face-to-face situations. These factors are especially important since the NLDA is still in an implementation phase of an electronic learning environment. In order to fully utilize the opportunities it offers, it appears important that the teaching staff is properly prepared to deal with this adjusted way of teaching, being it in a programme to support the development of ICT- and ICT-related competencies or in the other programmes they are responsible for.

5.2.10 Providing a digital learning environment to support the development of the required ICT- and ICT-related competencies for officers currently working in the NLDO

A need for the development of some of the ICT- and ICT-related competencies is established for the officers currently working within the NLDO and therefore it appears to be important to provide a digital learning environment for officers currently working in the NLDO so that they can develop the ICT- and ICT-related competencies that they require. Some officers have however indicated that they would prefer a blended learning environment. Furthermore the NLDA could consider providing a system of performance support related to the required competencies for those officers.

5.2.11 Developing an instrument to measure Information, communication and technological competencies required by managers in the information society

Using factor analysis, a set of principal components for ICT- and ICT-related competencies are extracted from the results of the questionnaire as illustrated in figure 5.1. This shows that smaller adjustments need to be made to some of the ICT- and ICT-related competencies that were identified based on the literature review. However, support is found for the main areas of competence.

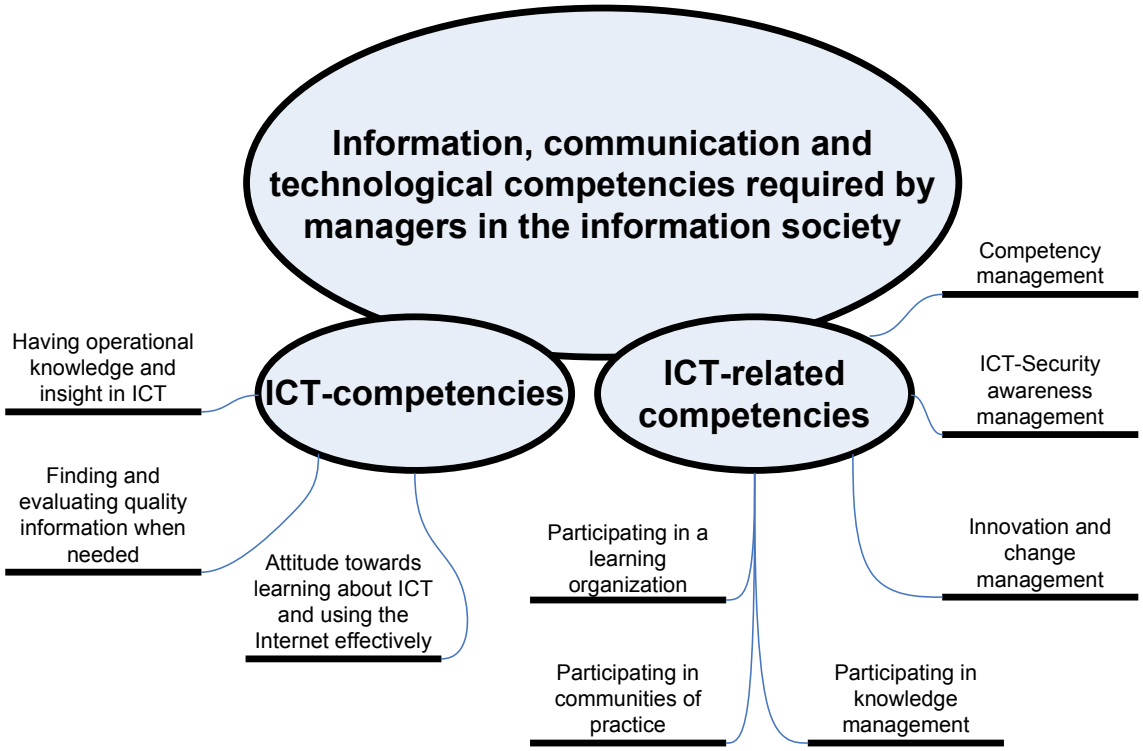

Figure 5.1 Model for information, communication and technological components for managers in the information society

When the organization specific statements are omitted from the questionnaire, the questionnaire appears to be a valid instrument to measure ICT- and ICT-related competence for managers in organizations by means of a self-evaluation. In table 5.6 the reliability of the scales for each competency are shown. The last three components have only two items each, it is recommended that at least one further item for each of those components is added.

Table 5.6 Reliability of the scales to measure ICT- and ICT-related competence

ICT-competencies	**Explained variance**	**Number of items**	**Cronbach's alpha**
Operational knowledge and insight in ICT	22%	5	0.74
Finding and evaluating quality information when needed	19%	5	0.7
Attitude towards learning about ICT and using the Internet effectively	16%	3	0.71
ICT-related competencies	**Explained variance**	**Number of items**	**Cronbach's alpha**
Participating in the learning organization	16%	10	0,9
Innovation and change management	10	5	0.84
Knowledge management in own unit, including communication about it.	8	6	0.83
Participating in communities of practice	7	3	0.7
ICT-security awareness	6	3	0.71
Competency management	6	3	0.7
Attitude towards learning at work	6	2	<0.6
Creating a working environment conductive to innovation	5	2	<0.6
Attitude towards lifelong learning	4	2	<0.6

5.3 Discussion

This research has shown that the effects of the information society and information and communication technology require adjustments in the way officers work and manage their subordinates in the NLDO. From this it can be concluded that the changed ways of working have implications for the training of officers in the NLDA. Especially the results from the interviews as well as the comments written on the questionnaires provided insight in how the officers experienced the changed ways of working in the information society. Hence this research shows both a need for and a demand to develop ICT- and ICT-related competencies which seems especially important in the light of the officers spending on average between 20 and 22 hours per week behind a computer.

5.3.1 Developing ICT- and ICT-competencies across the curriculum

The conclusion can be drawn from this research that when the technology is available it does not automatically happen that people know how to use it effectively. This is in accordance with the experience of Harrison & Kessels (2004) and Davenport & Prusak (1997). Furthermore, from this research can be concluded that using software effectively in the context of the work situation is very important in order to function effectively. This is in accordance with the research results from Boer & Hövels (2003). It has also become clear that communication using technology is not per definition the same as communication through languages (Hart-Davidson, 2000) and a number of participants have indicated that they are often not sure how to communicate using ICT. They indicated that they found it difficult to represent data effectively using the technology. Hence, it appears to be important to design a specific learning programme so that learners could master the new format, content and variety of dealing with information effectively in the information society (Town, 2003) in the context of the work field. However, such a learning programme needs to be re-evaluated over relative short periods of time, along with corresponding competency models (Zaccaro e.a., 2006).

According to Town (2003) a first step in finding a solution for the need for what he calls 'information literacy' is that policymakers recognize that the labour situation has changed and that adjustments in the training are necessary.
A sound starting point for determining what aspects should be covered in such a learning programme could be the seven pillars model (SCONUL, 2004) which is further explained in the literature review, but it is important to adjust this model in accordance with the recommendations of Town (2003) to specify the elements in this model in the context of the working environment of the officers and include not only library skills but also specific IT skills. This model could be extended for the officers in training in the NLDO since it does not include aspects like ICT-security awareness management where integrity, availability and exclusivity of information play a role. This is especially important for military organizations, but most likely for other organizations as well. The achievement of information literacy should not be seen as merely a training of competence, but needs to be recognized as an educational challenge (Town, 2003).

Whether information, communication and technology competencies as a learning module needs to be taught integrated across the curriculum within the formal academic programmes or whether it needs to be taught as a specific subject or a combination of both is the question. In the United Kingdom the practice varies since the issue crosses professional boundaries between teaching and library staff (Town, 2003). However, the participants have indicated that they prefer an integrated approach regarding the development of ICT- and ICT- related competencies in the sense that they prefer that the applications are used in the context of the defence organization across the curriculum.

5.3.2 The role of the teacher in a digital learning environment

It needs to be noted however that innovation and change in education is a difficult process (Lagerweij, 1994) and that it has a serious impact on all the actors (van der Klink, Kallenberg & Valcke, 2002). The role of the teaching staff is especially important in the case an integrated approach is selected and therefore it is important to establish their training needs as well, since online instruction is different from its face-to-face counterpart (Adendorff, 2004; Rosenberg, 2006). To implement a successful digital

learning programme across the curriculum it is important to ensure that the quality is acceptable. Geerligs, Mittendorf & Nieuwenhuis (2004) found in this regard that when the quality of such innovations is not ensured innovations often do not last.
In this sense it is also important to make sure that the participating teachers are able and motivated to deliver the required quality (Fresen, 2005).

From research done by Steyn (2001) about staff development it can be concluded that existing attitudes and learning cultures do not allow for self-development and that comprehensive staff development interventions are necessary. However, he has concluded that this is a complex problem and that different staff members will have different preferences in terms of developmental approach. Therefore, it is advisable that a variety of methods are used. For example workshops, communities of practice where especially best practices are discussed. Hence an ideal situation appears to be to create a learning organization where as many staff as possible can seize opportunities and participate to create a blended learning environment where the students could develop the ICT- and ICT-related competencies that they need in order to work effectively in the NLDO. In this light the results of the research done by Agelink (2004) are also relevant. He concluded that a community of practice for teachers offers advantages for the organization, the teachers as a team as well as for individuals.

According to Steyn (2001), time constraints of teachers who want to become involved in such a development programme need to be solved. Furthermore, the increased workload as a result of participating in new ways of teaching needs to be taken into consideration (Adendorff, 2004). Another hindrance of teachers becoming involved in new initiatives is often a lack of confidence (Burns, 2003). This is a further motivation for a staff development intervention. Burns claims that teachers need to be empowered by giving them proper training, making resources available and giving encouragement so that teachers can become creative. He argues further that creative teachers can inspire students to become creative themselves and prepare them to become creative leaders. Creativity is one of the most important competencies of leaders in the current information society (Robbins & Coulter, 2003; Zaccaro e.a. 2006; Burns, 2003 and Yukl, 2006). Hence it appears important that students receive support in developing creativity. According to De Villiers (2002) creativity could be enhanced in a digital learning

environment. She claims that creative and innovative learning experiences motivate the students to participate as well as stimulate creative cognitive processes.

McPherson & Nunes (2004) argue that if learners are expected to develop high cognitive skills such as reflective analysis and meta-cognition, teachers should have these skills themselves. Zaccaro e.a. (2006) claim that adaptive performance like handling emergencies, crisis situations or unpredictable work situations could be enhanced using simulations and gaming. This is supported by Geurts e.a. (2000).

5.3.3 Gender and ICT- and ICT-related competence

Female officers indicate that they are less confident and evaluate their own competence in most of the items that are researched lower compared to how their male colleagues evaluate themselves. The expectation is not that female employees are less competent than their male colleagues (Arun & Arun, 2002; Whitworth, 2007; Fox, 2006), but that female employees have less self confidence or perhaps are more realistic about their own abilities. This conclusion is supported by Meyers (2006) who found in her research that gender does appear to be an indicator of confidence. She suspects that this is not only related to using ICT, but in general. Meyers found that women tend to underrate their skills and men tend to overrate their skills compared to actual results. Anderson e.a. (2006) claim that empirical studies about gender differences in assessment centers related to management are evenly split between studies that show no significant differences between men and women and studies that show that women score somewhat higher than men, mostly in gender-typed roles like interpersonal leadership roles.

Wasburn & Miller (2006) as well as Meyers (2006) claim that when women study in non traditional areas such as computer science, there appears to be little difference in skills and confidence related by gender. This last result is supported by Rosen (2007) who has experience as a computer applications developer. He claims that women are very capable in that profession and that they are also confident about their own abilities. Wajcman (2006) however suggests that it is difficult for women to access senior levels of management in ICT. She suspects that the male culture associated with technical and

managerial expertise still has a negative effect on gender equality in those fields. In this light it is also interesting to mention that the Women in Technology in the European Community (WiTEC) have offered a postgraduate distance-learning programme in the field of information technology management to address the lack of confidence of women and to increase the number of woman IT managers (Chivers & McPherson, 1994). This programme ran successfully at the University of Sheffield until about three years ago after which it was closed since it was felt that this was no longer a problem (McPherson, 2007).

5.3.4 Establishing a learning organization and lifelong learning

Establishing a learning organization in which knowledge is effectively managed is difficult and a complex process (Harrison & Kessels, 2004; Florijn, 2001). They claim that changes in processes, product and structures are required as well as changes in management and culture in organizations. The directions set out by the strategic top of the organization need to be clear in this regard including a reflection about an integral approach across an organization whereby selections are made regarding suitable applications to support such initiatives. Clear is however that officers play a crucial role in establishing a successful learning organization and that learning how to participate in a learning organization is one of the important aspects that needs attention in a training programme for all officers. Harrison & Kessels (2004) argue that effective knowledge management will not happen automatically, but that HRD programmes should deal with those aspects. The results of this research support this notion.

Although lifelong learning is generally accepted by the officers, Yukl (2006) states that this is not sufficient any longer, but that individuals as well as organizations as a system need to learn how to learn and in this regard it is necessary to redefine and continue to redefine mental models which he names meta-cognition. Hargrove (2001) and Kamperman (2005) state that learning processes of an organization need to adjust to the new context of an organization and visionary objectives. In this light it is interesting to note that Oliver (2002) as well as Collis & Margaryan (2005) have found in their research that using ICT changes the way learning takes place in the sense that it has become possible to focus more on the process of learning and finding information instead of

learning content. Providing effective performance support for learners and employees in organizations is becoming increasingly important and could complement training (Rosenberg, 2006; Rossett, 2007). As such providing performance support could be seen as a component of knowledge management in an organization where the learner could access knowledge and information from a variety of resources (Rosenberg, 2003).

5.3.5 The influence of culture in a learning organization

Some of the officers regard their experience, knowledge and even information as their property and as such provide them with a sense of power.
This is also found in other organizations by Davenport & Prusak (1997) who found that jealousy over resources and political battles frustrate the sharing of information. They claim that organizations need to develop an overall strategy for the use and sharing of information in which these aspects are taken into consideration. Some important questions in this regard are whether information must be seen as a commodity or a process, and whether it belongs to an individual or to the organization by which the individual is employed.

A sound information management system is crucial towards establishing a successful knowledge environment that underpins integrated and cooperative working according to Haines & Dunn (2003). Certainly it can be argued that the officers play an important role in establishing this. Furthermore, Arun & Arun (2002) identify culture as one of the factors that influence the use of ICT. It would be interesting to know what the influence of culture is on the outcome of the scale for 'creating and participating in a learning organization'. The score for this scale is rather disappointing with a central tendency of 'applies partly' but there could be a number of contributing factors to this, for example lack of time or perceived benefits.

It is clear that the culture of a learning organization needs to support the development and distribution of knowledge in the organization (Rosenberg, 2006; Florijn, 2001). They claim that trust between staff members and also between staff members and line management is important in a spirit of open communication, commitment and a willingness to work together for a common goal. A further cultural change is embedding

the concept of lifelong learning in the labour environment of the officer. An important aspect of learning how to learn is certainly the ability of self-directed learning (Yukl, 2006; Poole & Axman, 2002).

5.3.6 The relation between using ICT and ICT- and ICT-related competence

In many of the scales there was a positive correlation between the number of hours that the computer was used at home for private purposes and the various ICT- and ICT-related items. This could support the notion that the more the computer is used by the officers during the course of their training, the better prepared they are to deal with ICT in their working situation.
However, spending more time on the computer for private use could also indicate a special interest in ICT in general which could also reflect on the use of ICT in the working situation.

5.3.7 Examples of integrating ICT- and ICT-related competencies across the curriculum

Online-self-teach modules that are freely available could be used to form a theoretical basis for such a learning programme. Examples of such modules are http://www.enterprise-ireland.com/ebusiness/default.asp and http://www.vts.intute.ac.uk/. In table 5.7 examples are given how the identified ICT- and ICT-related competencies could be integrated in a digital learning environment. It is an advantage if applications are used in the context of the future work situation (Collis & Margaryan, 2005). It needs to be noted that the theory of a number of the identified items is currently included in the curricula of some of the bachelor programmes of the NLDA. However, the argument remains that the ICT- and ICT-related competencies identified are essential for all officers and that they should be developed integrally across the curriculum.

Table 5.7 Examples of how the development of the identified ICT-and ICT-related competencies could be integrated in a digital learning environment

Item	**Examples of integration of the item in a digital learning environment. Some of those aspects are applicable for the academic forming but could also extend to the military forming**
MS Office applications	Self teach manuals available to the learners on-line, whereby taught sessions are initiated when the need arises. Integration of various applications where appropriate. MS Word and MS PowerPoint are already integrated in some subjects MS Excel can be integrated with subjects like Mathematics, Statistics, Methods and techniques of research. Since searches are often done in databases using keywords – some practical experience in MS Access seems appropriate
Searching and evaluation skills using the Internet, including the 'Deep Web'.	Online guidelines could be provided and practical exercises whereby critical search methods and critical evaluation regarding the reliability and credibility of the sources are a requirement could be integrated in a number of subjects and projects. Furthermore, the students could be encouraged to use a variety of databases like PiCarta and subject specific on-line databases. Examples of specialized online educational resources like online periodicals or textbook supplements could be used so that learners get an idea about what is available on the Internet that could support their study and research (Waterhouse, 2005).
Management of information and information management systems	Students can be encouraged to present management information in an acceptable way Management games and simulations could be used where case and scenarios could be used with increasing complexity.
Communication on various levels using e-mail	Participation in an international project, could also prepare students to deal with cultural differences. This is an aspect officers have to deal with when they participate in an international operation. Students could also experience working in an international community of learning.
Archiving of documents and e-mail	Guidelines could be provided and some practical exercises could be done by students in order to master this item.
Commando supporting systems or commando & control information systems	Simulations and games could be used. This could be part of the military forming.

Table 5.7 (continued) Examples of how the development of the identified ICT-and ICT-related competencies could be integrated in a digital learning environment

Item	**Examples of integration of the item in a digital learning environment. Some of those aspects are applicable for the academic forming but could also extend to the military forming**
Project management	When the students have a project to do, they could be required to use an application that so that the students understand what such a system could mean in practice. Prince 2 is the standard in the NLDO – a beginner self-teach manual could be designed. Ter Wee & Loog (2005) introduce the concept of an electronic meeting room where a combination of oral consultation is offered as well as a scala of tools to support each type of process and decision forming effectively.
Knowledge management	Collaboration software like wiki's could be used to encourage students to share knowledge with each other. A communal database like wikipedia could be used to explain the principles of a database.
Change management	Students could participate in a virtual change management project. Theory about factors that influence change management could be offered in the context of the NLDO.
ICT-security awareness management	An online self-test could provide some insight in ICT-awareness. Such a test could include hypertext with explanations about certain ICT-security issues; students could only learn what is relevant for them.
Influence of ICT on employees in general	A learning module where research results in this regard are presented could be used.
Latest developments of ICT, possibilities and opportunities	Students could be involved in a project where they have to investigate this item online within their own field of expertise.
Learning how to learn In this sense the computer could be seen as a cognitive tool and can be seen as a "*prosthesis for thinking, reasoning, estimating, experimenting and learning*" (Kommers, 2004:24).	(Online) learning journals like web logs could be used to encourage the students to reflect about what they have learnt, this enhances transfer of knowledge according to Ausubel (2001). Students could reflect about models of meta-cognition about learning and thus increase their understanding about their own learning (Yukl, 2006). Students could start a personal digital library of sources and abstracts of those sources and start creating a digital network. Students could be introduced to applications like CATPAC or Copernic Summarizer, which are intelligent programs that read text and summarize its main ideas. Student could be introduced to applications like Endnote that help them manage their sources digitally. Providing performance support or learning support online could also be

	seen as a means to improve learning how to learn (Rosenberg, 2006).

There are a number of ICT- and ICT-related competencies that the majority of officers do not find important enough to be included in an initial training programme of officers, but those items are seen as important by other officers. In table 5.8 examples are given how those ICT- and ICT-related items could be developed and integrated in a digital learning programme.

Table 5.8 Examples of how the development of alternative ICT-and ICT-related competencies could be integrated in a digital learning environment

Item	**Examples of integration of the item in the digital learning environment**
Tools to organize the thoughts	Students could be asked to brainstorm in a project group, whereby a tool like Mind Manager is used or they could be asked to use such a tool to summarize the important aspects of a subject/topic using a mind map. Interesting is that mind-mapping is seen as a creativity enhancing activity (Beijen, e.a., 2003).
Mobile learning	Short pieces of text and/or tests named pod casts could be available to mobile technology, to encourage collaboration wiki's could be used, for individual use are online journals like web logs (blogs) available. RSS News feed (an xml-based format to easily share content on the Internet) could be used. A number of learning materials could be provided via those media and the learners can select what they want to learn when it suits them. Further research results and examples can be found in Kukulska, Hulme & Traxler (2005).
On-line conferencing	Students could participate in synchronous (e.g. a virtual workshop using Breeze web conferencing or Skype) and a-synchronous discussions.
Teleconferencing	Participation in an international project whereby students could at least once use teleconferencing facilities.
Online networking	Students could be encouraged to create an online network with fellow students in a joint project across the various sub organizations. Experience in working in a virtual team could thus be obtained.

5.3.8 Reflection on the methodology used

The combination of qualitative and quantitative techniques as well as the order in which they were conducted seems to have worked well. In agreement with Fraser (n.d.) this research was an investigation in mere a reflection of the changed labour environment of the officer in the NLDO, but the attempt was certainly to make the reflection as clearly as possible. Peters (2004: 28) argues that in a lot of leadership research the rational is over-emphasized ignoring what he calls *"messiness of what is"*. This research was an attempt to combine the two.

For this global descriptive and exploratory research about the changed labour environment of the officer of the NLDO can be said that the qualitative techniques used were fairly credible and that the quantitative techniques were sufficiently valid and reliable for the purpose of this research. When the purpose of the research would have been to investigate deeply on certain issues rather than broadly, a critical note could certainly be given to some of the scales and the number of in-depth interviews, although the comments written on the questionnaire as well as the results of the discussion group of the students also contributed to the qualitative research data. The quantitative research techniques provided an opportunity to generalize some of the results of the case study.

5.3.9 Contribution of the research

This research has provided some insight in what the influence of ICT and the information society is on the labour situation of officers in the NLDO. The complexity of the current work environment is emphasized. Furthermore, a model was created from a combination of the literature and results of the interviews, discussion group and questionnaire for the ICT- and ICT-related competencies that are required by the officers of the NLDO in their changed roles in the information society.

Although the results of this research can not be generalized it could provide a basis from which further research amongst managers in organizations could be conducted. Many of the results might be of a general nature and emphasize the importance of employers

being aware of the influence of implementing and applying ICT in their organizations. When some adjustments are made to the questionnaire, it appears to be a valid instrument to measure ICT- and ICT-related competence for managers in the information society. Furthermore a general model for information, communication and technological components required by managers in the information society was created, thus making a contribution to the knowledge of organizational management and ICT.

Some insight was also obtained in how competent the officers evaluate themselves in relation to the identified ICT-competencies as well as towards their participation in a learning organization, communities of practice and knowledge management, competency management, ICT-security awareness and management of innovation and change.

An unexpected research result was that female officers evaluate themselves less confident and less competent in a number of ICT- and ICT-related items which might have implications for the gender policy in the NLDO.

The contribution to computer- assisted education is that in the case study the need for some applications is established in the labour environment and this could be used as a motivator to use those applications in education and ways can be sought in computer assisted education to satisfy those identified needs. This kind of research is encouraged by Frowein & Kan (2003). In general the research results can be seen as a needs analysis regarding ICT- and ICT-competencies for the training of officers, which has clearly implications for their training environment. In this sense a learning programme in this regard can be seen as a demand-driven innovation in the education of officers.

Some insight is obtained in how a digital environment can be used to develop ICT- and ICT-related competencies in higher education. This research may have some relevance for higher education in general and as such a contribution is made to the field of innovation practice in education.

The research results indicate that there is a positive correlation between the private use of the computer and the confidence in using ICT. It is plausible that the more a computer is used the more confident and competent a person becomes in using ICT, which could

be a further motivator to use the computer in the training environment. Tijdens & Steijn (2005) have found in this regard that the willingness of employees to acquire ICT-competencies are primarily influenced by the use of ICT, an informed ICT-strategy of the organization and an intensive personnel policy which seem to emphasize the findings of this research.

5.3.10 Limitations of the research

This research was an attempt to provide a global overview and the focus was therefore broad instead of deep and focussed. The focus of this research was on management of ICT from a human resource development perspective and not from the perspective of business-information management.

The research questions turned out more complex than anticipated and a selection had to be made to make the research manageable, whereby not in all instances the right decisions were made. For example it was decided to reduce the number of personal questions in the questionnaire; A direct question about age was left out since it was anticipated that the number of years that officers are working in the NLDO could be used as an indicator of age, but it turned out not to be a solid enough indicator of age to base any conclusions on. It was therefore not possible to verify if younger officers who have grown up with computers evaluated themselves more competent than older officers in the various ICT- competencies like finding information on the Internet. Since learning and knowledge management is seen as especially important in the information society a substantial number of questions were used in this scale and fewer questions in the other scales, which means that they were in some instances rather superficial. In hindsight it would perhaps have been better to balance the number of questions more evenly over all the scales.

Furthermore, it would have been better to include a direct question about whether the officers had received the short or long version of the officer's training since officers with a long version of the training are trained at an academic level in the FMW and other officers are not necessarily trained at an academic level although many of them did complete a higher education. Although it is assumed that the head officers have

completed the long version of the training that is currently offered by the FMW of the NLDA, there might be a few exceptions since the organization currently offers excelling officers with a shorter training programme, similar contracts to officers with a longer training. In the past those contracts were exclusively reserved for officers with the longer training.

Although some of the scales for example on creating and participation in the learning organization are sound, some aspects of the research, for example the scales about info-stress, change management and innovation management are rather superficial because only a few items were used and hence not deeply focused enough to obtain meaningful results on a detailed level but rather provide an indication of the current situation.

Competence of the officers was not measured against specific performance criteria, but was used as an indication of commitment (attitude), knowledge about as well as skills and behaviour in the opinion of the officer themselves. Since competence was not evaluated according to a set of performance criteria the results can only be seen as an indication of competence and no further conclusions can be drawn. When the results show that female officers evaluate themselves as less competent compared to how their male colleagues evaluate themselves it can therefore not be concluded that they are in fact less competent. From the literature it seems as if other factors influence their own evaluation like a lower self confidence or perhaps their evaluation is more realistic than the evaluation of their male colleagues. Further research is therefore needed in order to make any firm conclusion in this regard.

One respondent wrote on the questionnaire that it was unfortunate that the NATO – ICT systems like CRONOS were not included in the research, since in his opinion those systems are similar to the Intranet and Internet of the NLDO and are equally important.

5.4 Recommendations

5.4.1 Recommendations for the NLDA

In order to deal with a competence profile for the students it would be necessary to determine specific performance criteria for the identified ICT- and ICT-related competencies so that individual students could be evaluated against those performance criteria.

It is recommended that a subject or learning trajectory is created in the NLDA that covers all the aspects of ICT- and ICT-related competencies. This subject could be named for example 'ICT for managers'. Furthermore, a member of staff could be made responsible to develop the curriculum for this subject, teach the theoretical aspects and oversees and consolidates the development of the identified ICT- and ICT-related competencies in an integrated approach across the curriculum. Aspects of the programme could fall outside the academic forming and be included in the military forming. Different approaches could be implemented for the different officer's training programmes, since some of the programmes have already been altered recently in order to include some of the identified aspects. The responsible member of staff could also investigate what available digital learning materials could be used and/or adjusted in such a learning programme. Furthermore, the NLDA could obtain access to open source digital learning modules and use what is applicable and available. The learning modules and/or –objects could be adjusted where necessary to make them more suitable for the context in which they are used. Furthermore, the staff members of the NLDA could be encouraged to contribute towards such initiatives in a database with learning objects, which are flexible and learner-centered. Openness in terms of sharing and cooperation could be encouraged amongst staff. Furthermore, ethical aspects of using information like understanding legal issues like copyright could be included in such a development programme as well as e-literacy skills identified by Town (2003).

In order to facilitate the aspects that are thought of across the curriculum it is necessary that a number of teaching staff participate in the newly envisaged learning programme. In order to prepare the teaching staff sufficiently to participate in this programme, it is

proposed that a development programme for teaching staff will be made available. In this regard it is recommended that the NLDA works towards becoming a learning organization where staff development and –support should be in constant demand. Improvements in teaching in and beyond the learning management system TeleTop that is used in the NLDA. Opportunities to develop on-line facilitating skills should be included as well as aspects like instructional design. The member of staff taking on the responsibility of the learning programme 'ICT for managers' could be involved in such a development programme for staff and encourage staff to participate in this learning programme across the curriculum as well as offering assistance in instructional design principles. Furthermore, it could be investigated further if and in way performance support could be provided online to teachers in the NLDO.

The FMW is in principle an institution of higher education where blended learning is used, but it could be investigated whether there exists a justifiable need for a digital learning environment as a means of distance education for some students that have been employed by the NLDO for a longer period of time and have received a military/maritime as well as personal forming in the organization, but have been selected to do a shorter version of the academic programme in order to become officers. Especially in the marines such a need was expressed.

A distance learning programme consisting of a number of modules could be developed so that the officers currently working in the NLDO could participate in the modules that they require in order to function more effectively in their current working environment. This could be complemented by occasional face-to-face meetings. Such learning programme could perhaps be facilitated via the NLDA. It could also be investigated if the Human Resource Academy that commenced the 1st of July 2006, and is part of the NLDA could offer digital learning modules related to for example competency management. Furthermore, it could be investigated further if and in what way information, communication and technological performance support could be provided online to the officers in the NLDO.

It needs to be noted however that changes in education should be seen as a process (Plomp, 2006) and therefore it is recommended that the development programmes

recommended earlier for both learners and teachers need to be continually evaluated and adjusted where necessary.

5.4.2 Recommendations for the NLDO

The NLDO is in a process of changing into a learning organization which is a complex process and requires a professional approach (Brophy, 2003; Rosenberg, 2006). The complexity of obtaining a clear picture of the communication patterns, networks and systems in an organization (Robbins & Coulter, 2003) motivates for a further investigation into the roles of information professionals in the organization. In this regard Stoker (2005) argues that managers have a need for professional advisors who could reduce the complexity of the information they have to deal with on a regular basis. This idea is supported by Ausubel (2000). Such professionals could further investigate what kind of performance support could be made available on-line to officers in the NLDO.

Based on the research results it appears to be important to investigate ways to improve the search facilities of the Intranet of the NLDO. Since research has shown that an effective ICT- infrastructure yields sustained competitive advantage for organizations (Byrd, 2001) it might also be important to investigate further the perceived slow connection to the Internet.

Since a number of officers in the operational units and/or participating in a mission indicated their frustrations about the ICT-facilitities that are currently available. It appears worthwhile to investigate whether the current ICT-facilities are indeed adequate for the changed ways of working that are required in the information society. Interesting to note in this regard is that the trade unions FVNO/ MHB[7] included the following phrase in their proposal for negotiations about a new collective labour agreement for 2007-2008: "... en het vervangen van verantwoordelijkheid door overdreven regelgeving en slechte ICT zijn denigrerend." (FVNO/MHB, 2007:1). [... and replacing responsibility by exaggerated legislation and bad ICT is denigratory].

[7] The FVNO/MHB is the federation of the Netherlands officers and middle and higher civilian staff of the Netherlands Defence Organization.

This phrase also indicates frustration about the excessive legislation in response to ICT-security breaches. This frustration was also mentioned by some of the officers which indicated that they understand and are willing to take on the responsibility with regards to ICT-security.

5.4.3 Recommendations for further research

The approach of this research was to create a wide overview in the field and therefore it was not possible to focus deeply on the various items themselves. It is recommended that further specialized research is done in the separate items in order to determine the specific performance criteria that need to be included in a student competency profile.

Since adaptivity, creativity and learning how to learn are seen as essential competencies for leaders in a fast changing environment (Yukl, 2006; Zaccaro, 2006; Hargrove, 2001; Robbins & Coulter, 2003) it appears important to obtain further insight in how those competencies could be developed and what the role of a digital learning environment could be in supporting the development of those competencies. Ausubel (2001) claims in this regard that creativity can only be achieved through continuing attention.

It appears worthwhile to research what kind of information, communication and technological online performance support would be useful to officers in the NLDO and how this could be made available to the officers. This could limit the amount of training time away from the workplace and could provide support at the time that it is required (Rosenberg, 2006; Rosett, 2007).

The results of this case study are used to suggest a general model for information, communication and technological competencies required by managers in the information society and offers a first instrumentalization for this model, this model might have implications for the development needs for students in higher education in general. This could be researched further.

Furthermore, the research instruments could be slightly adjusted by removing military specific topics and repeated in a civil large organization to investigate whether there are

differences between a military organization and a civil organization regarding the influence of ICT on the labour situation of managers.

Female officers evaluate their competence on a number of ICT- and ICT-related items lower compared to how male officers evaluate themselves. This could indicate that female officers have less self-confidence or are more realistic in their self-evaluation. However, it could also mean that they are less competent. This might have implications for the gender policy in organizations and appears to be an important issue for further research.

Further research appears to be necessary about how organizational culture is related to what information and knowledge is and to whom or what it belongs. In order to make changed and more effective ways of working in the information society possible it appears to be necessary to adjust aspects of the current culture of the organization in this regard.

The teaching staff is an essential role player in implementing the digital learning environment (Reeves e.a., 2005). From the literature it is not clear how teaching staff become committed to the digital learning environment in such a way that they fully face the challenges of integrating the digital learning environment with their more traditional methods of teaching. Further research is necessary in this regard in order to utilize the opportunities of the digital learning environment in institutions of higher education.

5.5 Conclusion

In conclusion it can be said that this research shows that ICT and the information society have a serious influence on the labour situation of the officers for which the officers are not in all instances prepared. Therefore it can be said that the changed labour environment makes it necessary to revisit the curriculum as well as the role of ICT in the learning environment of the officers doing their initial training in the Netherlands Defence Academy as well as for the officers currently working in the Netherlands Defence Organization. This also has implications for the development programme for teachers in the Netherlands Defence Academy.

Furthermore, a general model for information, communication and technological competencies required by managers in the information society is suggested and a first instrumentalization for this model is provided. This model will need to be adjusted in accordance with further research results and new technologies becoming available.