NTNU

Norwegian University of
Science and Technology

User Acceptance of Information Technology

An Empirical Study of It's Learning

Martin Grønland

Master of Science in Computer Science
Submission date: June 2010
Supervisor: Tor Stålhane, IDI

Norwegian University of Science and Technology
Department of Computer and Information Science

Problem Description

This task is a continuation of the work from the specialization project about the user acceptance of information technology. The task focuses on an empirical study of the educational platform It's Learning at NTNU. The purpose of the task is to measure the user acceptance of It's Learning by exploring more user groups and other educational establishments which are using the system. Based on this study the problems and improvement areas of It's Learning at NTNU shall be identified.

Assignment given: 15. January 2010
Supervisor: Tor Stålhane, IDI

Abstract

This study continues the work from the specialization project, carrying out the empirical study of the educational platform It's Learning at the Norwegian University of Science and Technology (NTNU). The goal of this study was to measure the user acceptance of It's Learning at NTNU, performing more surveys with the students at NTNU, but also with other educational establishments for comparison. In addition to this, we wanted more focus on It's Learning as a multi-user system.

To achieve the goal we did a study of technology acceptance in information systems. In addition to this, we have studied important challenges of developing, introducing and using groupware to get more focus on It's Learning as a multi-user system. In addition to the survey we performed during the specialization project, three new surveys have been performed in this study. Two surveys were performed with student groups at NTNU, while one survey was performed with a student group at Sør-Trøndelag University College (HiST). In addition to this, we have performed interviews with some of the teachers at NTNU to get an indication of their usage and opinion of It's Learning.

Instead of using one of the existing technology acceptance models as a framework for the survey, we created a new research model. The new model combines elements from two existing technology acceptance models, and was created to better adapt to It's Learning. The survey, together with the interviews with the teachers, and the groupware challenge study, created a basis for an evaluation of It's Learning.

The results from the survey in this study clearly contradicted the results from the survey in the specialization project, but even though the results differed, all the student groups identified many of the same topics when it comes to problems with It's Learning and how to improve the system

The results from the study indicates that two of the main problems with It's Learning at NTNU is that too few subjects use It's Learning, and that It's Learning is not utilized in a good way by the teachers. These two problems represent two important challenges with multi-user systems, the "critical mass" challenge and the "non-standard use" challenge. As opposed to NTNU, HiST has mandatory use of It's Learning, meaning that they avoid the "critical mass" challenge.

We also found that It's Learning has an inflexible and cumbersome user interface, and the lack of possibilities for integrating the calendar and message system in It's Learning with other existing applications affect the utility value of these features. That It's Learning is a closed system is one of the largest problems for the teachers, in addition to some missing features for administrating exercises in their subjects.

From this study we found that general user acceptance models give a good indication on the user's perception of an information system, but that there is also important to focus on the challenges related to specific types of systems, like the multi-user environment in the case of our study.

Preface

This thesis is the result of the Computer and Information Science Master Thesis and was produced during the spring of 2010. It was written at the Department of Computer and Information Science (IDI) at the Norwegian University of Science and Technology (NTNU).

The purpose of the report is to continue the work from the specialization project, and measure the user acceptance of the educational platform It's Learning at NTNU.

I would like to thank my supervisor Tor Stålhane for great input and helpful guidance throughout the thesis. I would also like to thank the students who participated in the survey and the professors who participated in the interviews.

Trondheim, June 11, 2010

Martin Grønland

Contents

List of Tables

List of Figures

List of Abbreviations

HiST	Sør-Trøndelag University College
LMS	Learning Management System
NTNU	Norwegian University of Science and Technology
SDK	Software Development Kit
SRS	Simple Random Sampling
TAM	The Technology Acceptance Model
TAM 2	The Technology Acceptance Model 2
TRA	The Theory of Reasoned Action
URL	Uniform Resource Locator
UTAUT	The Unified Theory of Acceptance and Use of Technology

Chapter 1

Introduction

This chapter gives an introduction to the rest of the report. We will start by presenting the motivation and the background for the study. We will then describe the problem definition, in addition to the scope of the study and the research methods that are used. At the end of the chapter we will present an outline of the rest of the report.

1.1 Motivation and background

This study is a continuation of the work from the specialization project (Grønland, 2009) which we performed in the autumn of 2009. The specialization project focused on studying the role of usefulness and user-friendliness in technology acceptance of information systems. In this study, It's Learning was used as a subject for research. We studied the use of It's Learning at the Norwegian University of Science and Technology (NTNU) and also studied how usefulness and user-friendliness affected the user acceptance of the system. The study was carried out by doing a user acceptance survey of It's Learning with students at the Department of Computer and Information Science at NTNU. The results indicated a low satisfaction with It's Learning amongst the students, and both usefulness and user-friendliness received low scores. A total of 65% of the students answered that they were dissatisfied or very dissatisfied with It's Learning. The survey also revealed that the integration of It's Learning at NTNU was an important factor when evaluating the system, meaning that a focus on usefulness and user-friendliness alone would not be sufficient when expanding the study. Because of this, we changed the focus on technology acceptance to include not just usefulness and user-friendliness, but also facilitating conditions like the integration of It's Learning at NTNU. In addition to this, we also focus on the challenges of developing, introducing and using multi-user applications and systems. We will expand the research which was started in the specialization project, and continue the empirical study of It's Learning.

The background for the study is to explore the research field of technology acceptance of information systems and understand how user acceptance can be measured. Technology acceptance is about the conditions in which information systems are accepted and used (Venkatesh and Davis, 2000). These conditions can be used to predict future use of an information system, but also measure the user acceptance of existing system. In the case of It's Learning we will be measuring the user acceptance of an existing system. As It's Learning is a multi-user system we will add more focus on this by studying groupware challenges which are important to handle for a multi-user system to be a success.

The reason for choosing It's Learning as a subject for this study is that there has been expressed a lot of frustration about the lack of functionality and user-friendliness in the system by students and employees at NTNU (Paulsen, 2007). These statements were supported by the specialization project study, were the students were generally dissatisfied with It's Learning at NTNU. In this study we will further explore the use of It's Learning by examining more user groups at NTNU, but also other educational establishments that are using It's Learning as their learning management system (LMS). In this way we will see if the results in this study will support the results from the specialization project. Based on this study we will create a basis for a presentation of the results for NTNU and It's Learning AS (developers of It's learning).

1.2 Problem definition, research methods and scope

The problem definition for this study is as follows:

- Use the technology acceptance study to create a basis for measuring the user acceptance of It's Learning, in addition to focusing more on It's Learning as a multi-user system.
- Continue the empirical study of It's Learning by exploring more relevant user groups to see if the results from the specialization project will be supported.
- Identify the problems and potential of improvement for It's Learning at NTNU.

The study of technology acceptance in information systems was performed in the specialization project and we supplemented this part of the preliminary study with a study of groupware challenges. We did this study to get focus on specific challenges with multi-user systems, which are important when evaluating It's Learning as it is a large and complex multi-user system. For expanding the empirical study we decided to do more surveys with student groups at NTNU, and also included a student group from Sør-Trøndelag University College (HiST) for comparison. A new technology acceptance model was created and used as a basis framework for the survey. In addition to this, we performed interviews with three teachers at

NTNU to get their view of It's Learning. Based on the results from this study we have discussed the surveys, interviews and the groupware challenges to identify the problems and potential of improvement for It's Learning at NTNU.

The scope of the project is limited to studying the most well known models in technology acceptance research, and to obtain an understanding of important challenges when developing, introducing and using groupware (multi-user) applications and systems. The user acceptance survey with the students will be the main focus of this study, but we will limit the samples to three new user groups. The interviews performed with the teachers at NTNU will be used to get an indication of their opinion and usage of It's Learning.

1.3 Outline of the report

The report is divided into six main parts. The first part gives a description of the related technology in this study, where It's Learning is introduced. The second part presents the preliminary study of technology acceptance and groupware challenges. The description of the technology acceptance preliminary study is taken from the specialization project (Grønland, 2009). The third part presents the research methods which are used in this study, including the interview and the survey. The description of the survey is taken from the specialization project (Grønland, 2009). The fourth part presents the execution and results from the empirical study, which were performed as interviews (qualitative study) and surveys (quantitative study). The fifth part presents the discussion of the results from the empirical study, in addition to a discussion of the groupware challenges that are relevant for It's Learning. Part four and five will also present and discuss the results from the specialization project. The sixth and final part concludes the work.

Part I

Related Technology

Chapter 2

It's Learning

It's Learning is a learning management system (LMS) developed by It's Learning AS, a leading supplier of information technology to educational establishments. It's Learning is used in all levels of education and is a tool for communication and collaboration, administration of educational resources and evaluation of pupils and students. It's Learning consists of several educational tools, which can be customized and filled with content by the schools that are using the system (It's Learning AS, 2010d,a).

It's Learning was recommended as a LMS for NTNU in 2002, after a two year period of testing several LMSs. The actual use started in the spring semester of 2003, with a gradually introduction of the system (Ramberg, 2002). It's Learning was offered to all subjects at NTNU in the autumn of 2003 and the contract with It's Learning AS was renewed in 2005 based on good experiences with the system (Multimediesenteret NTNU, 2006b).

Most of the functionality which is available at NTNU is displayed by the tabs in Figure 2.1. The figure shows It's Learning from a student's point of view, but there is also a part of the system which is available for the teachers. A short description of each perspective will be given below.

The main page (See Figure 2.1) consists of several shortcuts to the rest of the system including list of tasks and subjects. The subject tab contains an overview of all the subjects the student attends in the current semester, in addition to all the previous subjects that has been attended. All the subjects that the student attends this semester are also presented on the main page of the system. Within each subject the student can find all the information and material which have been published. The subject functionality in It's Learning uses an access control system consisting of "administrator", "teacher", "student" and "guest" as standard profiles. It is also possible to create customized profiles if needed. The project tab contains an overview of the projects that the students are a member of. This functionality

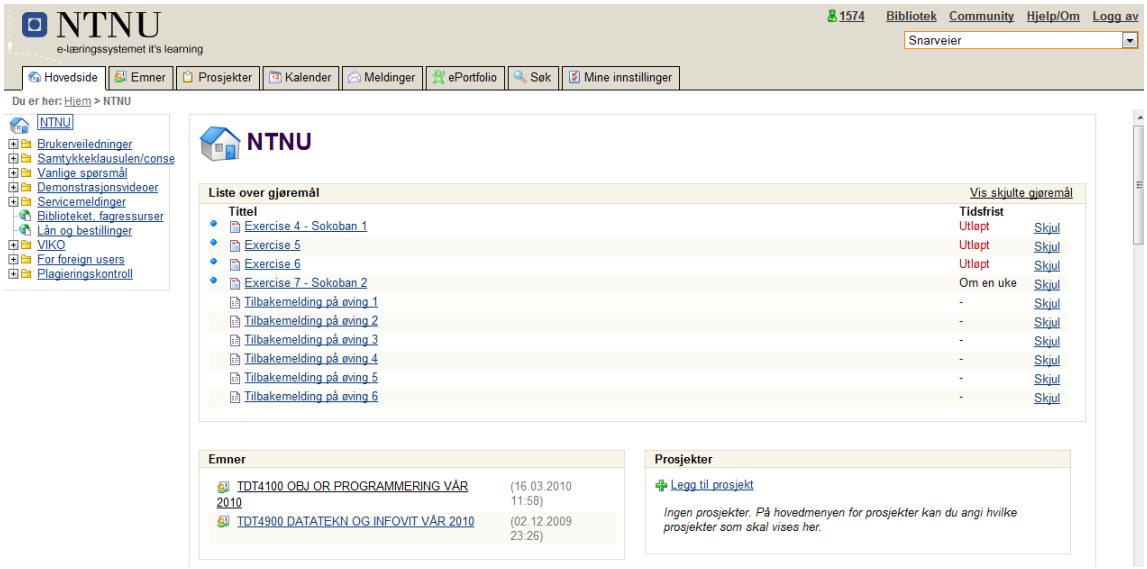


Figure 2.1: Main page of It's Learning

makes it is possible for the students to create their own project groups. The project functionality offers much of the same features that the teachers have for creating subjects. Similar to the subjects, the projects for the current semester will be presented on the main page of It's Learning. The calendar gives the students the opportunity to follow the activities in the subjects they are attending, in addition to adding their own personal activities. Today's activities are displayed both on the main page and the subject or project page where the activity belongs. The message system is a feature that can be used to send and receive messages internally in It's Learning. The message system has basically the same functionality as an e-mail system. It also offers forwarding of messages to the students e-mail account. In addition to this, It's Learning contains a search function, ePortfolio and other minor functions (Multimediesenteret NTNU, 2006a).

In addition to the functionality described above, the teachers can also administrate the subjects they are responsible for. The teachers can publish information, files and activities/tasks to the students, in addition to communicating with them. Some of the available features for the teachers can be seen in Figure 2.2. The features that are displayed in the upper left corner in Figure 2.2 can be used to administrate the subject. From this menu the teachers can generate status reports on the students, create groups, add pointers to external web pages and arrange net meetings. Figure 2.2 also shows some of the elements that can be added to the subject page. From this menu the teachers can add content like notes and messages on the bulletin board, and add new files and folders for the subject. Activities like tasks, tests or surveys can be added. When a teacher adds a new activity for a subject, the activity will also become available in the students calendar. The teacher can add lecture times in the subject calendar, which also will be available for the students attending the subject. As can be seen in Figure 2.2 the subject functionality also has support for

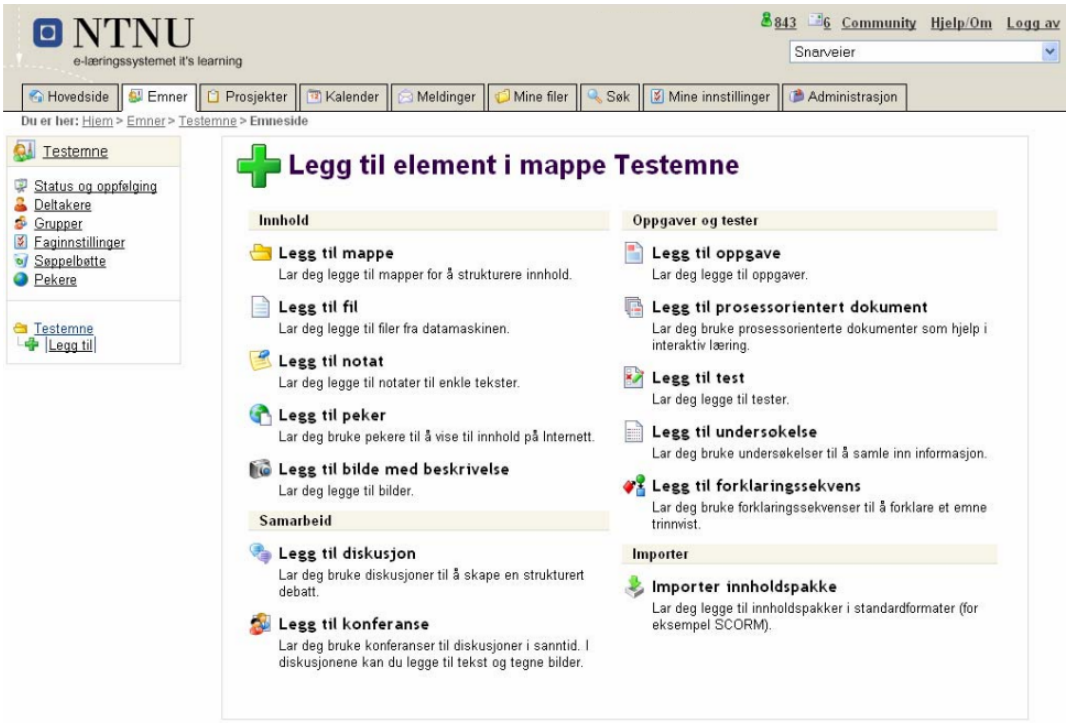


Figure 2.2: Features availiable in It's Learning

collaboration tools like discussion forum and conference (Multimediesenteret NTNU, 2006b).

Recently, It's Learning AS has introduced a software development kit (SDK), making it possible for users to develop their own applications and tools for It's Learning. In addition, there will also be possible for the users to extend the existing functionality in It's Learning. To use the SDK, the user has to have some programming knowledge. It's Learning is developed in C#[1], but applications and tools can also be developed in other programming languages like PHP[2] and Java[3]. The externally developed applications and tools will be connected with It's Learning through its application programming interface. The SDK is currently a beta version (It's Learning AS, 2010b). To read more about the It's Learning SDK, see (It's Learning AS, 2010c).

This chapter has only presented an overview of the features which are available in It's Learning. To get a more detailed description you can see (It's Learning AS, 2010d) and (It's Learning AS, 2010a).

[1]Read more about C# at: http://msdn.microsoft.com/en-us/vcsharp/default.aspx
[2]Read more about PHP at: http://php.net/index.php
[3]Read more about Java at: http://www.java.com/en/

Part II

Preliminary study

Chapter 3

Technology acceptance

In this part of the preliminary study we will take a look at two of the models which have influenced the research field of technology acceptance in information systems. There are many models within this research field, with a varying degree of influence on the evaluation of user acceptance in information technology. We have decided to take a look at the two most well known models, the Technology Acceptance Model (TAM) and The Unified Theory of Acceptance and Use of Technology (UTAUT). It is important to notice that TAM is sometimes referred to as two separate models; TAM which is the original model, and TAM 2 which is an extension of TAM. When various research studies are reviewing TAM they are mostly referring to TAM as one model. We will do the same in this chapter and throughout the report. UTAUT is based on the same principles as TAM, and is by some considered to be an extension of TAM as well (Bagozzi, 2007).

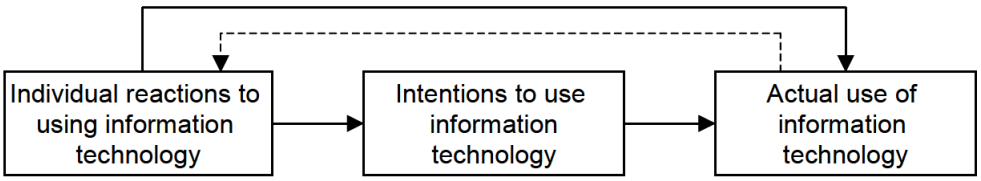


Figure 3.1: The basic concepts underlying user acceptance models (Venkatesh et al., 2003)

The models are based on the same basic concept for user acceptance models which are presented in Figure 3.1. You have a user's reaction to using an information system, which will form the intentions to use the system, which again lead to actual system use. Thus, the models are based on the concept that *intention to use* has a significant effect on using information technology, which again leads actual usage (Venkatesh et al., 2003).

3.1 The Technology Acceptance Model

The Technology Acceptance Model (TAM) was introduced by Fred D. Davies in 1985 (Davis, 1985) and is a model for evaluating user acceptance in information systems. The goal of TAM was to provide theory for developers to successfully design and implement an information system. A second goal was to give developers a model for evaluating planned information systems before implementing them (Davis, 1985).

TAM is based on the Theory of Reasoned Action (TRA) by Fishbein and Ajzen (Ajzen and Fishbein, 1980). TRA is a general model from social psychology which was designed to identify what affected human behavior. Davies used TRA as a starting point and developed an adaptation of the model to fit information systems specifically (Davis et al., 1989). Both TAM and TRA are based on finding the underlying reasons for a person's behavioral intention. In TAM this means to discover the underlying reasons for a user accepting or rejecting an information system.

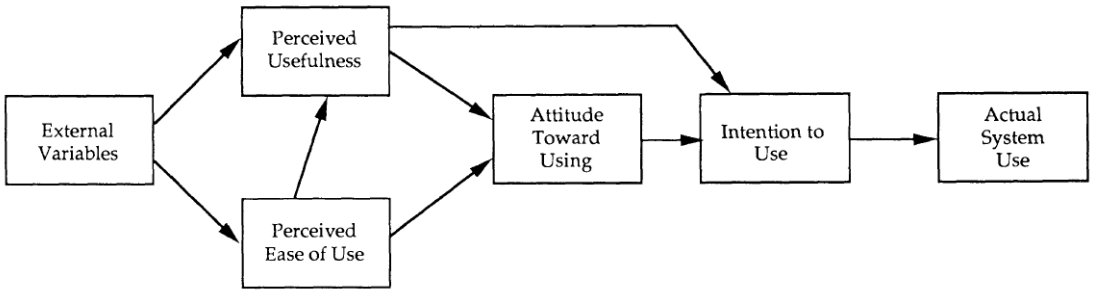


Figure 3.2: TAM (Davis et al., 1989)

3.1.1 Constructs of the original TAM

(Davis, 1989) came up with two determinants which were affecting the intention to using an information system; *perceived usefulness* and *perceived ease of use*:

1. Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or hers job performance" (Davis, 1989, p. 320).

2. Perceived ease of use is defined as "the degree to which a person believes that using a particular system will be free of effort" (Davis, 1989, p. 320).

As can be seen in Figure 3.2 both of these determinants are influenced by several *external variables*. Variables affecting *perceived ease of use* are for instance training and documentation (Davis et al., 1989). If an information system is well documented it will be easier for a user to start using it. The same applies for training. If the

company that is introducing a new information system has good training routines, it will be easier for the user to learn the system and accept the new technology.

In TAM, as shown in Figure 3.2, *perceived usefulness* and *perceived ease of use* contribute in the creation of an *attitude towards using* technology. The connection between *perceived ease of use* and *perceived usefulness* indicates that *perceived usefulness* will be affected by the level of user-friendliness in the information system. If the system has high user-friendliness, this will most likely increase the level of satisfaction for the user, and make the system more useful.

Even though *perceived ease of use* directly affects the *attitude towards using* the technology, it has no direct effect on the *intention to use* the technology. *Perceived ease of use* does not determine whether you will use a new information system or not, but will rather create an *attitude towards using* it. If an information system has high user-friendliness it will have a positive impact on the user and create a positive *attitude towards using* the new technology. If a new information system has no real usefulness for the user in doing his[1] job, it will not help that the system offers great user-friendliness. This is why *perceived ease of use* does not affect *intention to use* directly.

The connection between *perceived usefulness* and *intention to use* can be explained in the way that actual usefulness of using an information system will directly affect the intention to using it. If a user thinks that a new information system will increase his job performance it will have a positive effect on *intention to use*. *Intention to use* is also affected by the user's *attitude towards using* the information system.

3.1.2 Constructs of TAM 2

Technology Acceptance Model 2 (TAM 2) was developed by Viswanath Venkatesh and Fred Davies (Venkatesh and Davis, 2000) as an extension to TAM. The goal of TAM 2, according to (Venkatesh and Davis, 2000), was to include additional important determinants which affect *perceived usefulness* and *intention to use*, in addition to understand how the determinants can change over time as the user's experience increases. The model now includes social influence and cognitive instrumental processes to explain *perceived usefulness* and *intention to use*.

Figure 3.3 shows the structure of TAM 2. Inside the box on the right hand side in the figure we can see a simplified version of the original TAM (Figure 3.2). (Venkatesh and Davis, 2000) found that *perceived ease of use* appeared to have a direct effect on *intention to use*, without going through *perceived usefulness* and *attitude towards use*. *Attitude towards using* the system was found non-significant and therefore removed from the model. To read more information about *perceived usefulness* and *perceived ease of use*, see Section 3.1.1. Figure 3.3 also contains all the new determinants, including *voluntariness*, *experience*, *subjective norm* and *image* as

[1]Means his or hers. For the sake of readability we only use one gender throughout the report.

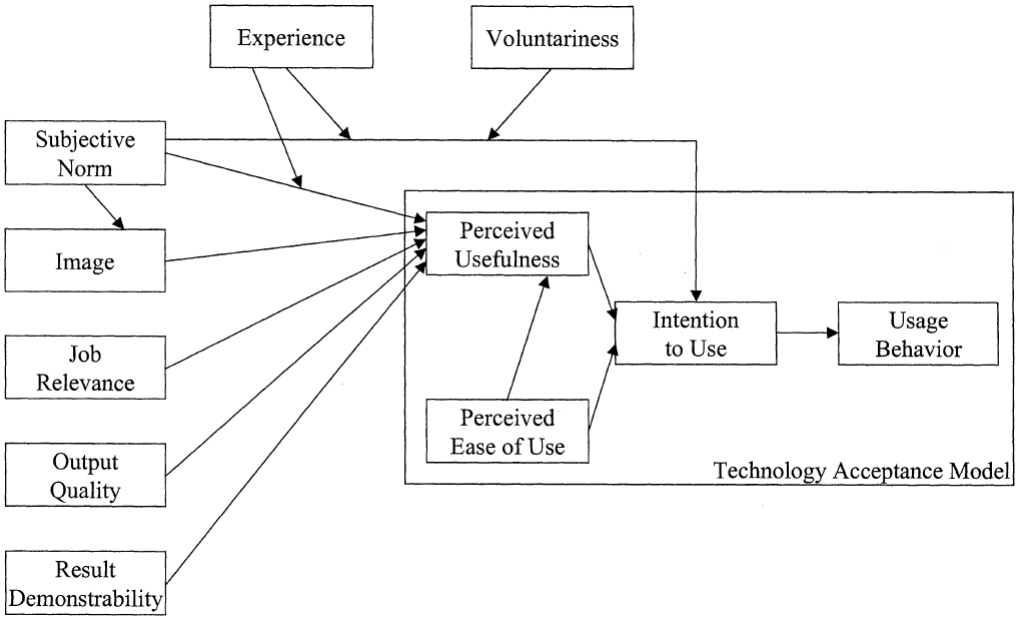


Figure 3.3: TAM 2 (Venkatesh and Davis, 2000)

social influence processes, and *job relevance*, *output quality*, *result demonstrability* and *perceived ease of use* as cognitive instrumental processes. (Venkatesh and Davis, 2000) presents the different determinants in the following way:

Social Influence processes

Subjective norm is what other people think and how they influence others to use, or not to use, an information system. *Image* indicates how much your social status will increase if you are using a new technology. *Subjective norm* will affect *image* as other people's opinions will have influence on your social status. (Venkatesh and Davis, 2000) says that increased social status will again contribute in greater job performance.

Voluntariness affect *subjective norm* in different ways depending on the situation. If the use of an information system is mandatory, *subjective norm* will have a direct effect on *intention to use*. On the other hand, if the use of the system is voluntary, then *subjective norm* will have no significant effect on *intention to use* (Venkatesh and Davis, 2000). That is, if you are using an information system at your own free will, then other people have little influence on your choice. This is in contrast to a mandatory setting, were the information system to use is decided for you, and *subjective norm* and social influence will play a bigger role. Thus, (Venkatesh and Davis, 2000) concluded that *voluntariness* will be a moderating factor of *subjective norm's* effect on *intention to use*.

Experience works in the similar way as *voluntariness* and is a moderating factor of

subjective norm's effect on *perceived usefulness* and *intention to use*. (Venkatesh and Davis, 2000) says that increased *experience* will decrease the effect of *subjective norm* to both *perceived usefulness* and *intention to use*. *Subjective norm's* effect on *intention to use* will apply for a mandatory setting only as *voluntariness* already has been stated to moderate this connection. This means that the effect of social influence will weaken over time as the user get more experienced in using the information system. As social influence would have a minor effect from the beginning in a voluntary setting, *experience* does not affect the connection between *subjective norm* and *intention to use* in a voluntary setting at all. When it comes to *subjective norm's* effect on *perceived usefulness*, this effect will decrease with more *experience* in both a mandatory and a voluntary setting.

Cognitive instrumental processes

Cognitive instrumental processes are the processes of comparing an information system's capability to what the user need to get done (Venkatesh and Davis, 2000). The system might be capable of doing the job, but it shall also present the results in a good way. Based on this, the cognitive instrumental processes will have a positive effect on *perceived usefulness* and increase the usefulness of the information system. The cognitive judgement is for the user to take. The cognitive instrumental determinants will be explained below.

Job relevance indicates to what degree the information system is capable of assisting the user in doing his job. *Output quality* is an evaluation of how good the system performs its tasks. *Result demonstrability* indicates how the system presents the result from the task that is performed. A system may present the results needed by the user, but it will still be bad *result demonstrability* if it does it in a poor way. *Perceived ease of use*, which is already presented in Section 3.1.1, must also be considered as a congnitive process. This is because it is a cognitive judgement to decide how much effort must be put into completing the task.

What effect *experience* will have on cognitive instrumental processes over time is also discussed in (Venkatesh and Davis, 2000). In the conclusions, the authors state that they do not have enough theoretical rationale to explain whether or not various effects (e.g. *experience*) on the cognitive instrumental processes will be affecting either *perceived usefulness* or *intention to use*.

3.1.3 Validity of TAM

TAM explains more than 40% of the usage intentions for an information system (Legris et al., 2003) and TAM 2 was in (Venkatesh and Davis, 2000) said to explain 60% of the variance in *perceived usefulness* and between 37% and 52% of the variance in the *intention to use*. Later in (Legris et al., 2003) it has, however, been stated that both TAM and TAM 2 can account for 40% of usage intentions. In support of

TAM it was in (Davis et al., 1989) concluded that "perceived usefulnes is a major determinant of people's intentions to use computers" (Davis et al., 1989, p.997), and that "perceived ease of use is a significant secondary determinant of people's intentions to use computers" (Davis et al., 1989, p.997). From (Venkatesh and Davis, 2000) it is also stated that both the social influence procesess and the cognitive instrumental processes of TAM 2 have a significant influence on user acceptance. In addtion to this, (Davis et al., 1989) had alone over 700 citations in 2007, and it has been the leading model of user acceptance for over two deacades (Bagozzi, 2007).

3.1.4 Shortcomings and limitations in TAM research

TAM has become an important model for studying the user acceptance in information technology. However, there has also been pointed out some shortcomings and limitations in the research which will be presented below.

In 2003 (Legris et al., 2003) did a critical review of TAM by analyzing 22 different articles on TAM research. They concluded with three significant limitations in the TAM research. The first is that most of the TAM studies are involving students. This is a question of cost, but in the opinion of (Legris et al., 2003) it would be better if TAM studies were performed in a business enviroment.

The second limitation pointed out was the type of applications which were studied. Mostly they studied the introduction of office automation software and systems development applications, and (Legris et al., 2003) believe that it would be benefitial to also study the introduction of business process applications. In another evaluation of TAM (Lee et al., 2003) it has been pointed out that multi-user systems and more complex systems in general should be included in the TAM studies.

The third limitation explained by (Legris et al., 2003) is self-reported use. They state that they do not actually measure system use, and that self-reported use will not give a precise measure. To exemplify what self-reported use is, (Legris et al., 2003) has taken an extract from the paper La Presse Montreal (Tuesday 17 October 2000) which in short says that observers in public toilets in the United States noted that only 67% of the persons washed their hands after visiting the toilet. In contrary in a telephone survey, 95% anwered that they washed their hands after going to the toilet. In (Lee et al., 2003) self-reported usage is reported as the most commonly reported limitation of TAM research. They say that 39 of the studies they examined relied on self-reported usage instead of measuring actual usage. To get more precise results, studies have to be done by observation or another form of monitoring. This will probably be more difficult to perform in addition to having higher cost in time and money.

In addition to stating that self-reported use is one of the major limitations of TAM, (Lee et al., 2003) also emphasize the importance of doing longitudinal studies as users expectations change as they get more experienced with using an information

system. In their research only 13 of 101 TAM papers which were examined were longitudinal.

3.2 Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) was developed by Viswanath Venkatesh et al. in 2003 (Venkatesh et al., 2003). UTAUT is based on a review of eight other models from user acceptance literature, and the goal was to create a unified model which is combination of elements from the existing models. An additional motivation for creating a unified model is to make it simpler for researchers to choose a model without having to sacrifice the contributions of other models (Venkatesh et al., 2003). As can be seen in Figure 3.4 the model is formulated to explain *behavioral intention* and *use behavior*. This is done through four determinants of intention and usage, in addition to four moderators which is moderating the effect of the determinants.

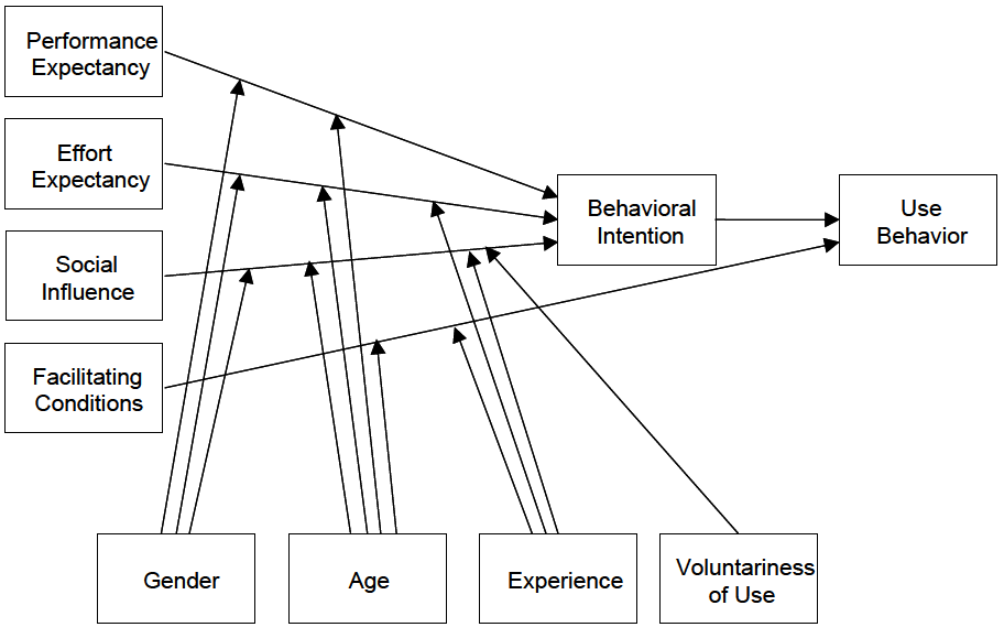


Figure 3.4: UTAUT (Venkatesh et al., 2003)

3.2.1 Constructs of UTAUT

In this section we will present the four determinants (*performance expectancy*, *effort expectancy*, *social influence*, *facilitating conditions*) and the four moderators (*gender*, *age*, *experience*, *voluntariness of use*) of UTAUT. We will also do some comparisons with TAM (Section 3.1), which is one of the models that were evalu-

ated in (Venkatesh et al., 2003).

Performance expectancy is the degree to which a user believes that an information system will help him get advantages in doing his job (Venkatesh et al., 2003). *Performance expectancy* can be compared to TAM's *perceived usefulness*, and works as a direct determinant of *behavioral intention*. As we can see in Figure 3.4, *performance expectancy* is not placed as a main determinant as *perceived usefulness* is in TAM (see Figure 3.3), but rather equated with the rest of the determinants. *Performance expectancy* is moderated by *gender* and *age*, indicating that the effect of *performance expectancy* is stronger for young men (Venkatesh et al., 2003). They state research has indicated that men are more task-oriented than women, and that age changes work expectation as people go through different phases in life (Venkatesh et al., 2003).

Effort expectancy is the degree to which a user believes that an information system is easy to use (Venkatesh et al., 2003). *Effort expectancy* can be compared to TAM's *perceived ease of use*, and is a direct determinant of *behavioral intention*. Like *performance expectancy*, *effort expectancy* is equated with the rest of the determinants in UTAUT, contrary to *perceived ease of use* in TAM (See Figure 3.3). *Effort expectancy* is moderated by *gender*, *age* and *experience* and it is stated in (Venkatesh et al., 2003) that the effect of the moderators will be stronger for younger women, especially with low experience. Some of the arguments are that *age* has an effect on the ability to learn new information systems, and that more *experience* will make systems easier to use.

Social influence is the degree to which a user believes that other people's opinions are important for the decision of using an information system (Venkatesh et al., 2003). *Social influence* can be compared to *subjective norm* which was introduced in TAM with TAM 2, and is a direct determinant on *behavioral intention* (See Figure 3.3). As for TAM, *experience* and *voluntariness of use* are moderators of *social influence*, in addition to *gender* and *age* (Venkatesh et al., 2003). The effect of the moderators will be stronger for older women, especially with low experience and in a mandatory setting (Venkatesh et al., 2003). Many of the same arguments as in TAM (see Section 3.1.2) are used to explain the effect of *experience* and *voluntariness of use*. (Venkatesh et al., 2003) say that gender theory reveals that women are more sensitive to *social influence* than men. *Social influence* will also be more prominent with older people, but will have a decreasing effect with experience.

Facilitating conditions is the degree to which a user believes that organizational and technical infrastructure will support the use of an information system (Venkatesh et al., 2003). *Facilitating conditions* is strongly related to *effort expectancy* in which that environmental factors will affect the using of an information system by making it easier to use and learn. By this we can say that it is also related to TAM's *perceived ease of use*. *Facilitating conditions* works as a direct determinant on *use behavior*. It has no significant effect on the *behavioral intention*, although it would

be natural to assume that *facilitating conditions* would predict *behavioral intention* if *effort expectancy* was not a part of the model (Venkatesh et al., 2003). *Facilitating conditions* is moderated by *age* and *experience*, so the effect will be more prominent for older and experienced people (Venkatesh et al., 2003). Research state that experienced users find more ways to get help and support, and that older people will be in more need for help and assistance in performing their job than younger people (Venkatesh et al., 2003).

Of a total of 32 constructs from the models which were evaluated, seven appeared to be significant direct determinants of intention or usage. Four determinants have already been presented. *Attitude towards using technology*, *self-efficacy* and *anxiety* was explained to not be direct determinants of intention and usage in UTAUT (Venkatesh et al., 2003). They are all modeled as indirect determinants of *behavioral intention*. The reason for this is that *self-efficacy* and *anxiety* are mediated through *effort expectancy*. *Attitude towards using* technology is defined as a user's emotional reaction to using an information system, and this determinant will indirectly affect all the four determinants of UTAUT (Venkatesh et al., 2003).

3.2.2 Validity of UTAUT and limitations in UTAUT research

As UTAUT is a much more recent model than TAM there have not been that many critical reviews of the model. It is though stated, based on the empirical validation in (Venkatesh et al., 2003), that UTAUT can explain 70% of the variance in usage intention. This is significantly more than any of the eight models which were examined in the study. Other strengths which are pointed out in (Venkatesh et al., 2003) are:

- UTAUT is based on a compromise between eight other existing models.
- All eight models in the study used within-subjects and longitudinal data from four organizations.
- UTAUT was tested by using original data from four organizations and cross-validated by adding data from two additional organizations.

UTAUT is by some considered to be another extension of TAM, and is criticized for just doing patchwork on TAM without making any integration and coordination within the model (Bagozzi, 2007). Bagozzi (Bagozzi, 2007) says that even though it is important to find all the variables that are influencing intention and usage, it is also important that the field of information systems does not get overwhelmed and confused by the growing number of piecemeal parts in technology acceptance.

Chapter 4

Groupware challenges

In this part of the preliminary study we will present some of the challenges of developing groupware. Groupware is defined as a collaborative application that helps people work together when they are in different locations (TechTarget, 2010). It is important to notice that groupware is defined in different ways by different researchers, and it can also be labeled as multi-user applications, computer-supported cooperative work (CSCW) applications or collaborative computing (Grudin, 1994). Some of the key features which groupware offers are a centralized location for data storage, possibilities for communication and improvement of groups' problem solving and collaboration capabilities (Marotta, 2006). Groupware can include specific features like bulletin boards, cooperative writing, e-mail/message system, meeting support systems, workflow systems, sharing of calendars and shared database/file access (Grudin, 1994). As can be seen in Figure 4.1, groupware applications can be placed somewhere between single-user applications, and larger mainframe systems in organizations. Groupware is often targeted at smaller groups than mainframe systems, meant for serving organizational goals. Groupware is also marketed as a product, as opposed to larger organizational systems, which are developed internal or contracted (Grudin, 1994).

When groupware was introduced it presented additional challenges to the ones known from single-user applications. Since individual persons interact with groupware applications, it has the same challenges as a single-user application, in addition to new challenges from multi-user environments and group processes (Grudin, 1994). The challenges presented in this chapter are taken from articles written by Jonathan Grudin (Grudin, 1994, 1988), where he explains why so many groupware applications fail to meet the expectations of the users. The challenges are presented below.

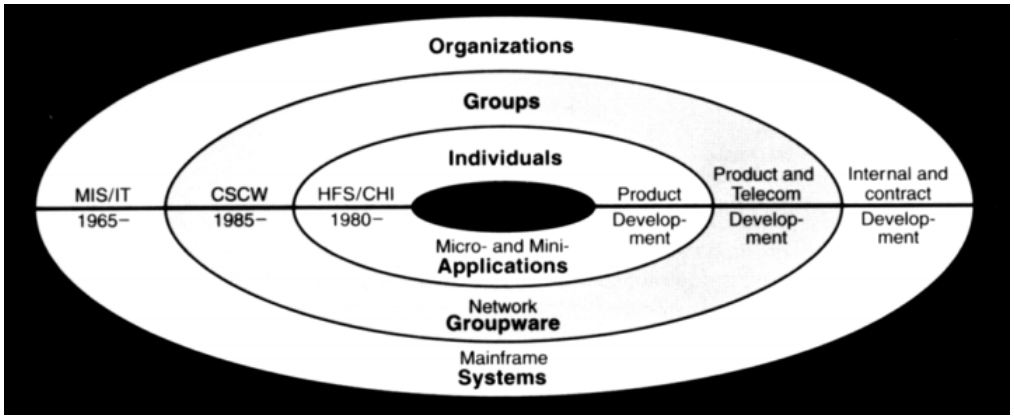


Figure 4.1: Development and research contexts (Grudin, 1994)

4.1 Disparity in work and benefit

The use of groupware applications will not always provide the same benefit for each person that is using the application. Even though groupware provides a collective benefit, some people will have to do additional work to create this benefit, without necessarily receiving a direct benefit from using the application themselves. In some cases this can lead to the application failing. An example of this problem is the use of an automatic meeting scheduling feature in an electronic calendar. The concept is that the meeting scheduler checks each person's individual calendar to find an appropriate time for a meeting. The question for this type of feature is who actually benefits from using it. In this case, it is most likely the manager, who initiates the meeting. The subordinates who shall participate in the meeting would have to do most of the work by maintaining their electronic calendars. To avoid this problem the ideal solution is for the developers to make groupware where the work is equally divided amongst the contributors, or at least minimize the extra work required. This is, however, not possible in all situations. An example of a successful groupware application where there is a good balance between work and benefit is e-mail.

4.2 Critical mass

The critical mass challenge is based on the concept that a groupware application is only useful if a high percentage of the persons in the group are using it. People may for instance have different preferences when it comes to choosing a word processor, but if they shall collaborate on a document they have to use the same collaboration tool. Obtaining the critical mass is essential to achieve the full advantage of groupware applications. To use the example of the electronic meeting scheduler, studies have shown that electronic calendars are mostly used as a communication device, and are not maintained properly by each contributor (Ehrlich, 1987). For

an electronic meeting scheduler to be successful, it is required that all the people in the group maintain their personal calendar at all times. Thus, in some cases, a drop-out of only one or two persons will result in the groupware application failing.

4.3 Disruption of social processes

People may resist the use of groupware if it interferes with complex social group dynamics. People are often guided by social, motivational, political and economic factors which are subtle and non-explicit factors which are hard to define in a development process of an information system. To handle this challenge it is important to consider the extent of the problem, and involve relevant users in the development process of groupware to get advice and insight in relevant social processes.

4.4 Non-standard use

Non-standard use of groupware applications is a challenge concerning how things are supposed to work and how they actually work in practice. Groupware is mostly designed to support standard procedures, but sometimes people make shortcuts and modifications which in many cases are exceptions which are not supported by the application. To handle this challenge it is important to learn how the work is actually done. The use of customizable systems can add flexibility, but customizing is also a challenge since people do not know the detailed organizational functioning and how people will be affected by the changes.

4.5 Unobtrusive accessibility

As features for supporting group processes in groupware are used relatively infrequently, it will require an integration with the more heavily used features for individual activity. The challenge is to create good design for infrequently used features. This leads to two important points when developing support for groupware. The first is that group support features will be better if they are integrated with features that support individual activity. An example is word processors and collaborative writing on a document. Instead of developing a standalone groupware application for collaborative writing, this feature should be integrated in the one used for individual writing. The second point is that the features should be designed to be unobtrusive, but still accessible for the users, without obstructing the more frequently used features. The key is to keep a good balance.

4.6 Difficulty of evaluation

Analysis, design and evaluation of multi-user applications are more difficult than for single-user applications. The main reason for this is the concern of the group members and not only an individual user. Different people using the same system have different backgrounds, jobs and preferences on how things should be done. In this way development of single-user applications can focus on a lowest common denominator, while development of groupware applications have to focus on all possible denominators (Grudin, 1988). Evaluation of groupware systems requires a different approach, based on methodologies from social psychology, making the evaluation more advanced. However, there will be a lower degree of difficulty in evaluating groupware systems if the groups in question are smaller and more homogeneous.

4.7 Failure of intuition

Intuitions in product development of groupware applications are generally poor. As mentioned in Section 4.6 it is hard for the decision-makers and managers to see the difficulty of developing and evaluating a groupware application. People's intuitions are often good when it comes to seeing the utility value for people similar to themselves, making the decisions-makers overlook and underestimate the extra work required to receive the actual benefit of the new application. The challenges in decision-making affect the design process, making it more vulnerable to errors. As for the evaluation in Section 4.6, the intuition will be less unreliable for smaller and more homogenous groups. To overcome this challenge it is important to bring in the potential users early in the decision phase.

4.8 The adoption process

Managing the acceptance of groupware is another challenge which has to be taken into account. The introduction of new groupware can be difficult and if the wrong strategy is used, the product will fail. Take for instance off-the-shelf sale. If a single-user application like a word processor is liked by one out of five customers it is likely to be a success. On the other hand, a groupware application that only appeals to one out of five persons in an organization would be failure (critical mass). It is important to introduce groupware in a cautious way and have the challenges described in the above sections in mind when planning, developing and introducing new groupware.

Part III

Research methods

Chapter 5

Survey[1]

A survey is a qualitative method for collection of data gathered from a given sample of people to create statistical information about some topic. Surveys are usually standardized which means that all the people in the sample will get the same questions. Surveys are one of the most used data collection techniques within social science, but also in the business sector to do market and organizational surveys (Ringdal, 2001).

The steps in the design of a survey are presented in Figure 5.1. A survey starts by defining the purpose and the problem the researcher would like to look into. The size of the objective for the surveys varies, and for smaller surveys performed by scientists or students, the objective is often bound to the purpose of the report or the thesis. The next steps are split into two paths as seen in Figure 5.1. One path is used to choose a data collection technique, then formulate the questions, and do a pilot test. The pilot test gives feedback on problems which should be fixed before the main survey. The second path is about the scope of the sample. The scope of the sample is the population which the sample is taken from. To plan the sample the researcher must define how large the sample must be, and how it shall be drawn. When the planning phase is over the fieldwork can start. The goal for the fieldwork is to find and contact all the persons in the sample. The next step is the supplementary work, which varies in quantity based on the data collection technique that was chosen. The last step is to document the data. The documentation is called metadata[2], and is important when the results from the survey shall be used by people who were not involved with the survey. When all these steps are performed the data are ready for analysis to check its reliability and validity.

There are several types of data collection techniques, and surveys are usually performed with personal-visit interview, phone interview or questionnaire (self administrated survey). In some cases a combination of techniques is used, for instance

[1]The main source for this chapter: (Ringdal, 2001)

[2]Metadata is data that describes other data

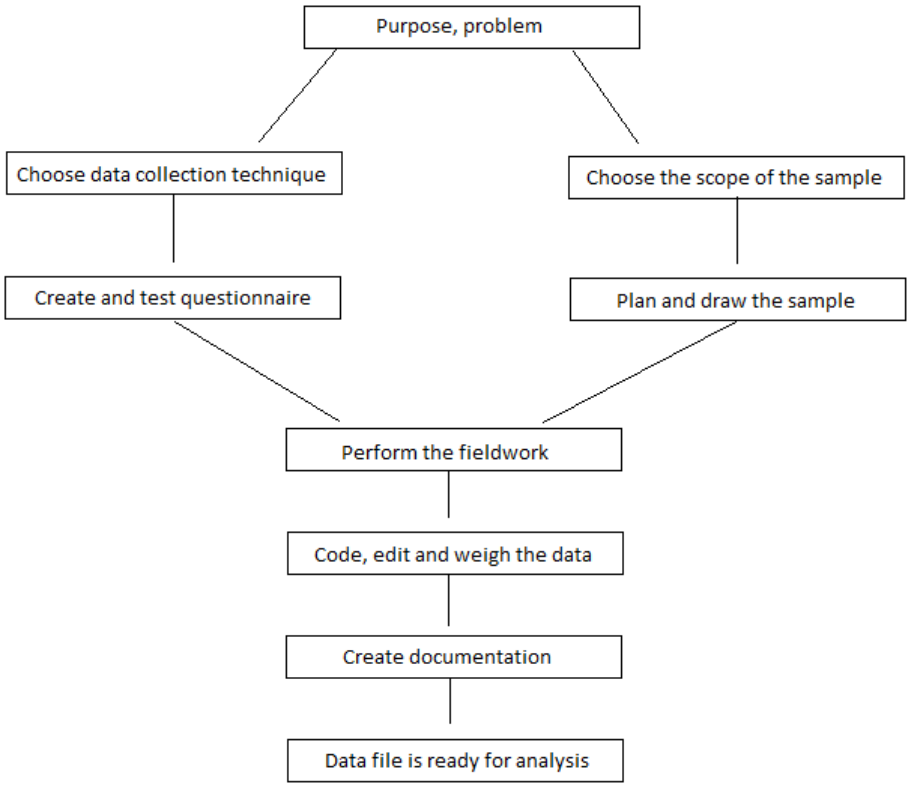


Figure 5.1: Steps in a survey (Ringdal, 2001)

a mix between personal-visit interview and questionnaire. The personal-visit interview is based on a face to face interview where the interviewer reads the questions for the respondent. The advantages of using this technique are that it is flexible, and that the interviewer can motivate the respondent and solve possible misunderstandings which may occur by giving follow-up questions. The main disadvantage is the high cost. The reason for this is that the researcher has to make appointments and visit all the respondents. This requires some organization. Other disadvantages are that it takes long time to perform and that the interviewer can influence the answers. The privacy protection in personal-visit interviews is low as the interviewer is present and that other people can overhear the interview. The phone interview is limited to auditory communication and the consequence of this is that the number of answer alternatives have to be low. An advantage of using phone interview is that it is cheaper than personal-visit interview. It can be performed quickly as all the communication is done from the same place. It is also easier to reach out to people which are geographically scattered. The disadvantages of using this technique is that the researhcer has to perform short interviews which can be superficial, and that people might deny to answer by hanging up on you. The privacy protection of the phone interview is average. As for personal-visit interview, people can overhear the interview. With questionnaire the respondent reads both the questions and the

answer alternatives at the same time. The advantages of using this technique are that it can be performed by only one person, and that it is by far the cheapest alternative. As for phone interview it can reach out to a large sample of people which are geographically scattered. There is a great degree of freedom in answering for the respondents and the performance time varies depending on the technical solution selected. The disadvantages are that questionnaire can give a high drop-out rate, and that there is little opportunity to control the process as the performance is completely up to the respondent.

Open and closed questions are two measuring techniques which are used for surveys. Open questions are questions where the respondent can answer freely, while closed questions have answer alternatives. The most used format for the closed questions is the Likert scale (Ringdal, 2001). Here the researcher base his questions on statements which are graded by the respondent. Each statement has from three to seven answer alternatives, for instance strongly disagree; disagree; neither agree or disagree; agree; strongly agree.

When formulating questions it is important to adapt them to the target group and not overestimate their knowledge level. Advanced/technical terms should not be used, unless the target group is some sort of experts, like for instance computer engineers or computer science students. It is also advantageous to create short questions. Longer questions can be hard to comprehend for the respondent and can be interpreted in the wrong way. For beginners it would be smart to reuse questions from other surveys as these questions have been tested before.

It is important to get a representative sample of people when doing a survey. A sample plan for a survey usually consists of these elements (Ringdal, 2001):

1. A sample scope which consist of a list that the sample can be drawn from.
2. Random drawing of persons from the list.
3. A mechanism which ensures that key groups in the sample are represented.

There are several techniques to draw a sample. Simple random sampling (SRS) is used when the researcher wants the same probability for all the people in the sample. Stratification can be used if the researcher likes to ensure that important groups are represented or overrepresented in the sample. Group selection is another technique where samples of groups or sample areas are drawn. Afterwards, a sample from these groups is drawn by SRS. In addition to this, there are techniques for non-probability selection and selection of rare populations (Ringdal, 2001). It is also important to consider the size of the sample. It is possible to calculate the necessary sample size based on the required precision. The estimates which are based on the results of the survey have error margins which decrease as the sample gets larger.

It is also important to minimize the size of total survey errors. We usually separate between measuring errors and representation errors. Different types of measuring

and representation errors are presented in Table 5.1.

Table 5.1: Survey errors

Measuring errors	**Representation errors**
Validity: How well do we measure what we actually want to measure?	*Coverage error:* Systematic bias which occur if the sample do not cover the entire population.
Reliability: Does repeated measurements give the same results?	*Sample error*: Errors which occur because we do measurements in a sample and not the entire population.
Editing errors: Technical errors in the editing of the data. Rarely gives severe errors.	*Drop-out error:* Error which is caused by drop-out of people. The representativeness of the sample is not influenced if the drop-out is random.
Adjustment error: The wrong use of weighting to fix drop-out errors can cause adjustment errors.	

Chapter 6

Interview[1]

The purpose of the interview is to gather information about a topic of interest by the researcher, rather than measuring variables like you do in a survey. An interview is usually performed to get information from a subject (the interview respondent) which have knowledge and experiences that the researcher is interested in. The interview is based on a conversation between the interviewer and the respondent and mostly open questions are used. An exception from their mode of operation is when registering background information about the respondent where standardized (closed) questions are more suited.

The content and the number of respondents needed for the interview will depend on the purpose of the interview. If the purpose of the interview is to get knowledge and information about a process in a company, a few respondents can be sufficient to give a good description. In other cases the purpose can be to understand how people experience a specific situation. In this case it will be necessary to interview more respondents as each person might have a different experience about the situation.

To maintain a structure when doing the interview an interview guide should be created. The interview guide is a set of questions which can be used by the researcher during the interview. The questions in the interview guide can vary from keywords to completely formulated open questions. How the interview guide is created depends on the purpose of the interview. For people who are not experienced in performing interviews it is a good idea to have formulated the questions in advance. The interview guide is supposed to be used as a guidance to make sure that the researcher gets the information that he needs.

It is important to notice that there is a difference between the interview which is described in this chapter and the structured interview which is used in surveys (See Chapter 5). The structured interview consists only of closed questions and is less flexible than the interview which is presented here. In some cases it might be

[1]The main source for this chapter: (Ringdal, 2001)

appropriate to use a combination of these two interview techniques, where important questions are given to all the respondents.

The interview usually starts with an introduction where the purpose of the interview is explained and the respondents get assured that the information from the interview is kept confidential (if this is necessary). In the beginning of the interview some people like to register some background information about the respondents which can be used when analyzing the interview afterwards. The interview guide is used as a manuscript to give the interview a structure. In some cases it is important that the interviewer follow up the answers to get as much information as possible. The follow-up questions can either be semi-planned questions taken from the interview guide, or improvised as the interview progress. The need for using follow-up questions depends on the respondent. Some respondents tell long stories where there is no need to interrupt, while others nearly have to be "forced" to give answers. Thus, the success of the interview depends both on the respondent and the relation between the interviewer and the respondent.

During the interview, the interviewer should behave in a neutral and non-leading way towards the respondent, so that he is not influenced in any way when giving answers. As there is room for improvisation in an interview, there is a risk that the interviewer will influence the respondent. To avoid this it is wise to prepare some follow-up questions in advance. It is also important for the interviewer to be aware of, and note the respondent's use of body language, as this can be important when analyzing the interview.

To register information from the interview there are three methods; take notes, sound recording or video recording. The most common way is to use sound recording. This has to be approved by the respondent before starting the interview. When using sound recording the interviewer can focus entirely on the respondent and all the information is captured by the recording equipment. After the interview, the sound recording has to be transcribed so that the interview can be analyzed. Video recording is similar to sound recording and should be used if the interviewer/researcher need visual information from the interview. The problem with video recording is that many respondents tend to deny the use of it during the interview. In some cases respondents will also deny the use of sound recording, and in that case you have to register the information by taking notes. The problem with taking notes is that the interviewer can be too occupied with taking notes and miss important information from the respondent. Taking notes is also well suited when you use a relatively detailed interview guide. In this case the interviewer can keep track of the answers by using the question numbers to structuring the notes. When taking notes it is important to transcribe the interview shortly after it is finished, as the interview notes are probably mostly keywords. In this way the interviewer will not forget important information. The interviewer will also have the advantage of being able to leave out irrelevant information at once, which will not be possible when transcribing the interview based on a sound or video recording.

Doing a measure of validity, reliability and generalization can be difficult for a qualitative research method like interview. This is because the qualitative research methods are just collecting data, rather than measuring predetermined variables as in the quantitative research. Validation says something about whether we actually measured what we intended to measure. This validation process has to be done by the researcher/interviewer or the participants in the interview. Reliability of the interview is based on random measuring errors which can be difficult to indentify for the researcher. Doing a statistical generalization of the results from interviews is possible, but there are rarely enough interviews to do this. Even though the sample for the interview is large enough, it can be difficult for the researcher to do a generalization as the interview is unstructured. This means that the interview does not use standardized questions where the answer can be measured for all the respondents.

Part IV

Execution and results

Chapter 7

It's Learning survey

In this chapter we present the execution and results from the user acceptance survey about It's Learning. The survey is performed to get additional results to the ones presented in the specialization project report (Grønland, 2009), were a similar survey was performed. The chapter will start by describing the purpose of the survey. Then we will describe the research model which is used to create the survey, and present the structure of the survey. After this we describe the execution of the survey and present the results.

7.1 Purpose of the It's Learning survey

The purpose of this study is to use the research model, which is presented in Section 7.2, as frawework model for performing a survey that measure the user acceptance of It's Learning. The goal is to see if the students are satisfied with It's Learning as a LMS for their university/university college. By doing the survey we will see if the results will support the results from the survey which was performed in the specialization project (Grønland, 2009), but also help us identify other problems and potential of improvement with It's Learning. A more specific purpose of each of the samples included in the survey is described in Section 7.4.

7.2 The research model

The user acceptance survey is based on a technology acceptance model, which we have created, that combines elements from both TAM and UTAUT. The research model was created to better adapt to It's Learning. The reason for creating a new model, instead of using one of the existing models which were presented in Chapter 3, was based on the experience from the It's Learning survey in the specialization project (Grønland, 2009). As mentioned in the introduction of the report we used TAM and the TAM 2 framework as a basis for creating the survey in the special-

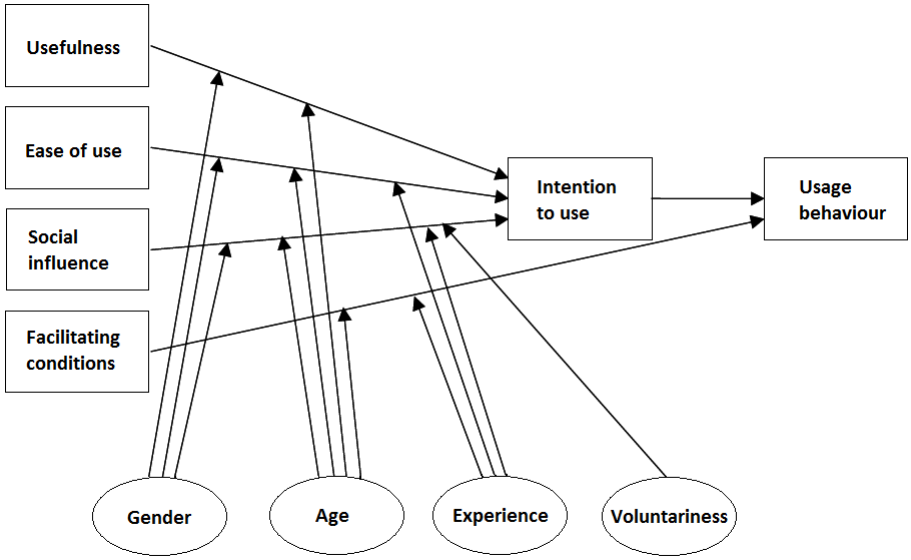


Figure 7.1: The research model

ization project. When evaluating the use of TAM in the specialization project we found that it could be convenient to use a simpler model with fewer determinants for explaining *perceived usefulness*. Some of the determinants also turned out to not be that relevant for It's Learning. Especially *image* did not fit well with the evaluation of It's Learning, but also the *output quality* and *result demonstrability* of It's Learning was hard for the students to evaluate. In addition to this, we learned that it was important to focus on more areas than just usefulness and user-friendliness when evaluating a complex multi-user system like It's Learning. Other factors, like the integration of the system at NTNU, and possible support services, had to be taken into account. This meant that UTAUT would be a more appropriate framework model for this survey, as the model distinguishes between four main determinants (See Section 3.2), instead of two as in TAM (See Section 3.1).

Based on this evaluation and the general experience from performing the survey in the specialization project, we have created a new model (See Figure 7.1). The model's construct and appearance is similar to UTAUT (See Figure 3.4), but there have been extensive changes when it comes to the questions and statements for measuring the determinants. We will base our discussion and evaluation of the results from the survey on the UTAUT constructs as they are presented in Section 3.2. We must, however, consider that we use different questions from the ones originally presented for UTAUT in (Venkatesh et al., 2003). There have been some small changes to the appearance of the research model to distinguish it a little from the original UTAUT. The names *performance expectancy* and *effort expectancy* (known from UTAUT) is changed to *usefulness* and *ease of use* (known from TAM). The names have been changed because we use questions from TAM to measure usefulness and user-friendliness in this survey. Thus, we found it more suitable to

use the terms from TAM. We also use the terms *intention to use* and *usage behavior* as they were used in relation to TAM throughout the specialization project report. In addition to this, we have changed the shape of the moderators in Figure 7.1 to distinguish the moderators from the determinants in the model.

All the statements that we have included in the research model can be found in Appendix A. The determinant *usefulness* is measured based on ten statements about the usefulness of It's Learning, taken from TAM (Davis, 1989). In (Davis, 1989) it was originally 14 statements, but we have chosen to include only ten of them. The reason for leaving out four of the statements was that we felt that some of them were too similar to each other. The statements "It's Learning addresses my school work related needs" and "It's Learning supports critical aspects of my school work" was combined into one question as they focus on the same topic. In this case we decided to use the text from the first statement as this fitted best with It's Learning. It could be hard for the students to define what the critical aspects of their school work are. We also removed the statements "Using It's Learning improves my job performance" and "It's Learning enables me to accomplish tasks more quickly". These statements were removed because we wanted to reduce the number of statements concerning the job performance and effectiveness in relation to It's Learning. These topics were already represented by the statements "It's Learning enhances my effectiveness in my school work" and "It's Learning increases the productivity in my school work". In addition to this, we removed the statement "Using It's Learning saves me time" as the statement "It's Learning reduces the time I spend on unproductive activities" represented much of the same topic.

The determinant *ease of use* is measured from 14 statements about the user-friendliness of It's Learning, taken from TAM (Davis, 1989). As opposed to *usefulness*, we have included all the 14 original statements from (Davis, 1989) in the model. The determinant *social influence* is measured from three statements about how social influence affects the students' use of It's Learning. These three statements are the same as we used for *subjective norm* in the specialization project and they are taken from TAM (Venkatesh and Davis, 2000). The determinant *facilitating conditions* is measured from six statements to discover if important infrastructures and services exist to support the students' use of It's Learning. For *facilitating conditions* we have used four statements from UTAUT (Venkatesh et al., 2003) and added two more statements from the specialization project (Grønland, 2009). The two extra questions were important for the survey in the specialization project and focus on the integration of It's Learning at the university/university college.

The moderators *age*, *gender* and *experience* will be measured through some general questions about the students' age, gender and how long they have used It's Learning. The moderator *voluntariness* is measured by three statements to discover if the students are using It's Learning voluntary, and is closely related to the determinant *social influence*. The statements are taken from TAM (Venkatesh and Davis, 2000) and are the same statements that we used for the survey in the specialization project.

7.3 The survey

The survey for measuring the user acceptance of It's Learning is based on the research model which was presented in Section 7.2. In contrast to the survey which was performed in the specialization project (Grønland, 2009), this survey will only consist of one part. It was practical to use two parts in the specialization project as we wanted to focus on the role of usefulness and user-friendliness in technology acceptance. As we have taken a wider focus on technology acceptance in this study, it is more appropriate with one survey. The survey is a little simplified and more adapted to It's Learning as we use a research model that is a customized version of UTAUT and TAM. The major change from the survey in the specialization project to this survey is that there is less focus on the specific functionality in It's Learning.

The survey can be found in Appendix B. The first section in the survey contains questions concerning general information about the students and their relation to It's Learning. This section will cover the measure for the moderators *age*, *gender* and *experience* in the research model (See Figure 7.1). We will also ask the students how many of their subjects that are using It's Learning in the current semester. The reason for adding this question to the survey is that the specialization project revealed that one of the problems with It's Learning at NTNU was that not all the subjects were using the system. The second section contains questions concerning how often the students use the functionality which It's Learning offers. These are general questions about the use of It's Learning and are not covered in the research model (See Figure 7.1). The third section in the survey is about measuring the usefulness of It's Learning, and is based on the questions from the determinant *usefulness* in the research model. The fourth section is about the user-friendliness in It's Learning and is based on the determinant *ease of use* in the research model. The fifth section in the survey contains statements about how social influence affects the students' use of It's Learning. This section consists of questions from the determinant *social influence* and the moderator *voluntariness*. These two factors are put in the same section as *voluntariness* moderates the effect of *social influence*, and thus are closely related. The sixth section contains statements concerning how different infrastructure and services support the students' use of It's Learning. The statements are taken from the determinant *facilitating conditions* in the research model. The last section of the survey contains a total assessment of It's Learning, where the students shall evaluate It's Learning as a whole.

The data collection technique we used for the survey was questionnaire (self administrated survey). This technique is presented in Chapter 5. We used both open and closed questions in the survey. The closed questions were mostly related to the research model, and were mandatory. The open questions were elaborative questions were the students could give more specific and detailed answers. The data were collected electronically by using the Google Docs feature "Forms" (Google, 2010). The use of an electronic method made an effective data collection compared to the

manual data collection method used in the specialization project. Before the survey was performed, a pilot test was carried out. The pilot test only revealed the need for minor changes, like spelling errors and some question rewrites.

7.4 Execution of the It's Learning survey

The survey was performed with three student groups. The first survey was performed with students from the Faculty of Informatics and e-learning at Sør-Trøndelag University College (HiST). The reason for choosing a sample of students from another university college was so that we could compare the results from HiST with the results from NTNU, and explore possible differences in the use of It's Learning. The survey was performed in the time period from the 12th of February to the 19th of February with a total of 64 respondents.

The second survey was performed with students from the Department of Industrial Economics and Technology Management at NTNU. The reason for choosing this sample of students was to compare and possibly confirm the results from the specialization project (Grønland, 2009). These results, in addition to the results from the specialization project, will also be used when comparing the results with the results from HiST. The second survey was performed from the 16th to the 23rd of April with a total of 70 respondents.

The third survey was performed with students from the Department of Psychology at NTNU. The reason for performing this survey was to get a sample from a field of study that is non-technological when evaluating the use of It's Learning at NTNU. The results will be compared with both the results from HiST and the rest of the results from NTNU. The main purpose with this sample was to see if there were any differences in between the student groups with an education with a technological profile and non-technological profile. The third survey was performed from the 16th to the 23rd of April with a total of 50 respondents.

The data analysis of the results from the survey was done by creating a representation of the mean results from the statements so that we could compare the results from each student group in an easy way. We also created box-plot graphs (See Appendix D) for all the statements so that we could get a better indication of the distributions of the data than what we could get from the mean result representation. From this we have created a basis for a discussion of the data from the survey, together with the students' answers from the open questions (qualitative data).

7.5 Results from the It's learning survey

This section presents the results from the three surveys that were performed in this study. The questionnaire used for the surveys can be found in Appendix B. When presenting the results, we will also show the results from the survey in the

specialization project (Grønland, 2009), so that we can compare them with the new results. The survey in the specialization project was performed with students from the Department of Computer and Information Science at NTNU. We will present the results in the sequence that they are presented in the survey (See Appendix B). As described in Section 7.4, the results are based on samples of students from informatics and e-learning at HiST, economy and management at NTNU and social science at NTNU. The informatics and e-learning students at HiST will be referred to as "HiST" throughout the result section as the purpose of this sample is mainly to do a comparison with NTNU. In addition we will compare the results with the results from the survey in the specialization project, which consists of computer science students from NTNU.

We start by presenting some background information about the student groups, then the use of the functionality in It's Learning, and continue with the a presentation of the utility value and user-friendliness of It's Learning. Then we present how social influence and facilitating conditions affect the use of It's Learning, and last we present the students' total satisfaction with It's Learning. When reading the results in this section it is advised to continuously refer to Section 7.3 and 7.2, which describes the structure of the survey and the research model where the statements are taken from. The Likert scale that was used to measure the statements in the survey ranges from *strongly disagree* (1) to *strongly agree* (5), with an exception of Section 7.5.2 where a three point scale is used, and Section 7.5.7 where we use a five point satisfaction scale.

The results in this section will be presented as mean values. The number scale which was used to calculate the mean results are based on the number of alternatives for the statements. For example, when *strongly disagree*, *disagree*, *neither agree or disagree*, *agree* and *strongly agree* are the alternatives, the mean can range from one (1) to five (5).

7.5.1 Background information

This section presents some general results from the first part of the survey where the students were asked to enter some general background information about themselves (See Appendix B). This section was used to measure the moderators *gender*, *age* and *experience* in the research model (See Figure 7.1). How the moderators are measured is described in Section 7.2. The first section of the survey also contained a question on how many of the students' subjects that are using It's Learning in the current semester. This question was added so that we could get an indication on how frequently It's Learning is used among the teachers. The results from the first section in the survey are presented in Table 7.1. Some of the variables presented in Table 7.1 are not available for the computer science student group as these results are taken from the survey in the specialization project (Grønland, 2009). The average experience is based on the students' total number of years using It's Learning, and

not only at NTNU.

Table 7.1: Background information

	HiST	**Economy and management**	**Social science**	**Computer science**
Gender (dist.)	Male: 86% Female: 14%	Male: 66% Female: 34%	Male: 18% Female: 82%	Male: 100% Female: 0%
Age (avg.)	24.5 years	22.7 years	24.4 years	21.7
Experience (avg.)	3.0 years	3.2 years	4.22 years	3.8 years
All subjects using It's Learning (dist.)	88%	24%	20%	N/A

7.5.2 Use of functionality

Figure 7.2 shows the mean results from the usage of the functionality in It's Learning. The functionality is coarsely divided into seven parts which are presented in Chapter 2. *Projects* and *create new project* are part of the same functionality, the *project functionality*. *Create project* indicates whether or not the student has created a new project, and *projects* indicates whether they have been part of a project group in It's Learning (e.g. using the *project functionality*). When the students were asked how much they use a given functionality, they were told to measure it against their overall of use of It's Learning. The scale for measuring the usage consisted of three alternatives; *never* (1), *sometimes* (2) and *often* (3).

The results in Figure 7.2 indicates that the *announcements* and *subject information* are the most used functionality by the students, with means from 2.02 to 2.47 for *announcements* and a means from 2.25 to 2.73 for *subject information*. The use of the *project functionality* varies a little between the student groups. The economy and management students use the *project functionality* more than the other student groups. By looking at the distribution of the answers in Appendix C, we can see that only 3% of the economy students said that they *never* attend projects, and that 9% answered that they have *never* created a project. This is a lower share than for the rest of the student groups in this study (17% and 34% for the HiST students and 14% and 30% for the social science students). When it comes to the results from the computer science student group, we can see that the means for the use of the *project functionality* is considerably lower than the other student groups (1.30 - *projects* and 1.12 - *create new project*). 73% of the computer science students answered that they *never* attend projects, and 86% answered that they have *never* created a new project. The *calendar functionality* is rarely used by any of the student groups, but the students at HiST seem to use this functionality more than the students at NTNU. Looking at the distributions of the answers we can see that 64% of the HiST

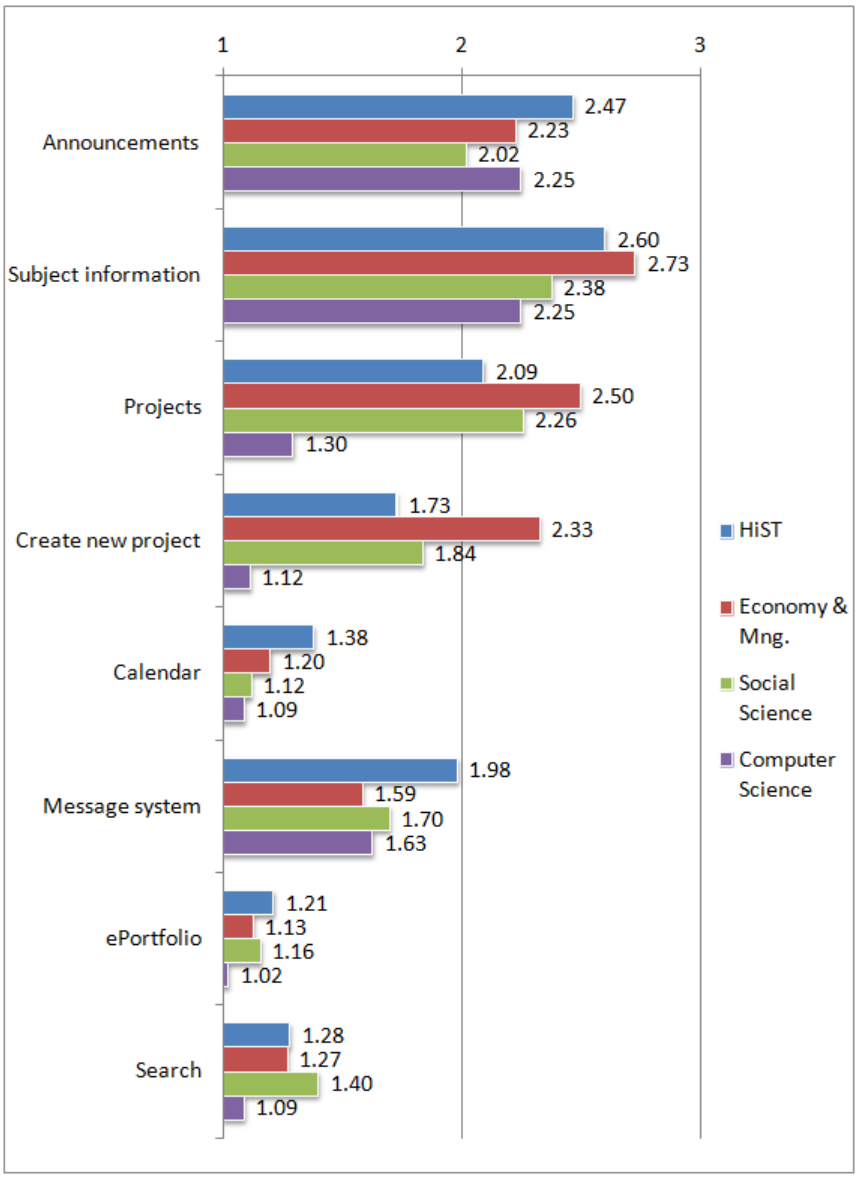


Figure 7.2: Mean results for the usage of functionality

students answered that they *never* use the calendar functionality, compared to 83-91% for the student groups at NTNU. The same applies for the use of the message system, where Figure 7.2 shows that the HiST students are using the *message system* more than the students at NTNU. 17% of the HiST students answered that they *never* use the *message system* in It's Learning, compared to 34-43% for the student groups at NTNU. The mean results (See Figure 7.2) show that the *ePortfolio* and the *search functionality* are seldom used by students. The use of functionality in its entirety shows that the computer science students generally use the functionality that is offered by It's Learning less frequently, with an exception of *announcements* and *subject information*.

7.5.3 Usefulness

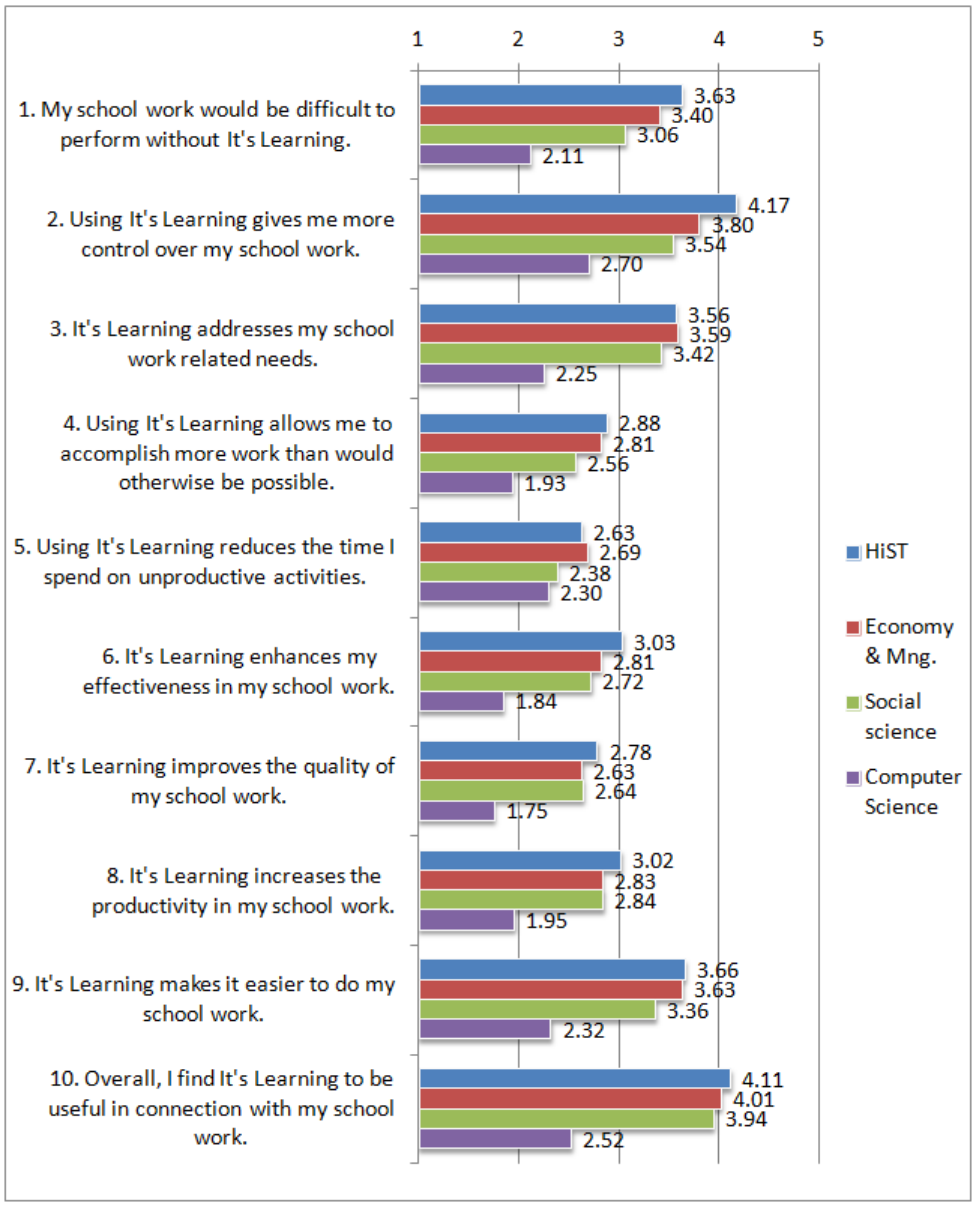


Figure 7.3: Mean results for usefulness

Figure 7.3 shows the results from the statements concerning the usefulness of It's Learning. These statements are taken from the determinant *usefulness* in the research model used for the survey in this study (See Section 7.2). The total mean for HiST, economy and management and social science are 3.35, 3.22 and 3.05 respectively, indicating that the usefulness of It's Learning is perceived to be above average by these student groups. The total mean for the computer science students is 2.17, indicating a below average satisfaction with the usefulness of It's Learning. The overall evaluation of the usefulness in statement 10 shows that the HiST, economy and management and social science students believe that It's Learning has an

overall high utility value, with a mean ranging from 3.94 to 4.11. The computer science students indicate that they do not see the utility value of It's Learning, with a mean of 2.52. Overall, the results in Figure 7.3 shows that the computer science student group have considerably lower means than the other student groups for all the statements determining *usefulness*, with an exception of statement 5.

7.5.4 User-friendliness

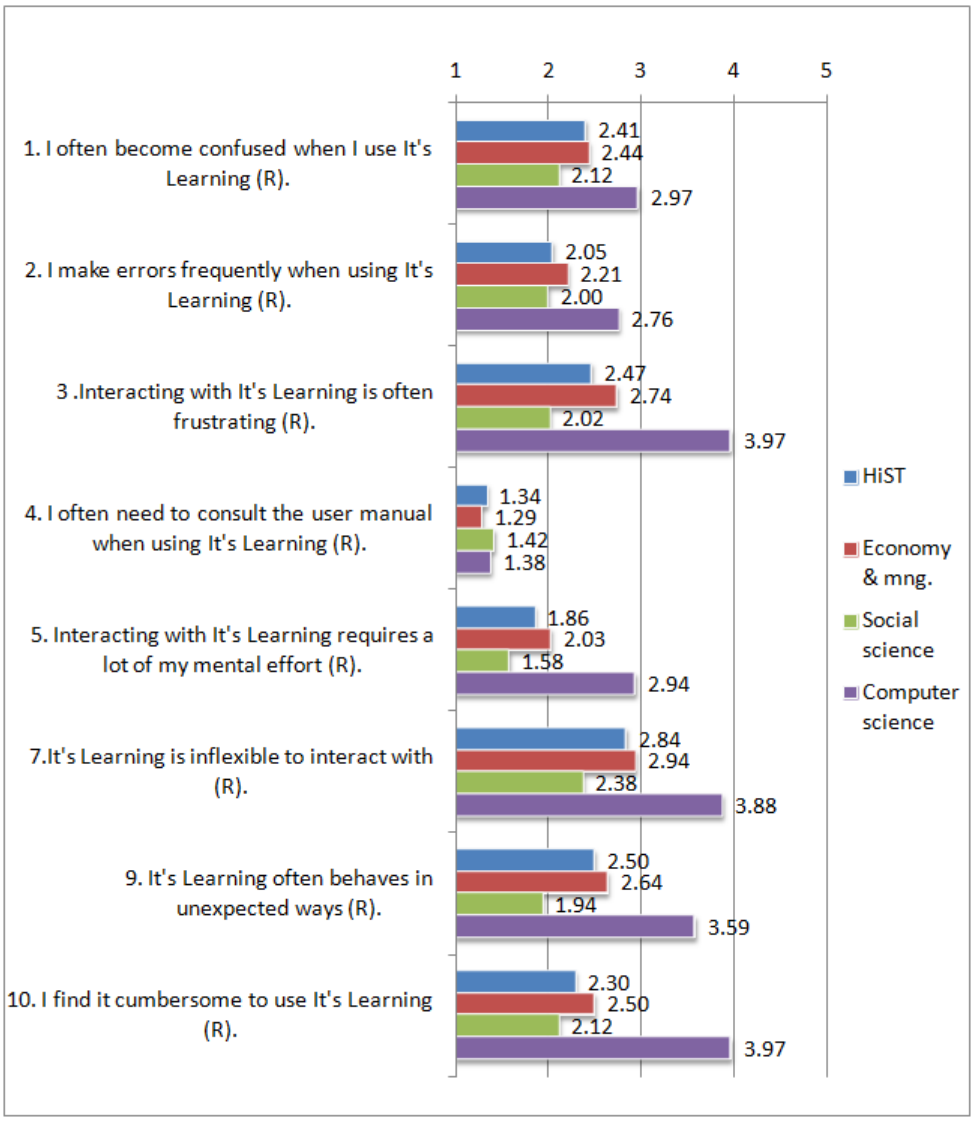


Figure 7.4: Mean results for user-friendliness (reversed)

Figure 7.4 and 7.5 show the mean results from the statements concerning the user-friendliness of It's Learning. These statements are taken from the determinant *ease of use* in the research model (See Section 7.2). The statements are divided in two separate diagrams because some of them are "reversed", meaning that they are angled

in a negative way. The statements in Figure 7.4 have a negative angle (reversed) towards *ease of use*, while the statements in Figure 7.5 have a positive angle towards *ease of use*. The total means for HiST, economy and management and social science for the statements in Figure 7.4 are 2.22, 2.35 and 1.95 respectively, while the total means for the statements in Figure 7.5 are 3.49, 3.41 and 3.63 respectively. Thus, the means indicate that the user-friendliness of It's Learning is perceived to be above average by these student groups. The total mean for the computer science students for the statements in Figure 7.4 (reversed) are 3.18, while the total mean for the statements in Figure 7.5 are 2.87. This indicates a below average satisfaction with the user-friendliness of It's Learning. As for the statements about usefulness in Section 7.5.3, the results from the computer science student group have considerably lower means (higher for the reversed statements) than the other student groups for most of the statements determining *ease of use*.

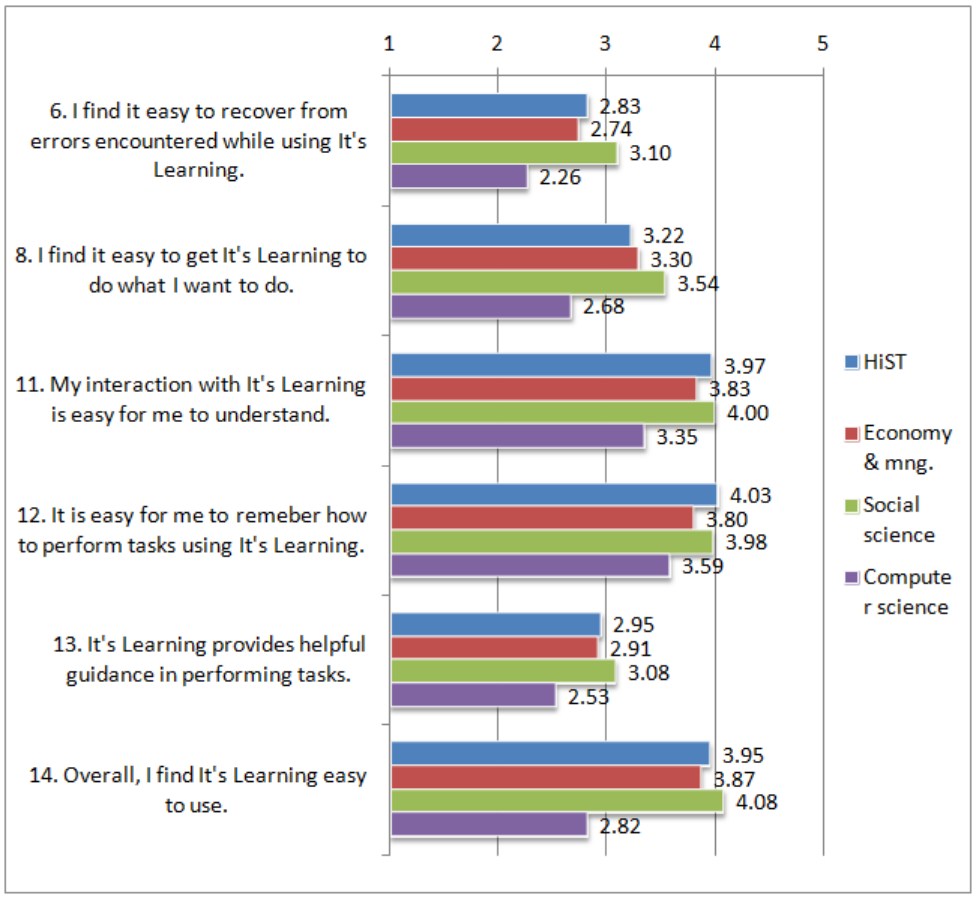


Figure 7.5: Mean results for user-friendliness

7.5.5 Social influence

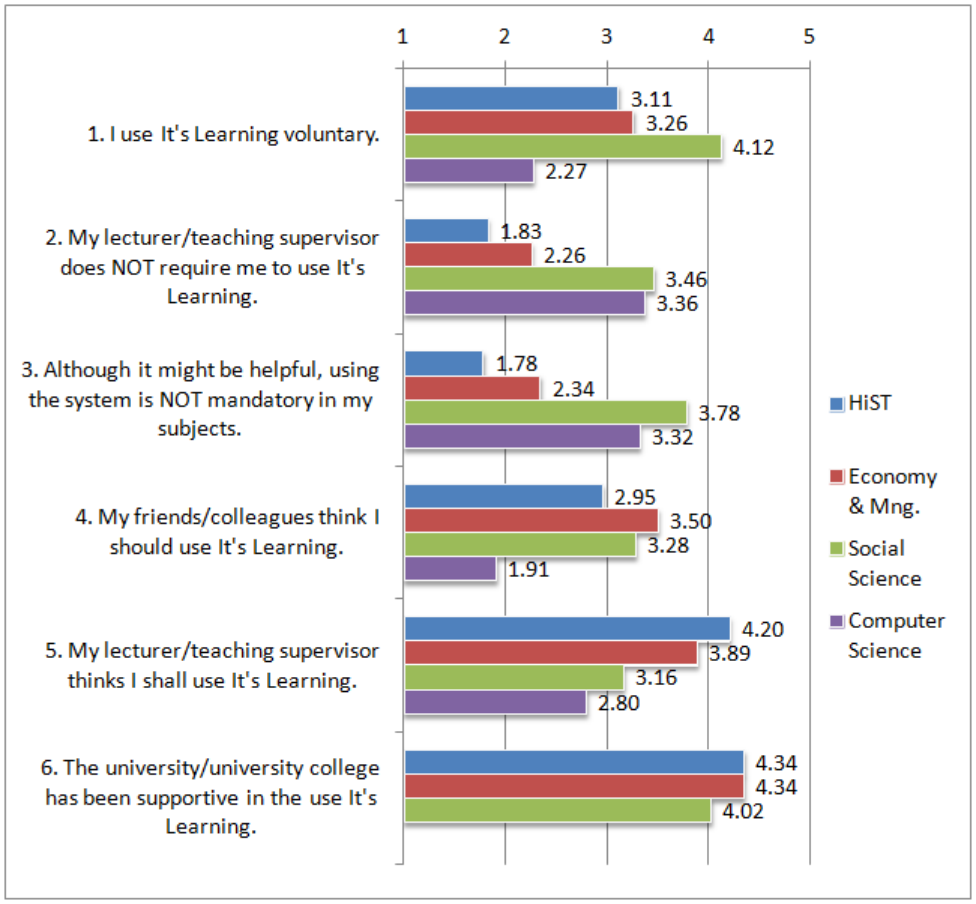


Figure 7.6: Mean results for social influence

Figure 7.6 shows the mean results from the statements concerning how social influence affects the use of It's Learning. Statement 1 to 3 are taken from the moderator *voluntariness* in the research model, while statement 4 to 6 are taken from the determinant *social influence* in the research model (See Section 7.2). The total mean for the statements about *voluntariness* for HiST, economy and management, social science and computer science are 2.24, 2.62, 3.79 and 2.98 respectively. The means indicate that the social science students believe that the use of It's Learning is highly voluntary, while the rest of the student groups indicate a below average degree of voluntariness in the use of It's Learning. The total mean for the statements about *social influence* for HiST, economy and management, social science and computer science are 3.83, 3.91, 3.49 and 2.35 respectively. In this case, the means indicate that the computer science students are not considerably influenced by other people, while the rest of the student groups indicate that they are being influenced by others in using It's Learning. It is important to notice that statement 6 was not included in the specialization project survey (Grønland, 2009), so this statement is not included in the mean for the computer science student group. *Voluntariness* is a moderator

of *social influence* (See Figure 7.1). The effect of this relation will be discussed in Section 9.4.

7.5.6 Facilitating conditions

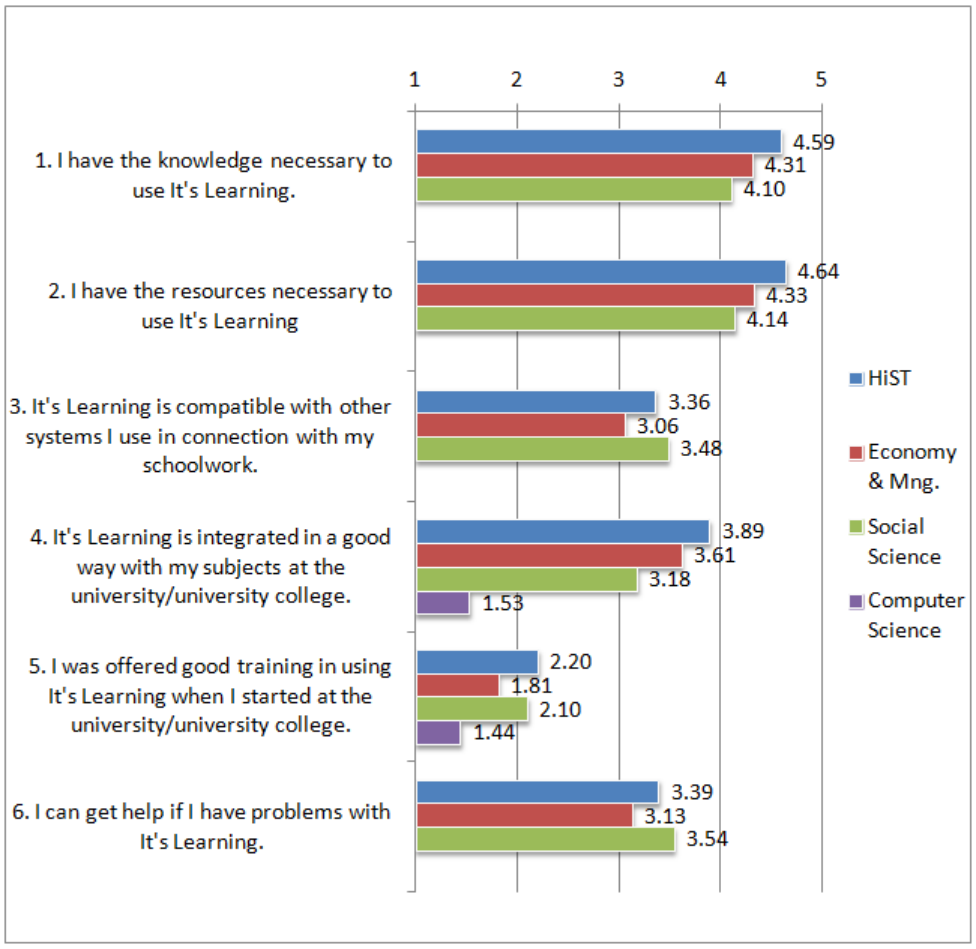


Figure 7.7: Mean results for facilitating conditions

Figure 7.7 shows the means from the statements concerning how facilitating conditions affect the use of It's Learning. These statements are taken from the determinant *facilitating conditions* in the research model (See Section 7.2). This determinant affects *usage behavior*, as opposed to the other determinants in the research model, which affect *intention to use*. This means that *facilitating conditions* has no direct effect on the students' *intention to use* It's Learning. The total mean for HiST, economy and management and social science are 3.68, 3.38 and 3.42 respectively, indicating that these student groups believe that the school's support infrastructures and services are above average for It's Learning. We have chosen not to include the mean for the computer science students as only statement 4 and 5 were included in the specialization project survey (Grønland, 2009). However, these statements had a mean of 1.53 and 1.44, indicating that the computer science

students are not satisfied with the way It's Learning is integrated at NTNU, and the amount of training in using the system.

7.5.7 Total assessment

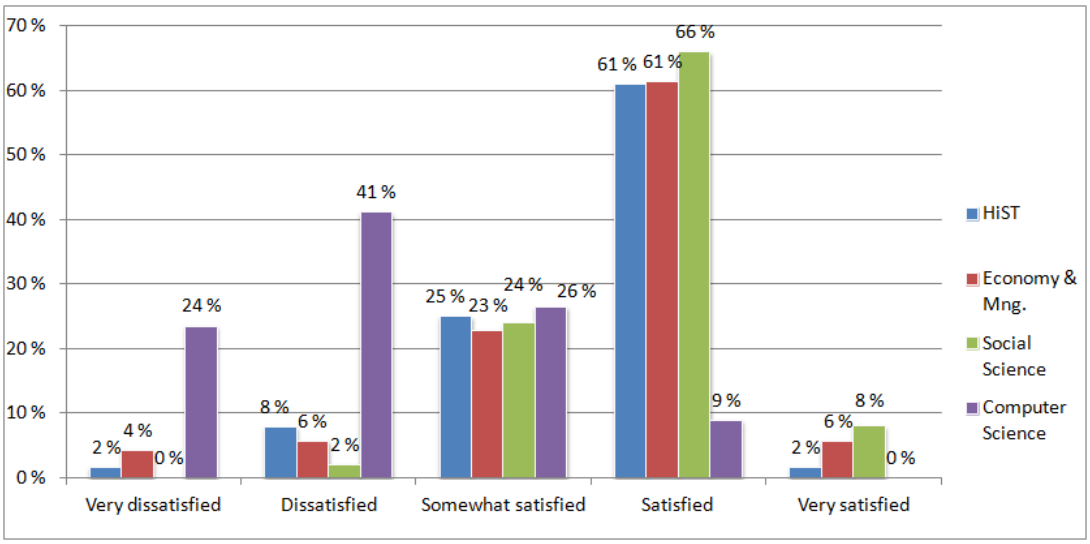


Figure 7.8: Results from the the total assessment of It's Learning

Figure 7.8 shows the students' total assessment of It's Learning. The results show that HiST, economy and management and social science are satisfied with It's Learning as 63% to 74% answered that they were satisfied or very satisfied with It's Learning. In contrary, in the survey performed in the specialization project (Grønland, 2009), 65% of the computer science students answered that they were dissatisfied or very dissatisfied with It's Learning.

Table 7.2: Main reason for dissatisfaction

	Percentage of students answered	**Alt. 1: low usefulness**	**Alt. 2: low user-friendliness**	**Alt. 3: Other**
HiST	31%	10%	50%	40%
Economy and management	31%	14%	68%	18%
Social science	18%	44%	44%	11%
Computer science	74%	44%	36%	20%

If the students were dissatisfied with It's Learning they were told to indentify the main reason for this (See the last section Appendix B). Table 7.2 shows the number of students that answered this question and how the answers were distributed among the alternatives. The students from HiST who answered that there were other

reasons (alternative 3) for their dissatisfaction emphasized user-friendliness issues like low flexibility, the use of frames[1], slow response and that the It's Learning is cumbersome to use. Another reason was that not all the teachers are using It's Learning. The economy and management students answering that there were other reasons for their dissatisfaction wrote that there was a mix of both usefulness and user-friendliness issues. One social science student answered that there was another reason for his dissatisfaction. He wrote that not enough teachers use It's Learning. The computer science students answering that there were other reasons for their dissatisfaction wrote that It's Learning has to be used in more subjects, that there are too much unnecessary functionality, that It's Learning is not integrated with the subjects at NTNU in a good way, and that there is a problem that It's Learning is closed to people who do not take a particular subject.

[1]Read more about frames at the World Wide Web Consortium: http://www.w3.org/TR/REC-html40/present/frames.html

Chapter 8

It's Learning interview

This chapter presents the execution and results from the interviews about It's Learning. The interviews were performed with some of the teachers at NTNU. We will first describe the purpose and execution of the interviews, and then present the results.

8.1 Purpose of the It's Learning interview

The purpose of the interviews is to get an indication of the teachers' opinions about It's Learning. In addition to this, we would like to get a better understanding of why some teachers do not use It's Learning, as this was indicated as a problem in the user acceptance survey that was performed in the specialization project (Grønland, 2009). The results from the interviews will also contribute to identifying the problems and potential of improvement for It's Learning at NTNU.

8.2 Execution of It's Learning interview

The interviews were performed with teachers (professors) at the Department of Computer and Information Science at NTNU in the period from the 10^{th} of February to the 17^{th} of February. We decided to perform an interview with the teachers to get an indication on how It's Learning is perceived at NTNU. As people experience It's Learning in different ways, we decided that it would be appropriate to interview both teachers that are using It's Learning and those who do not. Doing only three interviews we cannot expect to draw any conclusions about the teachers' perception of It's Learning in general, but it will give us some indications on important factors that we can discuss.

For the interviews we created a fairly detailed interview guide which can be found in Appendix E. The guide is divided into three parts. The first part consists of general

questions for all the respondents. The second part consists of questions intended for the respondents that are not using It's Learning, while the third part is intended for the respondents that are using It's Learning. The use of the interview guide varied from respondent to respondent, but the general questions in the first part of the guide were used with all the respondents.

When deciding how to register the information from the interview we considered two of the options presented in Chapter 6; taking notes or using audio recording. We decided to go with the first alternative as we were going to perform short interviews and because it was the simplest method. During the interview we took notes in the form of keywords and small sentences, and shortly after the interview was finished we transcribed the interview. This method worked well and the use of keywords and small reminders in the notes made us reproduce the conversation with the respondent when transcribing the interview.

The data analysis of the results from the interviews was done by categorizing the transcribed interviews (See Appendix F) into the in the three predefined categories from the interview guide; general questions, questions to the teachers who do not use It's Learning, and questions to the teachers who use It's Learning (See Appendix E). We did a data reduction of the interview transcriptions by creating summaries of the answers in each category. From the summaries we grouped the answers to fit the questions in the interview guide. From this we have created a good overview of the results and a basis for discussing the data from the interview.

8.3 Results from the It's Learning interview

In this section we present the results from the interviews about It's Learning which were performed with three of the teachers at NTNU. The results will be presented as summaries in three tables which focus on answering the questions presented in the interview guide in Appendix E. The three interviewees use the aliases Alpha, Beta and Charlie. Table 8.1 is a summary of the answers which are based on the general questions about It's Learning (See part one in the interview guide). All the respondents are included in this table. Table 8.2 is a summary of the answers which are based on the questions to the teacher who is not using It's Learning (See part two in the interview guide). Respondent Alpha is included in this table. Table 8.3 is a summary of the answers which are based on the questions to the teachers who are using It's Learning (See part three of the interview guide). Respondents Beta and Charlie are included in this table. The questions presented in Table 8.1, 8.2 and 8.3 will mostly be similar to the ones presented in the interview guide, but there may be some variations in content and sequence. See Appendix F for the complete transcription of the interviews.

Table 8.1: Answers from the general questions about It's Learning

	Alpha	**Beta**	**Charlie**
Do you use It's Learning?	No.	Yes, but has not used it in some time now.	Yes.
What is the NTNU administration's attitude towards the use of It's Learning?	Not been recommended to use It's Learning.	Got some sort of recommendation or hint to start using It's Learning.	Lacks a more active attitude from the management at NTNU concerning the use of It's Learning.
Have you been offered any training courses in using It's Learning?	No mandatory training.	No mandatory training.	Attended a course when It's Learning was introduced. Believes it is better to explore the system on his own.

Table 8.2: Answers from the teacher who do not use It's Learning

	Alpha
Why do you not use It's Learning?	Teaching assistants are doing the job of updating the web page for the subject. Did not find any reason for changing to It's Learning as it was quicker to send an e-mail with information to the teaching assistants.
Which alternative to It's Learning are you using? Why is this alternative better?	Uses regular subject web pages. Regular web pages cover the needs for the subjects he is teaching. An open web page gives the possibility to market his subjects to everyone.
What can make you use It's Learning?	The use of It's Learning has to be easier to use than regular web pages. This means that administrating It's Learning would have to be easier than sending e-mails with subject information to the teaching assistants. As little work as possible. If it was mandatory to use It's Learning he believes that there would be no choice.
How do you perceive the use of It's Learning at NTNU today?	Reports said that there was much fuss and difficulties with the system in the beginning. It's Learning is possibly better today. He believes it is a little cumbersome to work with, but knows people who like it.
What else?	There are probably better alternatives to It's Learning, but that the most important thing is utility value for the people who shall use the system. Not everyone is eager to try new systems if they do not see any utility value that makes the system better than what already exists.

Table 8.3: Answers from the teachers who use It's Learning

	Beta	**Charlie**
Are you satisfied with It's Learning as a LMS at NTNU? Why? Why not?	Somewhat satisfied with It's Learning. It was a little fuss and difficulties in the beginning, but the system is better now.	Satisfied with It's Learning. It offers a lot of advantages over regular web pages, but it also has some weaknesses. (See below).
What are the advantages of using It's Learning?	The students have all the information in one place and get notified about updates in a particular subject. It is cumbersome for the students to have some subjects that use It's Learning and other subjects that use their own web page.	-The possibility for creating forums for discussion between students, teaching assistants and teachers. -Everything is arranged for you. All the functionality is in one place and you only have to add information. -You do not have to use a lot of time maintaining a web page. There is little value added for the features that are not in It's Learning. For a regular web page you mostly duplicate features that are already in It's Learning. -Easier for the students and the student assistants as they only have to focus on (learning) one system and gives the teachers more control.
		Continued on the next page

Table 8.3: Answers from the teachers who use It's Learning

	Beta	**Charlie**
What are the problems with using It's Learning?	-Students who are not registered in the student register at NTNU cannot access It's Learning. This is especially a problem with foreign students as it takes time to register these students. -It's Learning has no option for releasing public information and material.	-Cumbersome to administrate student groups and register exercises. -The system is closed. There is no good feature for creating public material. It also takes time before the students get access to It's Learning as they first have to be registered in a central system at NTNU. It is possible to register them manually, but this is a cumbersome method. -(These problems are also the advantages for the regular web pages)
What functionality are you satisfied with in It's Learning?	-Functionality for publishing general information. -It is practical to send messages to the students as he does not need to create an e-mail list and add all the participants manually.	-The "grade book". A feature for administrating exercises. Gives the possibility to choose between mandatory and non-mandatory exercises and register scores per exercise. All the information about the students' exercises is available to the teacher. Reports can be created for each student, giving the teacher an overview of the student's activity in It's Learning. -Forums for discussion. -Copying teaching material from an earlier semester from the archived subjects. -The survey tool is convenient for evaluating individual exercises and the subject as a total.

Continued on the next page

Table 8.3: Answers from the teachers who use It's Learning

	Beta	**Charlie**
What functionality are you missing, or are not satisfied with, in It's Learning?	-It should be possible to transfer subject material from one semester to the other, so that all the subject information does not have to be uploaded again at the start of a new semester. -It is difficult to define groups of students within a subject. -Approving of exercises can also be cumbersome as exercises can only be defined as mandatory or non-mandatory. There should be support for a combination. For instance, five out of eight exercises have to be approved.	-No decent feature for group division and assigning of teaching assistants to each group. He had to use a seperate web page for this purpose for a while, but the problem was solved by creating group folders with the belonging students and teaching assistants. -No search function for finding students when approving exercises. This problem was solved by filtering on group, displaying all group members in one screen.
What of It's Learning's functionality do you use?	The most basic functionality like publishing information, curriculum and slides. Sometimes uses the survey tool to get feedback from the students at the end of a semester.	Discussion forum, calendar, test tool and survey tool, in addition to the basic functionality for publishing information, exercises etc.
How is It's Learning perceived by students and other teachers?	Have the impression that people get more and more satisfied. He believes that the students' opinion about It's Learning have changed in a somewhat positive direction.	He has the impression that the students in his subjects are satisfied with his use of It's Learning.

Continued on the next page

Table 8.3: Answers from the teachers who use It's Learning

	Beta	**Charlie**
How to improve It's Learning?	-Better dialogue between It's Learning AS and the users of the system (at least the major users) concerning updates and maintenance of the system. -It is a problem that It's Learning is a closed system with no decent feature for making educational material public. Students, other teachers and also people from other universities and schools could be interested in the subject information. This could be improved with an enhanced access control system with different access levels. This way the teacher can differentiate between material available for the students only, and material that shall be public. -A possibility to generate a public web page for a subject would be a nice feature.	-Make it possible to have parts of It's Learning available in public so people can access subject information and material without registering. The use of different levels of access control would be suitable. It should be possible to define a "teaching assistant" role, not just "student" and "teacher". -Some teachers do not utilize the potential in It's Learning for administration of exercises, discussion forums and calendars with activities. He believes it is all about giving It's Learning a chance. To make all the teachers use It's Learning, he believes it has to be mandatory to use the system. A suggestion for improving the use of It's Learning is for the teachers to learn from each other by sharing experiences. Another suggestion is that the lecture schedule should be automatically registered in the It's Learning calendar.

Continued on the next page

Table 8.3: Answers from the teachers who use It's Learning

	Beta	**Charlie**
How to utilize the potential in It's Learning?	N/A	-He believes you gain the most out of It's Learning for large subjects, as there is a lot of work with regular web pages when the subject has many participants (without saying that it should not be used for smaller subjects). -People have to use some time to get familiar with It's Learning. A system does not have to be perfect for people to start using it. It is important to make the most out the poor parts of It's Learning. There is a problem that the teachers do not find any reason for changing to It's Learning as they believe that regular web pages cover the needs for their subjects.

Continued on the next page

Table 8.3: Answers from the teachers who use It's Learning

	Beta	**Charlie**
What else?	N/A	-He tells about the SDK that has been developed for It's Learning. This gives the users the opportunity to develop applications for It's Learning and customize the system. NTNU can utilize the resources they have to expand and customize It's Learning for specific subjects. There is also a need for having a running dialogue between It's Learning AS and the major users of It's Learning to benefit from the SDK. -He has not tried any alternatives to It's Learning, but is aware that there exist open source alternatives. An open source variant would be easier to customize for the exact needs of NTNU, but would require a lot of resources to operate. For It's Learning it is the opposite, as you pay for a package of functionality and operation of the system.

Part V

Discussion

Chapter 9

It's Learning survey discussion

In this chapter we will discuss the results from the user acceptance survey about It's Learning (See Section 7.5). We will discuss the survey results starting with the use of the functionality. Next we will discuss the results concerning the usefulness and user-friendliness, and continue with a discussion about how social influence affect It's Learning and if there are facilitating conditions that support the students' use of It's Learning. Then we will do a discussion of the students' total assessment. The results presented in Section 7.5.1 will be discussed in the sections where they are relevant, and will therefore not have a separate section in this chapter. We will also do an evaluation of the research model and the survey where possible survey errors will be discussed. The discussion of the results will be based on the mean results presented in Section 7.5, the distributions of answers in Appendix C and the box-plot graphs in Appendix D. In addition to this, we will use the data from the open questions in the survey to back up and explain the results. When referring to the "student groups from this study", we mean HiST, economy and management and social science, as opposed to the computer science student group from the specialization project (Grønland, 2009).

9.1 Use of functionality

The results from the students' use of the functionality in It's Learning are presented in Figure 7.2. The results indicate that the announcements page (the main page of It's Learning) and subject information functionality, in addition to the project functionality, is the most frequently used functionality. This is the functionality that the students have to use if the subjects they attend are using It's Learning. Looking at Figure 7.2 there are some variations in the answers among the student groups, which probably is a result of each individual student's evaluation of the question. The students were told to estimate their usage of the different functionality against the total amount of time they use on It's Learning, and the students may have different interpretations of the alternatives "sometimes" and "often".

Many students write that they only use It's Learning to get subject information, slides, exercises and other relevant school material, meaning that It's Learning is not used in the way it is intended to do. This may lead to dissatisfaction among the students as the system does not add any new features compared to a regular web page with subject information. The only real advantage It's Learning offers over a regular subject web page when used in this way, is that all the information is in the same place.

The use the project functionality (See projects and create new project in Figure 7.2) is not as widespread as announcements and subject information among the students. This is expected as the project functionality must be considered as an extra feature for the students, where they can create their own project and work groups. As presented in Section 7.5.2, the economy and management students use the project functionality more than the other students. This is also supported by many of the answers to the open questions, where the economy and management students suggest improvements for the project functionality. The students believe that It's Learning's project functionality should have support for real-time communication like chat, collaborative writing on documents (like Google Docs[1] offers) and sharing of calendars. Chat is also mentioned as a missing feature by the HiST students. This is a function that would improve the utility value of It's Learning. Support for real-time features should be used in all parts of It's Learning, not only the project functionality. For instance, an easily accessible real-time chat would increase the effectiveness in the teaching as teachers and students could communicate in an easy way. Students from both economy and management and HiST also write that the forum should be connected to activities in It's Learning like exercises and other published material. This way a forum thread for a given exercise can be found together with that exercise, and not in a separate forum.

The results also show that the computer science students rarely use the project functionality. The reason for this is that they have alternatives which they believe are better. They find that It's Learning's project functionality is more cumbersome to use than for instance Google Docs, Dropbox[2] and file repositories at NTNU. This indicates that It's Learning's project functionality probably do not offer any extra advantages compared to the more simple applications mentioned above. A reason why the computer science students use the project functionality less frequently than the other student groups is probably that they are more eager to explore other solutions, and that they have higher expectations to the software as they are computer science students. However, a question that arises is why the HiST students do not have the same attitude as they study computer science (informatics and e-learning) as well. An answer can be that the use of It's Learning is more widespread (mandatory) at HiST than NTNU, reducing the chance of students exploring other alternatives. Even though we do not have results for the computer science students, the last row of Table 7.1 shows that more subjects use It's Learning at HiST than

[1]Read more about Google Docs at: docs.google.com/

[2]Read more about Dropbox at: http://www.dropbox.com/

at NTNU.

The calendar functionality is rarely used by the student groups and much of the same findings as presented in the specialization project (Grønland, 2009) are supported by results in this study. More subjects have to use It's Learning and the teachers have to continuously update the calendar with tasks, lectures and other activities. There is no utility value for the students in using the calendar as long the teachers do not use it regularly. If more teachers also use It's Learning the students can have the activities for all their subjects in the same calendar, making it more useful. Another feature that would improve the calendar functionality is the possibility for importing and exporting. This way the students could synchronize the It's Learning calendar with their own personal calendar (for instance the calendar on their mobile phone, in Microsoft Outlook[3] or Google Calendar[4]). A synchronizing feature will increase the utility value for each subject using It's Learning as a student can add the activities for a given subject into his calendar.

Even though the message system is more frequently used than the calendar, it suffers from some of the same problems. It has to be taken into use by the teachers, and good integration with other messaging systems, like the student e-mail system, is important for being put to use. Today (2010), there is no way to integrate the message system in It's Learning with other e-mail systems, with the exception of a forward function for messages. From Figure 7.2 we can see that the NTNU students use the message system less frequently than the students from HiST. It seems to be a common conception among the student groups at NTNU that e-mail is a more standardized way of communicating, and as not all the teachers use the message system, it will not contribute to any benefit for the students. The real benefit of using the message system is for the teachers as they do not have to create mailing lists for their subject(s). However, as for the calendar functionality, the message system would be of more use if all the teachers and students at NTNU used the same system. The It's Learning message system may work well with schools that do not have their own e-mail system, but in the case of NTNU an integration of with the existing student e-mail system is most likely the key to a success.

The HiST students use the message system more frequently, which is probably linked to a more widespread use of It's Learning at HiST as discussed above. Looking at the box-plot graph for the use of the message system in Appendix D, we can see that HiST have a large group of students saying that they *sometimes* (2) use the message system. We also have some outliers on each side of the scale that use the message system *often* (3), and those who *never* (1) use it. Some of the students wrote that they use an alternative message system called "HiST exchange", and because of this they have never used the message system in It's Learning. This may count for all the outliers, indicating that It's Learning's message system is actually used on a

[3]Read more about Microsoft Outlook at: http://office.microsoft.com/en-us/outlook/FX100487751033.aspx

[4]Read more about Google Calendar at: www.google.com/calendar/

regular basis among the rest of the students at HiST.

The search functionality and the ePortfolio functionality are the least used functionality in It's Learning. The search functionality is perceived as useful, but is in most cases not needed by the students as they find what they need without it. Some of the students wanted a better search function for finding information about other students. However, this feature also depends on having many of the students in It's Learning. Some students from economy and management and computer science also mentioned that they have worked as teaching assistants at NTNU[5], and was missing a good feature for grouping students and a search function to find a particular student when approving exercises (See related discussion in Chapter 10). The box-plot graph for ePortfolio in Appendix D shows that only a few students (the outliers) use this functionality. ePortfolio is by most of the students regarded as unnecessary functionality and some of the students write that they have never heard of it.

9.2 Usefulness

The results for usefulness in Figure 7.3 shows that the surveys performed in this study generally has higher means for all the statements compared to the survey performed in the specialization project (Grønland, 2009). This means that neither the HiST students nor the economy and management and social science students at NTNU support the computer science students' opinion that It's Learning has a low utility value. Even though the results differ, the student groups from this study identified many of the same problems as the computer science student group did when it comes to the utility value of It's Learning.

As mentioned in Section 9.1, there seem to be a general opinion among the students that It's Learning is a place to get information and school material for the subjects. This means that a reason for the differing results can be that the student groups in this study measure the usefulness in seeing It's Learning as an information channel only. On the other hand, the computer science students see It's Learning as what is supposed to offer, and thus feel that It's Learning's usefulness potential is not utilized properly. Students from HiST and economy and management also write that they find It's Learning useful as a place for publishing information, which support the above hypothesis. We can also back this up by looking at the results in Figure 7.3. The statements having a mean above average (statement 1, 2, 3 and 9, in addition to statement 10 about the overall evaluation of the utility value) are the statements concerning control, support and simplification of school work. The statements presenting It's Learning as a tool for increasing effectiveness, productivity and quality of the school work (statement 4 to 8) are rated below average also among the student groups in this study. This distinction indicates that It's Learning primarily help the students in organizing their subject information and material,

[5]Teaching assistants are employed for administrating the exercise system in a subject and guide students when they perform exercises.

but do not really provide any help in improving the daily school activities. Still, the means for statement 4 to 8 in Figure 7.3 are lower for the computer science students than the other student groups. However, the seemingly large differences can be caused by the students' use of the Likert scale. Looking at the box-plot graphs for usefulness statement 4 to 8 in Appendix D, we can see that the computer science students has a larger group of answers at the bottom of the graph than the other box-plots. In the case where the computer science students use *strongly disagree* (1), a student from another student group can content himself with only *disagree* (2). This phenomenon will influence the means and will be discussed more in the evaluation of the survey in Section 9.7. Other reasons for the variation in the results between the computer science students and the other student groups will be discussed in Section 9.6, as it concern all the parts of the survey.

The students claim that one of great benefits of using It's Learning is that they have all the school related information in one place. This way they only have to learn and relate to one system. The problem is, as stated by all the student groups at NTNU, that not all the teachers use It's Learning for their subjects. A student from economy and management wrote: *"The utility value decreases fast if several subjects use their own web pages. The intention of having all the subjects in one place does not work in practice. This makes It's Learning just another place for finding information instead of what it is supposed to be"*. This statement explains one of It's Learning's problems at NTNU in a good way. The teachers do not use It's Learning, and the potential in the system is thus not utilized. This is called the "critical mass" challenge in Chapter 4, and is also discussed further in Chapter 11.

As discussed in Section 9.1, the lack of teachers using It's Learning will decrease the utility value of the functionality that It's Learning offers, and make some of the functionality, like for instance the calendar, superfluous. This issue is not mentioned as a problem among the students from HiST, as more subjects use It's Learning (See last row of Table 7.1). Another issue, however, which is mentioned by both students at HiST and NTNU, is that the teachers do not use the functionality that It's Learning offers in a good way. If the teachers do not utilize the functionality that It's Learning offers, or do not use it at all, the usefulness of the system will disappear.

When the students were asked how the utility value of It's Learning could be improved, almost all the answers from the social science students indicated that the teachers had to use, or be better at using It's Learning. Ideally, a teacher should use It's Learning for all activities concerning his subject, including continuous use of the calendar, publishing and submission of exercises, having discussions in forums and for sending messages to the students via the message system. However, some questions do arise: Does It's Learning support all the necessary features that the teachers need at a university/university college? How user-friendly is It's Learning for the teachers compared to the alternatives? These questions are discussed in Chapter 10 in connection with the interviews performed with three of the teachers

at NTNU.

A topic that was presented by the computer science students in the specialization project, but which was mentioned only a few times by the students in this study, is that It's Learning is a closed system. This means that It's Learning has, as of today (2010), no decent feature for publishing material for people who are not participants of a particular subject. This way It's Learning excludes possible groups of users, like for instance students and other teachers who like to get information about a subject without being a part of it. A computer science student also mentioned that an open system would benefit the reputation of NTNU, as other schools and universities could access information and teaching material. This topic is discussed further in Chapter 10, as this was important for the teachers we interviewed.

The students claim that many of the features mentioned in Section 9.1 are important for increasing the utility value of It's Learning, like real-time communication and integration of the calendar and messaging system with existing calendars and e-mail systems. In addition to having all information in one place, the students also claim that It's Learning offers some additional advantages in having a good overview of all their exercise deadlines, and the possibility to deliver exercises and other tasks within the system, instead of on paper. The students also appreciate that It's Learning offers a feature for creating their own project group workspace. Especially the economy and management students, which use the project functionality the most, emphasize the utility value of having this feature. The students from NTNU also request the possibility to log into It's Learning via the It's Learning web page portal, instead of using "Innsida"[6]. Another request that is mentioned by all the student groups is the possibility to access subject material from previous semesters. It's Learning actually saves all the information from the students' previous subjects, but these requests clearly indicate that not all students are aware of how to access this information. A combination of a more self-explanatory graphical interface and better training in using It's Learning would contribute to solving this problem.

The research model in Figure 7.1, which the survey in this study is based on, shows that *usefulness*, which is moderated by *age* and *gender*, is a direct determinant of the students' *intention to use* It's Learning. According to the UTAUT theory in Section 3.2.1, the effect of *usefulness* on *intention to use* is stronger for young men. UTAUT research has indicated that men are more task-oriented than women, and that age changes work expectations as people go through different phases in their life. This means that the effect of *usefulness* will influence *intention to use* in a strong degree in this study, as the average age for all the students groups are below 25 (See Table 7.1). Especially the HiST and computer science students will have a strong influence as these groups have a clear majority of male participants (See Table 7.1).

[6]Innsida is the intranet portal at NTNU

9.3 User-friendliness

The results for user-friendliness in Figure 7.4 and 7.5 shows that the surveys performed in this study has generally higher means (lower for the reverse statements) on most of the statements than the means from the survey performed in the specialization project (Grønland, 2009). Thus, neither the HiST students nor the economy and management and social science students at NTNU support the computer science students' opinion that It's Learning has low user-friendliness.

Figure 7.4 and 7.5 shows that the satisfaction varies among the students, but that the computer science students are most critical about the user-friendliness of It's Learning. Particularly statement 3, 7, 9 and 10 in Figure 7.4 have high means compared to the other student groups. The computer science students write that they are clearly annoyed by It's Learning's inflexible and cumbersome user interface, which is supported by the means for these statements. Many of the particular reasons for their annoyance will be presented in the next paragraph. It is not easy to define why the computer science students indicate much more dissatisfaction than the other student groups. As will be presented below, all the student groups describe mostly the same problems with the user-friendliness in It's Learning. A reason for the differences can be that the computer science students may have better knowledge of what good user-friendliness in information systems is, as usability evaluation is a mandatory part of their education. This may contribute to making them more critical. However, why do the HiST students not have a similar opinion as they also study computer science (informatics and e-learning)? This question and other reasons for the variations in the results between the computer science students and the other student groups will be discussed in Section 9.6, as it concern all the parts of the survey.

From Figure 7.5 we can see that statement 11 and 12 have higher means for all the student groups compared to the rest of the statements in this figure. These two statements clearly indicate that the students have no problems with understanding and performing tasks in It's Learning. This is also supported by statement 4 (reversed) which has a very low mean for all the student groups, indicating that the students rarely need help from any sort of user manual for performing actions in It's Learning. Although there are several box-plot graphs concerning user-friendliness that has some variations in the distribution of the results, statement 13 distinguishes itself from the other statements (See Appendix D). By looking at the box-plot graph for user-friendliness statement 13 we see that the largest weight of answers is concentrated at the middle (3 - *neither agree nor disagree*), with outliers on each side. This indicates that many of the students have had problems to define whether or not It's Learning provides helpful guidance to the users when performing tasks in the system. In comparison we can see that the distribution in the computer science students graph is more concentrated, indicating a more clear opinion among these students.

As indicated by the results in Figure 7.4 and 7.5, many of the students also write that they are satisfied with the user interface of It's Learning. Nevertheless, a great part of the students also believe that It's Learning has a lot of improvement areas when it comes to user-friendliness. As for usefulness (See Section 9.2), the student groups in this study lists many of the same problems, with the user-friendliness of It's Learning, that were presented by the computer science students in the specialization project. The students believe that It's Learning uses an outdated user interface with the use of frames for building each page. The use of frames means that the It's Learning web page is divided into frames were the content is presented, making it inflexible and cumbersome to work with more tabs or windows in a browser as only the main frame content is displayed when opening an Uniform Resource Locator[7] (URL). The use of frames also contributes to unpredictable navigation in It's Learning. The file administration system is also being criticized by the students for being too cumbersome in use. Slow response and too many steps are required when uploading, downloading and opening files. The file administration system is also criticized for missing useful features like the possibility to use "drag and drop" to move files, and uploading and downloading several files simultaneously. Some students also request support for more file formats and the possibility for storing larger files. Another topic, which was not discussed in the specialization project, is Internet browser compatibility problems. Several students from HiST and economy and management have problems with the use of the browser Mozilla Firefox[8]. Different layout problems and bugs have been reported, which may indicate that It's Learning does not support Mozilla Firefox properly. We must also consider the option that these problems can be related the user interface itself, and It's Learning's use of frames. Whatever the reason is, small bugs and sources of irritation like this will contribute in decreasing the students overall impression of It's Learning.

All the topics above were presented by the students from HiST, economy and management and computer science. The social science students had few additional opinions about the user-friendliness of It's Learning, with only a few students answering the question on how to improve the user-friendliness. They mentioned that the user interface of It's Learning is disorganized and cumbersome to use. The social science students' few opinions about specific actions to improve the user-friendliness are probably related to their non-technical education. All the other student groups study technical topics, making them more suited for evaluating the user interface of an information system. Economy and management students attend computer science subjects, and one branch within their field of study is specialization in computer science. The computer science students have taken subjects about evaluation of user-friendliness, and the HiST students (informatics and e-learning) have probably some knowledge about it as well. Another reason for the social science students' lack of suggestions can be that they just are satisfied, and have nothing to add. In Figure 7.4 we can also see that the social science students have lower means (reversed

[7] Address of a web page

[8] Web browser developed by Mozilla: http://www.mozilla-europe.org/en/firefox/

statements) than the rest of the students groups indicating greater satisfaction with the user-friendliness of It's Learning.

The research model in Figure 7.1 shows that *ease of use*, which is moderated by *age*, *gender* and *experience*, is a direct determinant of the students' *intention to use* It's Learning. According to the UTAUT theory in Section 3.2.1 the effect of *ease of use* on *intention to use* is stronger for younger women, especially with low experience. UTAUT research has indicated that age has an effect on the ability to learn new information systems, and that experience will make the systems easier to use. This means that the effect of *ease of use* will influence *intention to use* in a stronger degree for the social science students as they have a majority of women and an average age of 24.4 years (See Table 7.1). All the student groups have an average experience of three years or more (See Table 7.1). This is considered to be a high average as a student usually use three to five years to complete an education on a university/university college level. That experience makes systems easier to use may cause people to forget the problems they had when they started using the system, rating the user-friendliness higher than it really deserves. Some students in this study may have been influenced by this, meaning that it has some degree of influence on the results for user-friendliness.

From this study we have indications that better user-friendliness will influence the usefulness of It's Learning in a positive way as many students mention user-friendliness issues when asked how to improve the usefulness of It's Learning. On average, 40% of the suggested actions from the HiST students and economy and management students are related user-friendliness. This further support the findings from the specialization project, where we concluded that an initially useful system will be considerably weakened by poor user-friendliness.

9.4 Social influence

Figure 7.6 shows the results on how social influence affects the students' use of It's Learning. Statements 1 to 3 concern the voluntariness of use in It's Learning and shows that the results for the different student group varies. The HiST students have the lowest total mean (2.24). This supports what have been discussed earlier, that the use of It's Learning is mandatory in most subjects at HiST. This is clearly supported by the mean for statement 2 and 3 where the means are below 2 (*disagree*), saying that the teachers require the students to use It's Learning. Many students from HiST wrote that it is mandatory to use It's Learning at HiST, but some students also indicated that not all the teachers communicate through It's Learning. This explains the outliers in the HiST students box-plot graphs for statement 2 and 3 for social influence (See Appendix D). The economy and management students also have a low mean (2.62), but the box-plot graphs for statements 2 and 3 indicates more variation than for the HiST students. There are clearly some subjects and teachers that require the use of It's Learning, while others do not. This is also

supported by the students' comments. Statement 2 and 3 for the social science students and the computer science students are much higher than the other two student groups. By looking at the social science and computer science students box-plot graphs for these two statements (See Appendix D), we see that the distribution of the results are concentrated higher up on the scale than for the other student groups. This indicates that the use of It's Learning is mandatory in fewer subjects for these students, probably meaning that fewer teachers use It's Learning for their subjects. Many of the social science students comment that the use of It's Learning varies from one teacher to the other. A student also wrote that he believe that the use of It's Learning can depend on the number of students attending the subject (See discussion in Chapter 10). We have not discussed statement 1 in Figure 7.6 as many of the students seem to have misinterpreted the meaning of it. The statement does not reflect the results of statement 2 and 3. This will be discussed further in Section 9.8.

Statement 4 to 6 in Figure 7.6 concern how other people influence the students' decision to use It's Learning. The total means tell us that all the student groups, with the exception of the computer science students, are considerably influenced by other people in using It's Learning. Statement 4 shows that the economy and management students and the social science students have friends that support the use of It's Learning. The HiST students have varying opinions about this statement, while most computer science students do not believe that the use of It's Learning is a good idea (See box-plot graph for statement 4 for social influence in Appendix D). The computer science students' low mean on statement 4 reflect their general dissatisfaction with It's Learning. Statement 5 confirms the results related to voluntariness that have been discussed in the paragraph above (See the box-plot graphs in Appendix D as well). The HiST students have the largest part of teachers who think that the students shall use It's Learning, the economy and management students have a little more variation, while the social science students and the computer science students have less teachers that think the students shall use It's Learning. All the student groups in this study feel that the university/university college supports the use of It's Learning (statement 6).

The research model in Figure 7.1 shows that *social influence* is a direct determinant of the students' *intention to use* It's Learning. This relation is moderated by *voluntariness*, meaning the results from statement 1 to 3 moderate the effect of the results from statement 4 to 6. *Age*, *gender* and *experience* also moderate the effect of *social influence* on *intention to use*. UTAUT research (See Section 3.2.1) has indicated that gender theory reveals than women are more sensitive to social influence than men. Social influence will also be more prominent for older people, but will have a decreasing effect with experience. This is a description that does not fit well with any of the student groups as the students are young and have long experience in using It's Learning (See Table 7.1). This means that the effect of *social influence* has a limited effect on the students' *intention to use* It's Learning. The effect of *social influence* will be stronger for the student groups where the use of It's

Learning is mandatory (the HiST students), as the teachers decide whether to use It's Learning or not. Social influence have often more effect on novices as they have less experience in using the system themselves.

The results have showed that social influence have been moderated to have minor influence on the students' use of It's Learning. However, the voluntariness of use (mandatory or not mandatory) affects the student groups in different ways. The students from HiST have the most comprehensive use of It's Learning, where almost all the subjects must use It's Learning. The results from the student groups at NTNU have a lot of variation, indicating that the various faculties and departments at NTNU have differing attitudes towards the use of It's Learning. The economy and management students use It's Learning most frequently among the student groups at NTNU. Nevertheless, there are only 24% of them that have all their subjects in It's Learning (See Table 7.1). This is probably because they take subjects from several departments, including some that do not use It's Learning at all.

9.5 Facilitating conditions

Figure 7.7 shows the results from the statements concerning how facilitating conditions affect the students' use of It's Learning. As mentioned in Section 7.5.6, only statement 4 and 5 was included in the specialization project survey (Grønland, 2009), so the discussion will mostly focus on the student groups in this study. As most of the means (See Figure 7.7) for all the student groups are considerably above average we can say that the students are generally satisfied with the support infrastructure and services that are offered for It's Learning. Statement 1 and 2 clearly indicates that all the student groups have the necessary knowledge and resources needed to use It's Learning. Statement 3 has somewhat lower means, meaning that not all the students are satisfied with It's Learning's compatibility with other relevant applications and systems they use. As was discussed in Section 9.1 and 9.2, many students believe that It's Learning lack integration possibilities with other calendar applications and e-mail systems. The student groups from this study are fairly satisfied with the way It's Learning is integrated with their subjects. On the other hand, the computer science students do not believe that It's Learning is sufficiently integrated at NTNU as too few subjects use It's Learning. It is a little unexpected that the means are not lower for the rest of the student groups at NTNU as well, since they have all indicated that it is a big problem that not all the subjects use It's Learning. However, the statement can have been interpreted differently among the students, and the computer science students have been generally more dissatisfied with It's Learning throughout the whole survey.

Statement 5 is pulling the mean considerably down, indicating that the students have not received any training in using It's Learning. Many students mention that they have not received any training and some students also write that there is no need for any training course. A training course could, however, contribute to making

the students more aware of the features that It's Learning offers. For instance, as mentioned in the end of Section 9.2, some students request the possibility to get material from previous subjects they have attended. This functionality exists, and a training course in the use of It's Learning could have made the students aware of this. Students from economy and management and social science also believe that the teachers should get more training in using It's Learning. This is an important point, as the utilization of It's Learning's features is controlled by the teachers to begin with. The combination of all subjects using It's Learning, and training for the teachers using it, would considerably increase the utility value of It's Learning for the students.

The research model in Figure 7.1 shows that *facilitating conditions* is a direct determinant of the students' *usage behavior*, meaning that is has no significant effect on the students' *intention to use* It's Learning as the other determinants have. This relation is moderated by *age* and *experience*. The UTAUT theory in Section 3.2.1 indicates that experienced users find more ways to get help and support, and that older people will be in more need for help and assistance in performing their job than younger people. As all the student groups are young and considered experienced users (average age below 25 and average experience above 3 years, see Table 7.1), *facilitating conditions* will not be that important as they find help on their own. This is also indicated by many of the students who do not see the need for training or help when using It's Learning. Nevertheless, we have discussed a potentially important role for *facilitating conditions* when it comes to training courses in using It's Learning.

9.6 Total assessment

From Figure 7.8 we see that the results from the three surveys performed in this study contradict the result from the survey specialization project (Grønland, 2009), which indicated that the students were dissatisfied with It's Learning. The students' total assessment evaluation in Figure 7.8 shows that 63% of the HiST students, 67% of the economy and management students and 74% of the social science students are satisfied or very satisfied with It's Learning. On the other hand, 65% of the computer science students write that they are dissatisfied or very dissatisfied with It's Learning. We have seen this trend through all the sections in this chapter, where the computer science students have been generally less satisfied than the other student groups (lower means on most statements). Nevertheless, as discussed in this chapter, the students have identified many of the same topics when it comes to the problems with It's Learning and on how to improve the system.

We have found several reasons which can explain the differing results between the computer science students and the other student groups. It seems that the computer science students are just less satisfied than the other groups, but other factors, that we will discuss below, can have influenced the results. The students' comprehension

of what features It's Learning is supposed to offer is already mentioned in Section 9.2. Many students have written that they see It's Learning as a place to get information and school material. This may lead them to evaluate the utility value of It's Learning as only an information channel. This is a purpose that It's Learning may handle well, but this is not the only purpose of a LMS (See Chapter 2). If the students have different opinions of what an application is supposed to offer, the results for usefulness may show large differences. The computer science students may also have a different opinion of what a good information system is. As they study computer science they may have higher expectations for information software. The other student groups may be satisfied with an "okay" application, while the computer science students expect more. Some student groups may also have difficulties seeing the potential of technical improvements for It's Learning. This probably concerns the social science students the most in this survey, as they study a non-technical education. This is also reflected through the social science students' focus on non-technical improvements for increasing the utility value of It's Learning, but also their lack of specific suggestions for improving the user-friendliness in the system as we discussed in Section 9.3. While the computer science student group has done a more critical evaluation of It's Learning, focusing on all the possible weaknesses of the system, the other student groups may have done a more optimistic evaluation of It's Learning, focusing on what they believe are the most important areas of improvement, like for instance a more widespread use of the system. Another reason for the differing results can be that the computer science students know that there are better alternatives to It's Learning, or at least the possibility of creating a better alternative. Based on this, the students have different sources of comparison when evaluating the system, which may have influenced the results to some degree.

Even though there are many reasons for the differences between the results from this study and the results from the specialization project, it is more difficult to understand why the results for the HiST students (informatics and e-learning) and the computer science students are so different, as both student groups study computer science. Many of the above reasons can be relevant here as well, but it is likely to believe that these student groups are more homogenous. The students' general attitude towards It's Learning can be important. One student's opinion can affect the other and a general dissatisfaction or satisfaction may spread. Another reason can be that the informatics and e-learning students from HiST do not take subjects concerning usability evaluation which is mandatory for the computer science students. The most probable reason is, however, that the use of It's Learning is better organized at HiST. From what the results and the HiST students have indicated, the use of It's Learning is initially mandatory for all the subjects. This prepare for a better attitude towards It's Learning among the students. Even though all the teachers do not utilize It's Learning in the best possible way at HiST either, a larger user base will contribute in generating a greater satisfaction among the students.

In the total assessment, the students indicating that they were dissatisfied with It's Learning where asked to identify the reason for their dissatisfaction. The results can

be seen in Table 7.2. The computer science students have the highest percentage of answers (74%). The computer science students and the social science students have an even distribution between usefulness and user-friendliness, while the majority of the HiST students and the economy and management students have indicated that low user-friendliness is the main reason for their dissatisfaction. Even though 40% of the HiST students have indicated another reason for their dissatisfaction, most of these reasons are specific user-friendliness issues (See Section 7.5.7).

The students were also asked to mention specific reasons for their dissatisfaction and suggest how It's Learning could be improved. Many of the topics that have been discussed in this chapter were listed. The HiST students listed mostly user-friendliness problems and suggested that a better user interface should be developed without using frames, and that It's Learning should be compatible with more Internet browsers, reducing the number of bugs and the navigation problems. They also believe that It's Learning has to be used more extensively by the teachers, and not only for publishing information and exercises. The economy and management students also list many user-friendliness problems, but also mention that more subjects have to use It's Learning to improve the utility value of the system. Many of the students also believe that more support of real-time communication features would increase the utility value considerably. Almost all the reasons listed by the social science students were related to the use and utilization of It's Learning. They believe that more teachers should use the system and that training courses should be given so that they know how to use It's Learning in the best possible way. The other suggestions are related better file administration and user-friendliness in general. The computer science students listed items related to usefulness and better integration of It's Learning at NTNU, including more extensive use of It's Learning, that the subjects in It's Learning should be available for all students (open system) and that unnecessary functionality should be removed from It's Learning. Items related to user-friendliness were more streamlined design, better file administration system, no use of frames, fewer steps to complete a task and possibilities to customize the system.

What is interesting to see from Figure 7.8 and Table 7.2 is that there are a lower number of students saying they are dissatisfied with It's Learning than the students mentioning specific reasons for their dissatisfaction in the total assessment, and problems in general throughout the survey. This confirms what we believe, that the students have problems with It's Learning and suggestions for improvement, even though they are not generally dissatisfied. This can be considered as a sign of the students seeing the potential in using It's Learning, but also another reason for the differing results between the computer science students and the other student groups.

9.7 Survey evaluation

In this section we will do an evaluation of the survey based on the error sources that are presented in Table 5.1 in Chapter 5. The validity of the survey can have been affected by the students' use of the Likert scale. Some people have a tendency to draw their answers towards the middle of scale, and seldom use the extreme points of the scale. For instance, some persons may use *"strongly disagree"* while others content themselves with only *"disagree"* for measuring a statement in the survey. As discussed in Section 9.2, this can be a factor contributing to the variations in the results between the computer science students and the other student groups in the survey. As we use discrete variables in the representation of the results in Section 7.5, a seemingly large difference in the mean value can have been affected by such a measuring error. This type of error is indicated by the box-plot graphs in Appendix D, and as discussed in Section 9.2, this is particularly noticeable for statement 4 to 8 in the usefulness box-plots. Another factor that may have affected the validity is the students' interpretation of the questions and the Likert scale. One person's interpretation of *"strongly agree"* may differ from another person's interpretation. Especially the students' interpretation of *"often"* and *"sometimes"* when evaluating their use of It's Learning may have caused some variations in the results concerning the use of the functionality in It's Learning (See Figure 7.2). This is, however, not a big issue as the main purpose of these measurements was to see what functionality that was in use.

Other errors that can have affected the validity of the survey are response sets and social desirability. Response sets means that some people have a tendency to agree with all the questions and statements without considering the meaning of them (Ringdal, 2001). This error can be avoided by varying how the questions are formulated. This can, however, be risky as some people may assume that the questions are formulated in the same way through the survey, and fail to see that some questions are reversed. In the case of this survey all the questions are taken from the research model presented in Section 7.2, which consist of questions from TAM (Davis, 1989; Venkatesh and Davis, 2000) and UTAUT (Venkatesh et al., 2003). Thus, we have not considered this error when creating the survey as the purpose is to use the questions from TAM and UTAUT, which are acknowledged technology acceptance models. Social desirability means that some persons will edit the answer in a direction to which they find socially desirable (Ringdal, 2001). This source of error is hard to counteract, but can be avoided by using concrete questions. As we use a general technology acceptance model as a framework for this survey, it means that our questions and statements are exposed to this error. This source of error is, however, most common in a setting with sensitive questions. We consider that this survey has no sensitive questions, making this error less prominent.

In addition to the measurement errors presented above, there are some representation errors that must be considered. The survey is exposed to coverage errors

as the samples in the survey do not cover all the student groups at NTNU. We have, however, much better coverage now than we had for the survey performed in the specialization project, where only the computer science students were represented. The complete sample, including the sample for the specialization project, now includes three student groups, which we consider to be a good representation of students at NTNU. In addition to this, we also have one student group from HiST for comparison. There is also a variation in the background for the student groups. As presented in Section 7.4, we represent both students who have technological and non-technological education at NTNU. The samples are also representative when it comes to the distribution of gender and variation in age and experience of use. As mentioned, it would have been convenient that more student groups from different faculties and departments at NTNU were represented. However, representing the entire user group of It's Learning at NTNU would be too comprehensive for this study, and was considered out of scope. The survey is, however, not exposed to drop-out errors as we have complete student groups in the survey with no drop-out. All the students selected for the sample carried out the survey.

9.8 Research model evaluation

In this section we will evaluate the research model (See Section 7.2) which was used as a framework for the survey. This also includes an evaluation of the questions that was used in the survey, as they are part of the research model. As presented in Section 7.2, we decided to create a new model which was better adapted to the purpose of measuring the user acceptance of It's Learning, instead of using one of the existing technology acceptance models that were presented in Chapter 3. Overall, the research model worked well as a framework for the survey, and we believe that it was a better fit than TAM which was used as a framework for the survey in the specialization project (Grønland, 2009). In the evaluation of TAM in the specialization project, we felt that TAM was missing the *facilitating conditions* determinant which is represented in the research model we use for this study (See Figure 7.1). The addition of this determinant, and other changes described Section 7.2, contributed to creating a better research model for the purpose of measuring the user acceptance of It's Learning. As discussed in the evaluation of the survey in the specialization project (Grønland, 2009), and the description in Section 7.2, we believe that the constructs of UTAUT (See Section 3.2.1) was a better adaption than the constructs of TAM (See Section 3.1.2) for evaluating a multi-user system.

For each section in the survey the respondents had a space where they could insert comments to the statements (See Appendix B), but there has been little specific feedback on particular statements. This indicates that the students had little problems interpreting the questions. A student has commented that it was a little difficult to rate some of the statements in the social influence section of the survey (See Figure 7.6) as he both had teachers that use It's Learning and teachers that do not use It's Learning. This is a problem, but these students will probably answer something

in between, which again contributes in the correct distribution of answers. For instance, if a student has two teachers who use It's Learning and two teachers who do not use It's Learning, and the student answers *"neither agree nor disagree"* on statement 3 in Table 7.6, this will reflect the correct result.

A few students have also commented the Likert scale. Some believe that the alternatives are a little too coarsely divided in the functionality section of the survey. The reason why we used only a three-point scale in this case is that we wanted to categorize the use in these three groups; functionality that is used *often*, *sometimes* and *never*. The most important purpose with the functionality section was, as mentioned in Section 9.7, to find what functionality that the students never use. Some students also believe that a *"have no opinion"* alternative should have been added to all the statements. This can be considered as a missing feature in the survey, but the way the five-point Likert scale works, the middle value (*neither agree nor disagree*) represents a kind of *"have no opinion"* alternative. In many ways this gives a correct representation as the students that are uncertain of their answer will be situated in the middle of two opposite sides (*"agree"* and *"disagree"*).

As mentioned in Section 9.4, statement 1 in Figure 7.6 ("I use It's Learning voluntary") does not reflect the two other statements in the *voluntariness* questions set (See Appendix A), indicating that this statement was misinterpreted by many of the students. The misinterpretation is probably caused by a confusion about the word "voluntary", which does not fit in the setting for It's Learning, where the words "mandatory" and "non-mandatory" are more representative. To test the question set we did a Cronbach's alpha reliability calculation. Cronbach's alpha is the most used technique to measure reliability, and says something about the internal consistency of the measurements in the question set (Ringdal, 2001). By calculating the Cronbach alpha value with all the three statements in the question set we got values of 0.47, 0.69 and 0.51 for HiST, economy and management and social science respectively. By removing statement 1 from the question set we got a Cronbach alpha value of 0.79, 0.81 and 0.78 for HiST, economy and management and social science respectively. A Cronbach alpha value of 0.70 and above is considered to be satisfactory (Ringdal, 2001), meaning that statement 1 in the voluntariness question set should have been removed for better representation of the *voluntariness* determinant in the research model.

Another topic for the research model is the relationship between the determinants *usefulness* and *ease of use*. In TAM, these two determinants has an explicit relation (See Section 3.1.1 and Figure 3.2), and in the specialization project we concluded that there is a significant two-way relationship between them. We believe that it does not matter how user-friendly a system is if we cannot achieve any usefulness. Also the opposite relation is important. An initially useful system will be significantly weakened by poor user-friendliness. As presented in Section 9.3, we also have indications that better user-friendliness would influence the usefulness of It's Learning in a positive direction. Based on this evaluation we believe that this rela-

tionship should be represented explicitly in our research model (See Figure 7.1) as both this study and the study in the specialization project indicate that usefulness is considerably influenced by user-friendliness. We believe that this relationship can be generalized for all information systems evaluated by the research model.

In the end of this section we will discuss the research limitations for previous TAM and UTAUT studies (See Section 3.1.4 and 3.2.2) for our survey and research model. As for previous TAM studies, our study also involves students, introducing no new research environment to the technology acceptance research. This is partially because of the availability of respondents for the survey, but It's Learning was initially chosen as it was an interesting target for technology acceptance research. As for both TAM and UTAUT, our model is based on self-reported use (See Section 3.1.4). This limitation is almost impossible to avoid, as we cannot get representative samples if we should use observation techniques for measuring the user acceptance of It's Learning. This would take too long time and require a lot of resources. As opposed to previous TAM research we do evaluate a large and complex multi-user system. There have been little studies with multi-user system in previous TAM research (See Section 3.1.4), and this may also be a reason why we found the constructs of UTAUT to be a better match for the research model in this study. Multi-user systems introduce additional challenges to single-user systems which we have presented in Chapter 4 and discussed in Chapter 11.

Chapter 10

It's Learning interview discussion

In this chapter we will discuss the results from the interview with three of the teachers from the Department of Computer and Information Science at NTNU. The results are presented in Section 8.3. The discussion will be based on the results showed in Table 8.1, 8.2 and 8.3, but we will also use material from the complete transcriptions of the interviews in Appendix F as these contain more detailed information. From Table 8.1 we can see that Alpha does not use It's Learning, while Beta and Charlie do. We will start by discussing the results in Table 8.1. We will then discuss Alpha's reasons for not using It's Learning (See Table 8.2) and continue with a discussion of the results in Table 8.3, about how It's Learning is used and perceived by Beta and Charlie. Although this is the initial sequence in the discussion, there will be some cross-discussion and comparison with the results and discussion from the survey (See Section 7.5 and Chapter 9).

From the results in Table 8.1 we can see that NTNU does not seem to have any guidelines for the use of It's Learning at NTNU, at least none that the teachers are aware of. Charlie said that he lacks a more active attitude from the management at NTNU concerning the use of It's Learning. He also mentioned that there is not specified anything about the use of It's Learning in the strategy document for the Department of Computer and Information Science. From what Beta and Charlie says, there seem to have been given some sort of recommendation to start using It's Learning when it was introduced at NTNU, but no clear guidelines. The results also indicate that there has been no mandatory training in using It's Learning for the teachers. Charlie attended a course which must have been voluntary as the others have not taken such a course. No clear guidelines and lack of training courses do not contribute to getting more teachers to use It's Learning and can be an important reason for low usage of It's Learning at NTNU. The only way to get all the teachers at NTNU to use It's Learning is probably to demand mandatory use of the system. From the results and discussion of survey, it was revealed that almost all the subjects at HiST uses It's Learning as the use of It's Learning is mandatory (See Section 7.5 and 9.4). The student groups from NTNU also indicated that one of the major

problems with It's Learning was that not all the teachers used the system (See Section 9.2). Beta also claims that it is cumbersome for the students to have some subjects in It's Learning and other subjects that use their own web pages, as it ruins the advantage of having all the information in one place. To get more teachers to use It's Learning, NTNU could organize mandatory courses for the teachers. A course could give them the necessary introduction to start using It's Learning, but also make the teachers aware of their own and their students' advantages of using It's Learning. Many students in the survey also believe that the teachers need training in utilizing It's Learning in a good way (See Section 9.5).

As mentioned in the paragraph above and discussed in Section 9.2, the lack of subjects using It's Learning decreases the students' utility value of using the system. As presented in Table 8.2, Alpha uses regular subject web pages instead of It's Learning. For him to start using It's Learning it have to be easier than what he use now, or the teaching assistants would have to require the use of It's Learning. He feels that regular web pages cover the needs for his subjects, and see no reason for changing to It's Learning if the system does not add any advantages. Charlie also believes that teachers not finding any reasons for changing to It's Learning is one of the main reasons why they stick with regular web pages.

As have been discussed on Section 9.3 , It's Learning clearly has some user-friendliness issues making it cumbersome and inflexible to work with. This may prevent many teachers from using it. As mentioned by all three teachers in the interview, It's Learning seem to have had some problems when it was introduced at NTNU. This may still keep teachers away from It's Learning, although there have been improvements over the years. A new introduction to It's Learning for the teachers could be a solution. A problem with the use of It's Learning is that it is not the teachers that benefit the most from using the system. The students have the greatest advantage of all subjects using It's Learning, and it requires some effort from the teachers to utilize It's Learning in the best possible way. In Chapter 4, this challenge is called "disparity in work and benefit" and will be discussed further in Chapter 11. If a teacher feels that it is too much work or do not want to use an It's Learning subject page, a solution can be to appoint a teaching assistant to the job. Doing it this way, the teaching assistant can have a job description with a recommendation or requirement on how to use It's Learning. This will contribute to utilizing It's Learning's features in a better way. This will, however, be up to the each teacher or subject responsible to decide.

There are both advantages and disadvantages related to the use of It's Learning for teachers compared to the use of regular web pages (the alternative to It's Learning which is used at NTNU). Both Beta and Charlie believe that the students having all the information in one platform is an important advantage of using It's Learning, which is supported by all the student groups participating in the survey (See also discussion in Section 9.2). Charlie believes that it will be an advantage for the teaching assistants as well, as they only need to learn one system for correcting

and grading exercises. He also believes that people would have to use much more time maintaining a regular subject web page than maintaining It's Learning. He exemplifies this by saying that they earlier needed a full-time employed teaching assistant just for operating and administrating the web page. Charlie also mentions that specific functionality like the forum feature is a great advantage of using It's Learning. This is of course up to each individual teacher to consider, depending on their need for such a feature. For instance, e-mail is an alternative that can be used, even though it have to be considered more cumbersome than having a forum for discussions. This, again, is an example that not all teachers see the need for the features that It's Learning offers. Basically, most of the features (forum, calendar, exercise system etc.) that It's Learning offers will benefit the students, but it requires more maintenance work from the teachers and is thus not used.

A disadvantage of using It's Learning is that it is a closed system, meaning that only participating students and teachers have access. Alpha says that marketing his subjects through an open web page is an important advantage to him. This is supported by Beta and Charlie as well. They have experienced that registering students for subjects in It's Learning can take a long time as this registration process move through a general student registration system at NTNU. Both Beta and Charlie believe that some sort of access control system would be a nice feature, giving the subjects' administrators the possibility to differentiate between "public" and "non-public" material. People who do not attend a particular subject can access the information and material that they need. Having an open system is clearly considered an important feature among the teachers, but is also mentioned by the students in the survey as they can get information about subjects they consider attending (See Section 9.2). A minimum requirement would be for It's Learning AS to develop a function for creating a freely accessible web page displaying specific information and material in It's Learning. Charlie says that such a function exists in It's Learning, but that the result of using it is not satisfactory.

Beta and Charlie uses It's Learning in somewhat different ways. Beta uses mostly the basic functionality for publishing information, exercises, slides and such, while Charlie uses It's Learning in a more extensive way by using the discussion forum, calendar, test tool and survey tool, in addition to the basic functionality for publishing information and material. Charlie clearly utilizes It's Learning's features in a better way, increasing the utility value of It's Learning for the students taking his subjects. Many of the students that participated in the survey also indicated that they get higher benefit from a subject where the teachers utilize most of the features that It's Learning has to offer. This also corresponds to Charlie's impression, as the students are satisfied with his use of It's Learning. As discussed in Section 9.1, some of It's Learning's features, like the calendar, require all the students' teachers to use it for optimal usefulness ("critical mass", see Chapter 4 and discussion in Chapter 11). As discussed in the paragraph above, this is a goal that can be hard to reach as teachers have different attitude and opinions on how things shall be done. Nevertheless, NTNU should at least encourage to the use of these features. The most

important thing is to get all the teachers to use It's Learning. If this cannot be achieved and the teachers do not utilize the features that It's Learning offers, using regular web pages will be a better solution.

A reason why not all the teachers use It's Learning can be that It's Learning does not support all the necessary features needed to administrate a subject at a university. As mentioned by the students participating in the survey, they believed that real-time communication features would be a great addition to It's Learning (See Section 9.1). If put into use, this addition would actually increase the utility value of It's Learning for both students and teachers, without depending on all subjects to use It's Learning.

Both Beta and Charlie believe that It's Learning lacks a decent function for dividing students into groups in relation to exercise arrangements and such. Charlie mentions that he had to use a separate web page for this purpose, until they solved it by creating something called "group folders" in It's Learning, where the the belonging students and teaching assistant(s) could be added. Charlie says it took some time to assign all students manually to a group, but that the reward was a system that was easy to administrate. Another problem that Charlie mentions is that It's Learning does not have any search function for finding students when approving exercises. The teaching assistants had to browse to through a list of 500 students (20-30 per page) to find the correct student. This is a problem that was mentioned by some of the students in the survey as well, as they had worked as teaching assistants (See Section 9.1). For Charlie, this problem was also solved by the use of "group folders", as It's Learning added a feature for filtering by groups. This made it possible for the teaching assistants to filter out their own group.

Based on what has been presented it is clear that It's Learning does not have good enough support for important exercise features like group division and search functionality for finding students. Although a solution was found in this case, it is not a good and standardized way of administrating groups and exercises. This is mostly a problem for subjects with many students, but other teachers who need a good feature for running an exercise system may also find It's Learning insufficient in this matter. In comparison, a regular web page will be able to host a good exercise system, but it will take time and resources for development and maintenance. Although there are problems with important features for administrating groups and searching, Charlie also mentions the "grade book" functionality which he believes is a great feature for supporting the creation and administration of exercises. This feature support several exercise types, and also the possibility to create reports for each individual student, tracking the student's exercise progress.

User-friendliness may also be an issue when it comes to using It's Learning for the teachers. The user-friendliness of It's Learning that is perceived by the teachers is similar to what the students perceive, and can be evaluated based on the results in Section 7.5.4 and the discussion in Section 9.3. Nevertheless, the teachers come in

situations where they have to use It's Learning in a different way than the students, like for instance when organizing exercises. They are also dependent on user-friendly functionality to administrate large groups of students. An example of what may be a sign of bad user-friendliness is Beta and Charlie's contradictory answers concerning transferring of subject material from one semester to another. Beta says he lacks this functionality, while Charlie mentions this as functionality that he is satisfied with. It's Learning has functionality for copying content from archived subjects to other subjects, but this example indicates that it may be difficult to find. We have indications from the survey discussion that students also have problems with locating archived subjects (See Section 9.2). In the case of Beta, we must also consider the possibility that this is a feature that It's Learning have implemented recently, and thus were not available the last time Beta used It's Learning. Nevertheless, such functionality should be easily visible and accessible for the teacher, with for instance a message prompting them with the question of transferring previous content to a new semester. As it is now, a solution would be training courses notifying the teachers about such a feature. Based on three interviews we cannot draw any conclusions about the user-friendliness in It's Learning for the teachers in general, but based on the discussion we have indications of lack of functionality and some cumbersome design solutions. This is also supported by the discussion in Section 9.3.

When it comes to utilizing the potential of It's Learning, Charlie believes that the teachers gain the most out of using It's Learning for larger subjects since there will be more work with regular web pages when a subject has many students. This may be another reason why some subjects do not use It's Learning. Subjects with few participants are seldom in need of a large scale framework for administrating the subject, and the teachers find it easier to create a simple web page for the subject and use e-mail for communication and exercise deliveries. As we have discussed earlier in this chapter, and also in the survey discussion in Chapter 9, regular web pages serve the purpose of presenting information in a better way than It's Learning as it is available for everyone. If a teacher has never used It's Learning, it is likely that he will not use It's Learning in this situation and rather create a regular web page. This will probably require less effort than learning It's Learning for the teacher, even though the process of learning It's Learning is not that comprehensive. The problem is, however, that as long as subjects with few students do not use It's Learning, the students will never obtain the advantage of having all their subject material in one place. Even though small subjects do not have the same benefit of using It's Learning as large subjects, they will be able to benefit from the features that It's Learning offers, like for instance the forum, the possibility for online exercise deliveries, tools for performing tests and surveys. As mentioned earlier, this will require some effort from the teachers or the teaching assistants, but the reward for the students will be large. To make more teachers utilize the potential that lies in It's Learning, Charlie believes it is important that the teachers give the system a chance by using some time get familiar with It's Learning and its features. He also believes that the teachers can learn from each other by sharing experiences on how to utilize the

system in the best way. If the teachers are willing to do this, a community for learning and using It's Learning can be created.

Charlie also mentions the SDK that is developed for It's Learning. The SDK is described in Chapter 2, and gives the users the opportunity to develop and customize their own applications in It's Learning. Charlie believes that NTNU can utilize the resources they have to expand and customize It's Learning to specific subjects. The SDK is still only a beta version, but it is a feature that can be used for developing missing functionality and features for It's Learning at NTNU in the future. The missing group division functionality and search functionality that was mentioned earlier could for instance be implemented by employees or students at NTNU. We have not tested the SDK, so whether the SDK can be utilized in this way remains to be seen. Testing the SDK could, however, be an interesting topic for further work. As emphasized by Charlie, the use of the SDK would require a dialogue between NTNU and It's Learning AS to get maximum benefit out of using the tool. It's Learning AS needs to have a good dialogue with its major users so that experiences and improvements of It's Learning can be exchanged between them. Beta points out a case of bad dialogue between It's Learning AS and NTNU when a major update was installed in the beginning of a semester. This caused large problems and many complaints from the students as it involved downtime for It's Learning during a crucial time period. This is an example of a situation that may weaken the confidence in It's Learning AS as a supplier of the learning management system for NTNU among the teachers and students.

As we only interviewed three teachers we cannot draw any common conclusions about the teachers' perception of It's Learning at NTNU. Many other factors can be brought into play, but the teachers have given us some indications of important factors. An interesting point, however, is that the three interviewees represent three different user groups as Alpha does not use It's Learning at all, Beta uses mostly the basic functionality and Charlie uses It's Learning more actively by including more of It's Learning's features in his teaching. Thus, all angles are covered.

10.1 Interview evaluation

As presented in Chapter 6 it is difficult to evaluate validity, reliability and generalization for a qualitative research method, as we do not measure predetermined variables as in a quantitative reserach. As we discussed in this chapter, we only did three interviews, and cannot do any generalization about the teachers' opinion about It's Learning in general. The purpose was not to get a generalization basis, but rather to get an indication of the teachers' perception of It's Learning at NTNU. If we wanted more respondents among the teachers at NTNU we could have performed a survey with a larger sample. The interviews, however, gave us the possibility to dig more into the questions and get better knowledge about the "teachers' side" of It's Learning. Doing a survey we would have gotten a better overview of

the teachers' perception of It's Learning, but would have sacrificed the possibility to get more detailed information about the use of the system. As we already know the "student side" of It's Learning it was interesting to get a better insight into the features offered to the teachers. A strong side for the representation of the teachers is that the three interviewees represent three different user groups when it comes to the teachers at NTNU. One teacher that do not use It's Learning, one that uses mostly the basic functionality and one that uses It's Learning and its features actively (See discussion earlier in Chapter 10). A weakness for the representation of the teachers is that we have only representatives from one department at NTNU (Department of Computer and Information Science). Ideally, teachers from other faculties and departments should have been included, but as we only interviewed three teachers this was given a lower priority. As stated in the scope of this study, the student survey was the main focus, and the interviews were included to give an indication on the teachers' use of It's Learning. As the results and the discussion from the survey indicated that much of the students' utility value of It's Learning depend on the teachers use and utilization of It's Learning, it could be interesting to do a larger study amongst the teachers.

Chapter 11

Groupware challenges discussion

In this chapter we do a discussion about It's Learning and the groupware challenges presented in Chapter 4. It's Learning, as a LMS, is a system that fits the characterization of a groupware application which is described in Chapter 4. We will discuss the challenges in relation to It's Learning and how the system is used at NTNU. Overcoming the challenges is considered important for being a successful groupware application or system.

Disparity in work and benefit (See Section 4.1) is a challenge that is relevant for It's Learning and has already been mentioned in Chapter 10. In the case of It's Learning the teachers or teaching assistants have to do the work of maintaining the subjects in It's Learning without necessary receiving the direct benefit of the system themselves. The collective benefit received in this case is a better learning community, but the students are the main beneficiaries when the functionality and features in It's Learning are utilized in a good way. If the teachers and teaching assistants use It's Learning actively, the students can for instance benefit by having all their school information and material in one place, an up to date calendar, discussions with fellow students and teachers in discussion forums and the possibility for electronic delivery of exercises. Naturally, some sort of platform for communicating the subject to the students has to be used, but It's Learning is a framework that may require more effort than an alternative system, like for instance the use of regular web pages. In the case of a teacher and student situation like this, it is natural to believe that the teachers would arrange so the students can learn in the best possible way, but the challenge is still relevant as someone have to do more work than others for obtaining a common benefit.

The critical mass challenge (See Section 4.2) has been indicated by the students as one of the greatest problems for It's Learning at NTNU (See Section 9.2). All the student groups from NTNU in the survey have indicated that too few subjects use It's Learning, which clearly influence the utility value of It's Learning in a negative way. In the case of It's Learning, the critical mass is all the all subjects at NTNU.

It's Learning depend on many users and offers little or no single-user functionality for the users. This makes the critical mass very important as It's Learning must obtain the critical mass of users for maximum utilization of the features that is offered in the system. One could argue that It's Learning can be utilized for each individual subject in isolation, but from the discussion in Chapter 9 and 10 it has been revealed that the real benefit of using It's Learning for the students is to have all the subjects in the same system.

The problems with the disruption of social processes challenge (See Section 4.3) is also present for It's Learning. Some social and motivational factors may be important for the teachers as they have different attitudes towards teaching and how this shall be performed. We must for instance consider the fact that many of the teachers at NTNU do not only teach, but also have other tasks and responsibilities, like for instance research work. This way some teachers would like to use as little time as possible for administrating their subjects, choosing the simplest alternative that cover the needs of their subjects. As described in Section 4.3, to overcome this challenge it will be important that the teachers and students at NTNU are included in the process of choosing the LMS.

In some way we can say that It's Learning is exposed to non-standard use as described in Section 4.4. It is not that the users make exceptions which are not supported by It's Learning, but rather that the teachers do not utilize the features offered in It's Learning in a good way, leading to the system not working as intended (See related discussion in Section 9.2). It's Learning was developed with an intention on how it should be used, but from the discussion in Section 9.1 and 9.2 we found that the system is not always used this way. Many students consider It's Learning only as a place for finding subject information and material, and not a LMS, which is the intention. Both the intention of having one platform for all the subjects, and utilizing the LMS features that It's Learning offers, fail to some degree at NTNU. We do not say that It's Learning cannot be used for anything useful unless all subjects use It's Learning, or unless all the features are utilized. However, there is a probability that another system or application, with a somewhat different purpose, will be better fit for NTNU than It's Learning. As presented in Section 4.4, it is important to learn how work is actually done to handle the challenge of non-standard use. This may be a relevant problem with It's Learning at NTNU, as they have to adapt to It's Learning, and not the other way around. NTNU is in some degree controlled by It's Learning when it comes to the way teaching is done, but maybe a better solution would be to customize a system to their way of teaching instead. Another case can be that It's Learning may actually represent the way they like to teach at NTNU, but that the system does not match the intent when it is put into practice. System customizability is also presented as a way of handling this challenge in Section 4.4, but this will not help It's Learning at NTNU as the main problem is related to the utilization of the features already existing in the system.

The challenge of unobtrusive accessibility (See Section 4.5) is not that relevant for It's Learning as the system is a dedicated multi-user system that does not offer many features for individual activity, at least no heavily used single-user features. The question of balance between heavily used and less used features in general is relevant, but this is not the main intention of the unobtrusive accessibility challenge described in Section 4.5 as this is theory about groupware challenges.

Difficulty in evaluation (See Section 4.6) and failure of intuition (See Section 4.7) are challenges that will be relevant for all groupware applications and systems, including It's Learning. In the case of It's Learning this is both related to It's Learning AS, who develops It's Learning, and the people responsible for evaluating It's Learning and the way it is used at NTNU. For It's Learning AS it is difficult to develop a LMS that fits all teaching environments, and they thus have to reach a compromise as described in Section 4.6. Thus, It's Learning may not be a perfect match for the teaching environment at NTNU. In addition, as presented in Section 4.6, the evaluation of groupware is more difficult if large and heterogeneous groups of people are involved. This is the case for It's Learning as NTNU represent a great variation in fields of study and teachers with different approaches to teaching, making it difficult to do an evaluation of which LMS is best for NTNU. Developing or customizing their own LMS is most likely to be the best option for NTNU, but this requires a lot of resources. As we discussed in Chapter 10, the It's Learning SDK can probably be used to adapt It's Learning to what NTNU needs.

As described in Section 4.8, the adoption process is the challenge of managing the acceptance of It's Learning. For NTNU, this is related to the introduction of the system to the faculties and departments. As presented in Section 4.8, it is important to handle all the challenges discussed in this chapter if a groupware system or application shall be a success. Based on the discussion in this chapter we see that It's Learning struggle with some of the groupware challenges which have affected the user acceptance of It's Learning at NTNU. From our survey with the students, and the interview with some of the teachers, we have found that the critical mass and non-standard use challenges in particular must be handled in a better way.

Part VI

Conclusion

Chapter 12

Conclusion and further work

This chapter summarizes and concludes this study, in addition to presenting a description of further work.

12.1 Conclusion

The goal of this study was to continue the empirical study of It's Learning from the specialization project and measure the user acceptance of It's Learning at NTNU by including more student groups from NTNU, but also from other educational establishments for comparison. In addition to continuing the user acceptance study, we wanted more focus on It's Learning as a multi-user system.

To achieve the goal we performed a new survey with two more student groups from NTNU, in addition to one student group from HiST. The two student groups from NTNU were included to see if the results from the specialization project would be supported, and represent both technological and non-technological educations. The HiST student group was included to compare the use of It's Learning at NTNU and HiST. To get more focus It's Learning as a multi-user system we supplemented the preliminary study of technology acceptance with a study of groupware challenges to understand the important challenges of developing, introducing and using multi-user systems. We also performed three interviews with teachers at NTNU to get an indication of the teachers' usage and opinion of It's Learning.

Instead of using one of the existing models from the technology acceptance study, we created a new research model as a framework for the survey. The model was created to better adapt to It's Learning, and combines elements from both TAM and UTAUT. The survey presented us with a lot of interesting data, and the students used the open questions actively helping us explain much of the results. Some survey errors must also be considered. Particularly that the samples only represent three student groups from NTNU, in addition to the one student group HiST, but also the

students' use of the Likert scale which can have affected the validity of the results in some degree.

The results from the survey in this study contradicted the results from the specialization project. An average of 67% of the students from the student groups in this study answered that they were satisfied or very satisfied with It's Learning. On the other hand, 65% of the students from the specialization project study answered that they were dissatisfied or very dissatisfied with It's Learning. Even though the results differed, all the student groups identified many of the same topics when it comes to problems with It's Learning and how to improve the system.

We have found several causes which can have affected the differing results. The students' perception of what features It's Learning are supposed to offer may be an important factor. The computer science students may also have higher expectations to It's Learning, while the other students are satisfied with an "okay" system. In addition to this, the computer science students may have been more critical, had more sources of comparison, and a larger ability to see the potential for technical improvements when evaluating It's Learning as they study computer science and have taken subjects related to usability evaluation.

The area of improvement for It's Learning is somewhat split between the actions that NTNU can perform and actions that It's Learning AS has to deal with. We found that there is a problem that too few subjects use It's Learning at NTNU ("critical mass" groupware challenge). The great benefit of using It's Learning is that the students have all the subjects in one place so they only have to learn and relate to one system. To take advantage of this benefit all the subjects have to use It's Learning, meaning that the use of the system should be mandatory at NTNU, as it is at HiST.

Another problem is that the teachers do not utilize the features that It's Learning offers ("Non-standard use" groupware challenge). It's Learning is supposed to be an interactive platform for communication and collaboration among the students and the teachers, but is by many teachers only used as a place to add information and material the students. If the teachers do not utilize the features that It's Learning offers, and if some teachers do not use It's Learning at all, other simpler alternatives will probably be a better choice for NTNU. As it is not realistic to get all the teachers to utilize It's Learning optimally, NTNU should at least encourage the teachers and students to actively use It's Learning's features, which will contribute to better utilization of the system. A mandatory training course or introduction to It's Learning would also contribute as this will make the teachers and students aware of what functionality and features It's Learning offers.

The measures that It's Learning AS has to perform are mainly related to the user-friendliness and functionality that It's Learning offers. We found that It's Learning is in need of a user interface upgrade. The main concern is the use of frames. Frames is an outdated technique when it comes to building web pages and makes it

difficult for the students to navigate properly and work with more tabs or windows. Another problem is that the file administration system is somewhat cumbersome in use. The most important factor is that it takes to many steps too perform activities like uploading and downloading files. A problem if the students experience poor user-friendliness is that their general opinion about the system will be negatively affected by this. As presented in TAM, and which have been supported by the specialization project and this study, is that the user-friendliness will considerably influence the usefulness of It's Learning. Poor usefulness may prevent the students and teachers from exploring the system properly before making up their mind. In the worst case, a rumor of poor user-friendliness may get the teachers and students not to try the system at all.

We found that many of the features that It's Learning offers are not used by the students. The students are depending on the teachers to use the features in the first place, but better support for integration and customization would increase the utility value of existing functionality for each individual subject that use the particular features. Integration of the message system with the existing e-mail system at NTNU, and support for exporting, importing and synchronizing the calendar with other electronic calendars, would considerably increase the utility value of this functionality for the students. More support for real-time communication, like chat and collaborative writing on documents, would also increase the utility value of It's Learning and add more focus on collaboration among students and teachers in the system. This would especially add a new dimension to the project functionality in It's Learning.

The survey has revealed that many teachers at NTNU do not use It's Learning. From the three interviews with the lectures we cannot draw any common conclusions for all teachers at NTNU, but we have some indications on the teachers' opinions and usage of It's Learning. That It's Learning is a closed system is a concern among the teachers. It is important for the teachers to be able to market their subject and have resources available for public access. An open system will also be an advantage for the students as they can access information and material for subjects they plan to attend. As regular subject web pages are perfect for this purpose, many teachers and students prefer them instead. For It's Learning to compete with this advantage, some sort of access control system must be available.

According to the teachers, It's Learning lack some features when it comes to exercise management, like grouping of students and a decent search function for finding students. This is important functionality for handling subjects with many participants and must be considered essential for an LMS. Another important topic is that the teachers do the job of maintaining the It's Learning subject page without necessary receiving the direct benefit of the system themselves (the "disparity in work and benefit" groupware challenge). The students are the main beneficiaries of It's Learning when the system is utilized in a good way .

In this study we have found that technology acceptance concerns more than just usefulness and user-friendliness. Focusing only on these two variables alone we may miss out on important factors when evaluating an information system. Even though general user acceptance models give a good indication on the user's perception of the system, it may not cover topics related to specific types of systems. In our case, as It's Learning is a multi-user system, the extra challenges related to multi-user enviroments are important to consider when evaluating the system.

12.2 Further work

To get a better overview of the teachers' opinions and usage of It's Learning, a larger survey should be performed. Teachers from different faculties, departments and schools could be included in a more comprehensive survey giving a better measurement of the teachers' satisfaction and opinion about It's Learning. A general user acceptance survey could be performed, or a more specific survey could be created with the basis in the interviews performed in this study. Additional interviews with teachers from other departments and faculties could also be performed ahead of the survey, contributing to an even better basis for creating a survey.

An interesting project would also be to study the It's Learning SDK and learn how it can be used to customize the already existing features of It's Learning, or develop new features which will improve It's Learning at NTNU. A technology acceptance model can be used for evaluating a prototype of the new feature(s) before it is developed, and also for evaluating the developed feature(s). Alternatively a usability test could be performed with a selection of users.

Bibliography

Icek Ajzen and Martin Fishbein. *Understanding attitudes and predicting social behavior*. Prentice Hall, 1980.

Robert Bagozzi. The legacy of the technology acceptance model and a proposal for a paradigm shift. *Journal of the Association for Information Systems*, 8(4): 244–254, 2007.

Fred D. Davis. *A technology acceptance model for empirically testing new end-user information system: theory and results*. PhD thesis, Massachusetts Institute of Technology, Sloan School of Management, 1985. PHD in management.

Fred D. Davis. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3):319–340, 1989.

Fred D. Davis, Richard P. Bagozzi, and Paul R. Warshaw. User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, 35(8):982–1003, 1989.

Susan F. Ehrlich. Strategies for encouraging successful adoption of office communication systems. *ACM transactions on information systems*, 5(4):340–357, 1987.

Google. Google Docs. Availiable: `http://docs.google.com/`, 2010. Accessed on 17.03.10.

Martin Grønland. Usefulness and user-friendliness in technology acceptance - An empircal study of It's Learning. Specialization project, Norwegian University of Science and Technology, 2009.

Jonathan Grudin. Why CSCW applications fail: problems in the design and evaluation of organizational interfaces. In *CSCW '88: Proceedings of the 1988 ACM conference on Computer-supported cooperative work*, pages 85–93, New York, NY, USA, 1988. ACM. ISBN 0-89791-282-9.

Jonathan Grudin. Groupware and social dynamics: eight challenges for developers. *Communications of the ACM*, 37(1):92–105, 1994.

It's Learning AS. It's Learning user manual. Availiable: `https://www.itslearning.com/help/nb-NO/ApplicationHelp.htm`, 2010a. Accessed on 16.03.10.

It's Learning AS. Lag ditt eget it's Learning-verktøy! Availiable: `http://itslearningno.publishpath.com/sdk`, 2010b. Accessed on 17.03.10.

It's Learning AS. It's Learning SDK. Availiable: `http://developer.itslearning.com/`, 2010c. Accessed on 17.03.10.

It's Learning AS. www.itslearning.no. Availiable: `http://www.itslearning.no`, 2010d. Accessed on 16.03.10.

Younghwa Lee, Kenneth A. Kozar, and Kai R.T. Larsen. The technology acceptance model: past, present, and future. *Communications of the Association for Information Systems*, 12(50):752–780, 2003.

Paul Legris, John Ingham, and Pierre Collerette. Why do people use information technology? A critical review of the technology acceptance model. *Information & management*, 40(3):191–204, 2003.

Lynn Marotta. Improve the effectiveness of collaborative workgroups by clearly understanding the definition of groupware. Availiable: `http://www.web-conferencing-zone.com/definition-of-groupware.htm`, 2006. Accessed on 12.04.10.

Multimediesenteret NTNU. *Introduksjon til It's Learning - For studenter ved NTNU*, 2006a.

Multimediesenteret NTNU. *Introduksjon til It's Learning - For lærere ved NTNU*, 2006b.

Jonas Paulsen. - It's Learning er en katastrofe. Availiable: `http://www.underdusken.no/ekstern_id/5978`, 2007. Accessed on 25.08.09.

Kirsti R. Ramberg. Valg av LMS for NTNU. Anbefaling. Availiable: `http://www.ntnu.no/multimedie/its_learning/gamle_dokumenter/rapport_lms_anbefaling.pdf`, 2002. Accessed on 16.03.10.

Kristen Ringdal. *Enhet og mangfold: samfunnsvitenskapelig forskning og kvantitativ metode*. Fagbokforlaget Vigmostad & Bjørke AS, 2001.

TechTarget. Searchdomino.com: definition of groupware. Availiable: `http://searchdomino.techtarget.com/sDefinition/0,,sid4_gci212217,00.html`, 2010. Accessed on 12.04.10.

Viswanath Venkatesh and Fred D. Davis. A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2): 186–204, 2000.

Viswanath Venkatesh, Michael G. Morris, Gordon B. Davis, and Fred D. Davis. User acceptance of information technology: Toward a unified view. *Information & management*, 27(3):425–478, 2003.

Part VII

Appendix

Appendix A

Research model - variables

This appendix contains the statements and questions which are used to measure the different determinants and moderators in the research model.

DETERMINANTS:

Usefulness:

- My school work would be difficult to perform without It's Learning.
- Using It's Learning gives me more control over my school work.
- It's Learning addresses my school work related needs.
- Using It's Learning allows me to accomplish more work than would otherwise be possible.
- Using It's Learning reduces the time I spend on unproductive activities.
- It's Learning enhances my effectiveness in my school work.
- It's Learning improves the quality of my school work.
- It's Learning increases the productivity in my school work.
- It's Learning makes it easier to do my school work.
- Overall, I think It's Learning is useful in connection with my school work.

Ease of use:

- I often become confused when I use It's Learning (R).
- I make errors frequently when using It's Learning (R).
- Interacting with It's Learning is often frustrating (R).

- I often need to consult the user manual when using It's Learning (R).
- Interacting with It's Learning requires a lot of my mental effort (R).
- I find it easy to recover from errors encountered while using It's Learning.
- It's Learning is inflexible to interact with (R).
- I find it easy to get It's Learning to do what I want to do.
- It's Learning often behaves in unexpected ways (R).
- I find it cumbersome to use It's Learning (R).
- My interaction with It's Learning is easy for me to understand.
- It is easy for me to remember how to perform tasks using It's Learning.
- It's Learning provides helpful guidance in performing tasks.
- Overall, I find It's Learning easy to use.

Social influence:

- My friends/colleagues think I should use It's Learning.
- My lecturer/teaching supervisor thinks I shall use It's Learning.
- The university/university college has been supportive in the use It's Learning.

Facilitating conditions:

- I have the knowledge necessary to use It's Learning.
- I have the resources necessary to use It's Learning
- It's Learning is compatible with other systems I use in connection with my schoolwork.
- It's Learning is well integrated with my subjects at the university/university college.
- I was offered good training in using It's Learning when I started at the university/university college.
- I can get help if I have problems with It's Learning.

MODERATORS:

Age:

- Age: <number>

Gender:

- Gender: <male/female>

Experience:

- For how long have you used It's Learning? <number>

Voluntariness:

- I use It's Learning voluntary.
- My lecturer/teaching supervisor does NOT require me to use It's Learning.
- Although it might be helpful, using the system is NOT mandatory in my subjects.

Appendix B

It's Learning survey

This appendix contains the user acceptance survey about It's Learning. The text is written in Norwegian.

The survey consists if seven sections:

1. General information
2. Functionality
3. Usefulness
4. User-friendliness
5. Social influence
6. Facilitating conditions
7. Total assessment

Spørreundersøkelse - It's Learning

Dette er en spørreundersøkelse om It's Learning som utføres i forbindelse med en masteroppgave på Institutt for Datateknikk og Informasjonsvitenskap ved NTNU. Hensikten med undersøkelsen er måle hvor tilfreds studenter er med å bruke It's Learning som læringsplattform. Undersøkelsen består av 52 spørsmål/påstander. Takk for at du deltar!

*Må fylles ut

1 Generelt

I denne delen av undersøkelsen skal du fylle ut litt bakgrunnsinformasjon om deg selv.

Kjønn *

- Mann
- Kvinne

Alder *

Skole *

- NTNU
- HIST
- Andre:

Linje *

Hvor lenge har du brukt It's Learning? *
Oppgi i antall år (eks. 2,5)

Hvor stor andel av fagene du tar i år benytter It's Learning? *
Oppgi i brøk (eks. 3/4 hvis tre av fire fag bruker It's Learning)

Fortsett

2 Funksjonalitet

I denne delen av undersøkelsen skal du svare på hvor ofte du bruker funksjonaliteten som It's Learning tilbyr. Når du vurderer hvor hyppig du benytter diverse funksjonalitet i It's Learning så bør du vurdere det i forhold til den totale mengden av tid du bruker på It's Learning.

Funksjonalitet: *

	Aldri	Noen ganger	Ofte
Kunngjøringer (dvs. hovedsiden til It's Learning inkl. generell informasjon, gjøremål, aktiviteter, nye meldinger i innboks osv.)	○	○	○
Emne/faginformasjon	○	○	○
Prosjekter	○	○	○
Opprette nytt prosjekt	○	○	○
Kalender	○	○	○
Meldingssystem	○	○	○
ePortfolio	○	○	○
Søk	○	○	○

Kommentarer til påstandene:

Hva slags funksjonalitet savner du i It's Learning?

Tilbake Fortsett

3 Nytteverdi

I denne delen av undersøkelsen skal du vurdere påstander vedrørende nytteverdien av å benytte It's Learning.

Påstander om nytteverdi: *

	Svært uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
Mitt skolearbeid ville være vanskelig å utføre uten It's Learning.	○	○	○	○	○
Bruken av It's Learning gjør at jeg har bedre kontroll over mitt skolearbeid.	○	○	○	○	○
It's Learning støtter viktige aspekter i mitt skolearbeid.	○	○	○	○	○
Bruken av It's Learning gjør det mulig for meg å utføre mer arbeid enn jeg vanligvis ville fått gjort.	○	○	○	○	○
Bruken av It's Learning reduserer tiden jeg bruker på uproduktive aktiviteter.	○	○	○	○	○
Bruken av It's Learning gjør at jeg jobber raskere med mitt skolearbeid.	○	○	○	○	○
Bruken av It's Learning øker kvaliteten på det skolearbeidet jeg gjør.	○	○	○	○	○
Bruken av It's Learning øker produktiviteten i mitt skolearbeid.	○	○	○	○	○
It's Learning gjør det enklere å utføre mitt skolearbeid.	○	○	○	○	○
Totalt sett, jeg synes It's Learning er nyttig i forbindelse med mitt skolearbeid.	○	○	○	○	○

Kommentarer til påstandene eller nytteverdien generelt av å bruke It's Learning:

Hvordan kan man forbedre nytteverdien av å bruke It's Learning?
Nevn gjerne spesifikke tiltak.

Tilbake Fortsett

4 Brukervennlighet

I denne delen av undersøkelsen skal du vurdere påstander som omhandler brukervennligheten i It's Learning.

Påstander om brukervennlighet *

	Svært uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
Jeg blir ofte forvirret når jeg bruker It's Learning.	○	○	○	○	○
Jeg gjør ofte feil når jeg bruker It's Learning.	○	○	○	○	○
Jeg blir ofte frustrert når jeg bruker It's Learning.	○	○	○	○	○
Jeg må ofte benytte meg av brukerveiledningen når jeg bruker It's Learning.	○	○	○	○	○
Det krever mye anstrengelse å bruke It's Learning.	○	○	○	○	○
Det er lett å komme seg tilbake til utgangspunktet (angre) når feil oppstår i It's Learning.	○	○	○	○	○
It's Learning er lite fleksibelt å arbeide med.	○	○	○	○	○
Jeg synes det er lett å få It's Learning til å gjøre det jeg ønsker.	○	○	○	○	○
It's Learning oppfører seg ofte på uventede måter.	○	○	○	○	○
Jeg synes det er tungvint å bruke It's Learning.	○	○	○	○	○
Det er lett for meg å forstå hvordan jeg skal bruke It's Learning.	○	○	○	○	○
Det er lett for meg å huske hvordan jeg utfører oppgaver/handlinger i It's Learning.	○	○	○	○	○
It's Learning tilbyr god hjelp og veiledning når jeg utfører oppgaver.	○	○	○	○	○
Totalt sett, jeg synes det er lett å bruke It's Learning.	○	○	○	○	○

Kommentarer til påstandene eller brukervennligheten generelt i It's Learning:

Hvordan kan man forbedre brukervennligheten i It's Learning?

Nevn gjerne spesifikke tiltak.

Tilbake Fortsett

5 Sosial innflytelse

I denne delen av undersøkelsen skal du vurdere påstander som omhandler hvordan sosial innflytelse påvirker din bruk av It's Learning.

Påstander om sosial innflytelse *

	Svært uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
Jeg bruker It's Learning frivillig.	○	○	○	○	○
Min foreleser/faglærer /veileder krever IKKE at jeg skal bruke It's Learning.	○	○	○	○	○
Selv om det kan være nyttig, så er det IKKE obligatorisk å bruke It's Learning i mine fag.	○	○	○	○	○
Mine venner/kollegaer synes jeg skal bruke It's Learning.	○	○	○	○	○
Min foreleser/faglærer /veileder synes jeg skal bruke It's Learning.	○	○	○	○	○
Høgskolen/universitetet støtter bruken av It's Learning.	○	○	○	○	○

Kommentarer til påstandene:

Tilbake Fortsett

6 Støttevilkår

I denne delen av undersøkelsen skal du vurdere påstander som omhandler hvilke støttevilkår som er viktige for It's Learning.

Påstander om støttevilkår *

	Svært uenig	Uenig	Verken enig eller uenig	Enig	Svært enig
Jeg har den nødvendige kunnskapen for å kunne bruke It's Learning.	○	○	○	○	○
Jeg har de nødvendige ressursene for å kunne benytte meg av It's Learning.	○	○	○	○	○
It's Learning er kompatibel med andre applikasjoner som jeg bruker i forbindelse med mitt skolearbeid.	○	○	○	○	○
It's Learning er godt integrert med fagene jeg tar på høgskolen/universitet.	○	○	○	○	○
Jeg fikk god opplæring i bruken av It's Learning når jeg begynte på høgskolen/universitet.	○	○	○	○	○
Jeg har mulighet til å få hjelp hvis jeg skulle få problemer med It's Learning.	○	○	○	○	○

Kommentarer til påstandene:

Tilbake Fortsett

Totalvurdering

I denne delen av undersøkelsen skal du gjøre en totalvurdering av It's Learning. Du kan i tillegg benytte den siste tektboksen om du har noe mer å tilføye som ikke er tatt opp i undersøkelsen.

Totalvurdering *

	Svært lite fornøyd	Lite fornøyd	Noe fornøyd	Fornøyd	Svært fornøyd
Hvor godt fornøyd er du med It's Learning som helhet?	○	○	○	○	○

Hvis du er misfornøyd med It's Learning; hva er hovedgrunnen til dette?

- ○ Lav nytteverdi
- ○ Lav brukervennlighet
- ○ Andre:

Hvis du er misfornøyd med It's Learning; nevn spesifikke årsaker til dette?

Nevn de viktigste årsakene.

Hvordan kan It's Learning bli bedre?

Nevn de viktigste punktene.

Ønsker du å kommentere noe som ikke er tatt opp i undersøkelsen?

Tilbake Send

Appendix C

Survey - data distributions

This appendix contains the data distribution of the answers from the survey.

Here follows an explanation of the abbreviations used in this appendix:

- N: Number
- P: Percentage
- Avg.: Mean value/average value
- SD: Standard deviation

Informatics,
HiST

64 participants

FUNCTIONALITY	Never		Sometimes		Often		N/A	
	N	P	N	P	N	P	N	P
Announcements	2	3 %	30	47 %	32	50 %	0	0 %
Subject information	1	2 %	23	36 %	39	61 %	1	2 %
Projects	11	17 %	36	56 %	17	27 %	0	0 %
Create new project	22	34 %	33	52 %	7	11 %	2	3 %
Calendar	41	64 %	20	31 %	2	3 %	1	2 %
Message system	11	17 %	43	67 %	10	16 %	0	0 %
ePortfolio	48	75 %	13	20 %	0	0 %	3	5 %
Search	47	73 %	16	25 %	1	2 %	0	0 %

USEFULNESS	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. My school work would be difficult to perform without It's Learning.	1	2 %	10	16 %	16	25 %	22	34 %	15	23 %	3.63	1.13
2. Using It's Learning gives me more control over my school work.	0	0 %	1	2 %	5	8 %	40	63 %	18	28 %	4.17	0.40
3. It's Learning addresses my school work related needs.	1	2 %	3	5 %	29	45 %	21	33 %	10	16 %	3.56	0.76
4. Using It's Learning allows me to accomplish more work than would otherwise be possible.	3	5 %	16	25 %	33	52 %	10	16 %	2	3 %	2.88	0.71
5.Using It's Learning reduces the time I spend on unproductive activities.	5	8 %	25	39 %	23	36 %	11	17 %	0	0 %	2.63	0.75
6.It's Learning enchances my effectiveness in my school work.	3	5 %	15	23 %	25	39 %	19	30 %	2	3 %	3.03	0.86
7. It's Learning improves the quality of my school work.	5	8 %	15	23 %	33	52 %	11	17 %	0	0 %	2.78	0.68
8. It's Learning increases the productivity in my school work.	5	8 %	9	14 %	32	50 %	16	25 %	2	3 %	3.02	0.84
9. It's Learning makes it easier to do my school work.	2	3 %	3	5 %	18	28 %	33	52 %	8	13 %	3.66	0.77
10. Overall, I think It's Learning is useful in connection with my school work.	0	0 %	2	3 %	7	11 %	37	58 %	18	28 %	4.11	0.51

USER-FRIENDLINESS	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. I often become confused when I use It's Learning (R).	7	11 %	33	52 %	16	25 %	7	11 %	1	2 %	2.41	0.78
2. I make errors frequently when using It's Learning (R).	14	22 %	39	61 %	6	9 %	4	6 %	1	2 %	2.05	0.71
3. Interacting with It's Learning is often frustrating (R).	13	20 %	23	36 %	15	23 %	11	17 %	2	3 %	2.47	1.21
4. I often need to consult the user manual when using It's Learning (R).	47	73 %	14	22 %	2	3 %	0	0 %	1	2 %	1.34	0.48
5. Interacting with It's Learning requires a lot of my mental effort (R).	26	41 %	27	42 %	7	11 %	2	3 %	2	3 %	1.86	0.92
6. I find it easy to recover from errors encountered while using It's Learning.	6	9 %	19	30 %	22	34 %	14	22 %	3	5 %	2.83	1.07
7. It's Learning is inflexible to interact with (R).	3	5 %	23	36 %	22	34 %	13	20 %	3	5 %	2.84	0.93
8. I find it easy to get It's Learning to do what I want to do.	2	3 %	11	17 %	23	36 %	27	42 %	1	2 %	3.22	0.75
9. It's Learning often behaves in unexpected ways (R).	8	13 %	28	44 %	17	27 %	10	16 %	1	2 %	2.50	0.92
10. I find it cumbersome to use It's Learning (R).	14	22 %	28	44 %	13	20 %	7	11 %	2	3 %	2.30	1.07

11. My interaction with It's Learning is easy for me to understand.	2	3 %	2	3 %	6	9 %	40	63 %	14	22 %	3.97	0.73
12. It is easy for me to remember how to perform tasks using It's Learning.	2	3 %	1	2 %	5	8 %	41	64 %	15	23 %	4.03	0.67
13. It's Learning provides helpful guidance in performing tasks.	3	5 %	10	16 %	39	61 %	11	17 %	1	2 %	2.95	0.59
14. Overall, I find It's Learning easy to use.	1	2 %	1	2 %	9	14 %	42	66 %	11	17 %	3.95	0.52

SOCIAL INFLUENCE	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. I use It's Learning voluntary.	6	9 %	14	22 %	19	30 %	17	27 %	8	13 %	3.11	1.37
2. My lecturer/teaching supervisor does NOT require me to use It's Learning.	29	45 %	20	31 %	12	19 %	3	5 %	0	0 %	1.83	0.81
3. Although it might be helpful, using the system is NOT mandatory in my subjects.	31	48 %	18	28 %	13	20 %	2	3 %	0	0 %	1.78	0.78
4. My friends/colleagues think I should use It's Learning.	7	11 %	5	8 %	39	61 %	10	16 %	3	5 %	2.95	0.87
5. My lecturer/teaching supervisor think I shall use It's Learning.	1	2 %	2	3 %	9	14 %	23	36 %	29	45 %	4.20	0.83
6. The university/university college has been supportive in the use It's Learning.	1	2 %	1	2 %	6	9 %	23	36 %	33	52 %	4.34	0.71

FACILITATING CONDITIONS	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. I have the knowledge neccesary to use It's Learning.	0	0 %	0	0 %	1	2 %	24	38 %	39	61 %	4.59	0.28
2. I have the resources neccesary to use It's Learning	0	0 %	0	0 %	0	0 %	23	36 %	41	64 %	4.64	0.23
3. It's Learning is compatible with other systems I use in connection with my schoolwork.	6	9 %	5	8 %	22	34 %	22	34 %	9	14 %	3.36	1.25
4. It's Learning is well integrated with my subjects at the university/university college.	1	2 %	1	2 %	15	23 %	34	53 %	13	20 %	3.89	0.64
5. I was offered good training in using It's Learning when I started at the university/university	15	23 %	28	44 %	14	22 %	7	11 %	0	0 %	2.20	0.86
6. I can get help if I have problems with It's Learning.	3	5 %	4	6 %	25	39 %	29	45 %	3	5 %	3.39	0.75

TOTAL ASSESSMENT	V.Dissatisfied		Dissatisfied		S. Satisfied		Satisfied		V. Satisfied			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
Total assessment	1	2 %	5	8 %	16	25 %	39	61 %	1	2 %	3.44	0.54

Economy & Management, NTNU

70 participants

FUNCTIONALITY	Never		Sometimes		Often		N/A	
	N	P	N	P	N	P	N	P
Announcements	13	19 %	28	40 %	29	41 %	0	0 %
Subject information	3	4 %	13	19 %	54	77 %	0	0 %
Projects	2	3 %	31	44 %	37	53 %	0	0 %
Create new project	6	9 %	35	50 %	29	41 %	0	0 %
Calendar	58	83 %	10	14 %	2	3 %	0	0 %
Message system	30	43 %	39	56 %	1	1 %	0	0 %
ePortfolio	63	90 %	5	7 %	2	3 %	0	0 %
Search	54	77 %	13	19 %	3	4 %	0	0 %

USEFULNESS	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. My school work would be difficult to perform without It's Learning.	5	7 %	5	7 %	25	36 %	27	39 %	8	11 %	3.40	1.06
2. Using It's Learning gives me more control over my school work.	3	4 %	6	9 %	8	11 %	38	54 %	15	21 %	3.80	1.03
3. It's Learning addresses my school work related needs.	2	3 %	7	10 %	14	20 %	42	60 %	5	7 %	3.59	0.77
4. Using It's Learning allows me to accomplish more work than would otherwise be possible.	8	11 %	21	30 %	21	30 %	16	23 %	4	6 %	2.81	1.20
5.Using It's Learning reduces the time I spend on unproductive activities.	14	20 %	19	27 %	14	20 %	21	30 %	2	3 %	2.69	1.41
6.It's Learning enchances my effectiveness in my school work.	7	10 %	21	30 %	21	30 %	20	29 %	1	1 %	2.81	1.02
7. It's Learning improves the quality of my school work.	8	11 %	24	34 %	24	34 %	14	20 %	0	0 %	2.63	0.87
8. It's Learning increases the productivity in my school work.	6	9 %	23	33 %	18	26 %	23	33 %	0	0 %	2.83	0.98
9. It's Learning makes it easier to do my school work.	3	4 %	4	6 %	14	20 %	44	63 %	5	7 %	3.63	0.76
10. Overall, I think It's Learning is useful in connection with my school work.	2	3 %	2	3 %	10	14 %	35	50 %	21	30 %	4.01	0.83

USER-FRIENDLINESS	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. I often become confused when I use It's Learning (R).	5	7 %	40	57 %	14	20 %	11	16 %	0	0 %	2.44	0.71
2. I make errors frequently when using It's Learning (R).	8	11 %	44	63 %	13	19 %	5	7 %	0	0 %	2.21	0.55
3. Interacting with It's Learning is often frustrating (R).	5	7 %	32	46 %	16	23 %	10	14 %	7	10 %	2.74	1.24
4. I often need to consult the user manual when using It's Learning (R).	54	77 %	13	19 %	2	3 %	1	1 %	0	0 %	1.29	0.35
5. Interacting with It's Learning requires a lot of my mental effort (R).	24	34 %	28	40 %	11	16 %	6	9 %	1	1 %	2.03	0.98
6. I find it easy to recover from errors encountered while using It's Learning.	7	10 %	18	26 %	32	46 %	12	17 %	1	1 %	2.74	0.83
7. It's Learning is inflexible to interact with (R).	6	9 %	18	26 %	25	36 %	16	23 %	5	7 %	2.94	1.13
8. I find it easy to get It's Learning to do what I want to do.	3	4 %	7	10 %	27	39 %	32	46 %	1	1 %	3.30	0.71
9. It's Learning often behaves in unexpected ways (R).	8	11 %	27	39 %	20	29 %	12	17 %	3	4 %	2.64	1.07
10. I find it cumbersome to use It's Learning (R).	8	11 %	32	46 %	20	29 %	7	10 %	3	4 %	2.50	0.95
11. My interaction with It's Learning is easy for me to understand.	1	1 %	3	4 %	11	16 %	47	67 %	8	11 %	3.83	0.55

12. It is easy for me to remember how to perform tasks using It's Learning.	0	0 %	6	9 %	13	19 %	40	57 %	11	16 %	3.80	0.66
13. It's Learning provides helpful guidance in performing tasks.	3	4 %	11	16 %	46	66 %	9	13 %	1	1 %	2.91	0.51
14. Overall, I find It's Learning easy to use.	2	3 %	1	1 %	11	16 %	46	66 %	10	14 %	3.87	0.61

SOCIAL INFLUENCE	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. I use It's Learning voluntary.	6	9 %	15	21 %	13	19 %	27	39 %	9	13 %	3.26	1.41
2. My lecturer/teaching supervisor does NOT require me to use It's Learning.	12	17 %	31	44 %	24	34 %	3	4 %	0	0 %	2.26	0.63
3. Although it might be helpful, using the system is NOT mandatory in my subjects.	13	19 %	30	43 %	17	24 %	10	14 %	0	0 %	2.34	0.90
4. My friends/colleagues think I should use It's Learning.	1	1 %	3	4 %	34	49 %	24	34 %	8	11 %	3.50	0.66
5. My lecturer/teaching supervisor think I shall use It's Learning.	0	0 %	3	4 %	18	26 %	33	47 %	16	23 %	3.89	0.65
6. The university/university college has been supportive in the use It's Learning.	0	0 %	1	1 %	6	9 %	31	44 %	32	46 %	4.34	0.49

FACILITATING CONDITIONS	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. I have the knowledge neccesary to use It's Learning.	0	0 %	0	0 %	2	3 %	44	63 %	24	34 %	4.31	0.28
2. I have the resources neccesary to use It's Learning	0	0 %	0	0 %	4	6 %	39	56 %	27	39 %	4.33	0.34
3. It's Learning is compatible with other systems I use in connection with my schoolwork.	4	6 %	13	19 %	30	43 %	21	30 %	2	3 %	3.06	0.84
4. It's Learning is well integrated with my subjects at the university/university college.	1	1 %	10	14 %	16	23 %	31	44 %	12	17 %	3.61	0.97
5. I was offered good training in using It's Learning when I started at the university/university	29	41 %	30	43 %	7	10 %	3	4 %	1	1 %	1.81	0.79
6. I can get help if I have problems with It's Learning.	5	7 %	11	16 %	27	39 %	24	34 %	3	4 %	3.13	0.95

TOTAL ASSESSMENT	V.Dissatisfied		Dissatisfied		S. Satisfied		Satisfied		V. Satisfied			
	N	P	N	P	N	P	N	P	N	P	Avg.	
Total assessment	3	4 %	4	6 %	16	23 %	43	61 %	4	6 %	3.59	0.74

Social Science,
NTNU

50 participants

FUNCTIONALITY	Never		Sometimes		Often		N/A	
	N	P	N	P	N	P	N	P
Announcements	11	22 %	27	54 %	12	24 %	0	0 %
Subject information	4	8 %	23	46 %	23	46 %	0	0 %
Projects	7	14 %	23	46 %	20	40 %	0	0 %
Create new project	15	30 %	28	56 %	7	14 %	0	0 %
Calendar	45	90 %	4	8 %	1	2 %	0	0 %
Message system	17	34 %	31	62 %	2	4 %	0	0 %
ePortfolio	44	88 %	4	8 %	2	4 %	0	0 %
Search	32	64 %	16	32 %	2	4 %	0	0 %

USEFULNESS	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. My school work would be difficult to perform without It's Learning.	3	6 %	14	28 %	12	24 %	19	38 %	2	4 %	3.06	1.08
2. Using It's Learning gives me more control over my school work.	1	2 %	6	12 %	10	20 %	31	62 %	2	4 %	3.54	0.70
3. It's Learning addresses my school work related needs.	2	4 %	5	10 %	16	32 %	24	48 %	3	6 %	3.42	0.82
4. Using It's Learning allows me to accomplish more work than would otherwise be possible.	7	14 %	16	32 %	20	40 %	6	12 %	1	2 %	2.56	0.90
5.Using It's Learning reduces the time I spend on unproductive activities.	9	18 %	22	44 %	12	24 %	5	10 %	2	4 %	2.38	1.06
6.It's Learning enchances my effectiveness in my school work.	5	10 %	16	32 %	18	36 %	10	20 %	1	2 %	2.72	0.94
7. It's Learning improves the quality of my school work.	5	10 %	19	38 %	16	32 %	9	18 %	1	2 %	2.64	0.93
8. It's Learning increases the productivity in my school work.	5	10 %	13	26 %	17	34 %	15	30 %	0	0 %	2.84	0.95
9. It's Learning makes it easier to do my school work.	5	10 %	5	10 %	10	20 %	27	54 %	3	6 %	3.36	1.17
10. Overall, I think It's Learning is useful in connection with my school work.	2	4 %	1	2 %	3	6 %	36	72 %	8	16 %	3.94	0.67

USER-FRIENDLINESS	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. I often become confused when I use It's Learning (R).	10	20 %	30	60 %	4	8 %	6	12 %	0	0 %	2.12	0.76
2. I make errors frequently when using It's Learning (R).	10	20 %	33	66 %	4	8 %	3	6 %	0	0 %	2.00	0.53
3. Interacting with It's Learning is often frustrating (R).	15	30 %	24	48 %	7	14 %	3	6 %	1	2 %	2.02	0.88
4. I often need to consult the user manual when using It's Learning (R).	34	68 %	13	26 %	1	2 %	2	4 %	0	0 %	1.42	0.53
5. Interacting with It's Learning requires a lot of my mental effort (R).	26	52 %	21	42 %	1	2 %	2	4 %	0	0 %	1.58	0.53
6. I find it easy to recover from errors encountered while using It's Learning.	4	8 %	10	20 %	16	32 %	17	34 %	3	6 %	3.10	1.11
7. It's Learning is inflexible to interact with (R).	2	4 %	31	62 %	13	26 %	4	8 %	0	0 %	2.38	0.49
8. I find it easy to get It's Learning to do what I want to do.	0	0 %	7	14 %	12	24 %	28	56 %	3	6 %	3.54	0.66
9. It's Learning often behaves in unexpected ways (R).	15	30 %	23	46 %	12	24 %	0	0 %	0	0 %	1.94	0.55
10. I find it cumbersome to use It's Learning (R).	12	24 %	27	54 %	5	10 %	5	10 %	1	2 %	2.12	0.92
11. My interaction with It's Learning is easy for me to understand.	0	0 %	2	4 %	2	4 %	40	80 %	6	12 %	4.00	0.33
12. It is easy for me to remember how to perform tasks using It's Learning.	0	0 %	1	2 %	6	12 %	36	72 %	7	14 %	3.98	0.35

13. It's Learning provides helpful guidance in performing tasks.	0	0 %	6	12 %	36	72 %	6	12 %	2	4 %	3.08	0.40
14. Overall, I find It's Learning easy to use.	0	0 %	1	2 %	4	8 %	35	70 %	10	20 %	4.08	0.36
SOCIAL INFLUENCE	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. I use It's Learning voluntary.	0	0 %	1	2 %	6	12 %	29	58 %	14	28 %	4.12	0.48
2. My lecturer/teaching supervisor does NOT require me to use It's Learning.	2	4 %	9	18 %	12	24 %	18	36 %	9	18 %	3.46	1.23
3. Although it might be helpful, using the system is NOT mandatory in my subjects.	2	4 %	5	10 %	6	12 %	26	52 %	11	22 %	3.78	1.07
4. My friends/colleagues think I should use It's Learning.	2	4 %	7	14 %	18	36 %	21	42 %	2	4 %	3.28	0.82
5. My lecturer/teaching supervisor think I shall use It's Learning.	4	8 %	7	14 %	18	36 %	19	38 %	2	4 %	3.16	0.99
6. The university/university college has been supportive in the use It's Learning.	0	0 %	0	0 %	9	18 %	31	62 %	10	20 %	4.02	0.39
FACILITATING CONDITIONS	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. I have the knowledge neccesary to use It's Learning.	0	0 %	1	2 %	3	6 %	36	72 %	10	20 %	4.10	0.34
2. I have the resources neccesary to use It's Learning	0	0 %	0	0 %	4	8 %	35	70 %	11	22 %	4.14	0.29
3. It's Learning is compatible with other systems I use in connection with my schoolwork.	0	0 %	1	2 %	26	52 %	21	42 %	2	4 %	3.48	0.38
4. It's Learning is well integrated with my subjects at the university/university college.	1	2 %	11	22 %	17	34 %	20	40 %	1	2 %	3.18	0.76
5. I was offered good training in using It's Learning when I started at the university/university	13	26 %	23	46 %	10	20 %	4	8 %	0	0 %	2.10	0.79
6. I can get help if I have problems with It's Learning.	1	2 %	3	6 %	21	42 %	18	36 %	7	14 %	3.54	0.78
TOTAL ASSESSMENT	V.Dissatisfied		Dissatisfied		S. Satisfied		Satisfied		V. Satisfied			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
Total assessment	0	0 %	1	2 %	12	24 %	33	66 %	4	8 %	3.8	0.37

Computer Science, NTNU 44 (part 1) 34 (part 2)

FUNCTIONALITY	Never		Sometimes		Often	
	N	P	N	P	N	P
Announcements	6	14 %	21	48 %	17	39 %
Subject information	5	11 %	23	52 %	16	36 %
Projects	32	73 %	11	25 %	1	2 %
Create new project	38	86 %	5	11 %	0	0 %
Calendar	40	91 %	4	9 %	0	0 %
Message system	16	36 %	27	61 %	0	0 %
ePortfolio	43	98 %	1	2 %	0	0 %
Search	41	93 %	2	5 %	1	2 %

USEFULNESS (From part 1)	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. My school work would be difficult to perform without It's Learning.	20	45 %	11	25 %	4	9 %	6	14 %	3	7 %	2.11	1.73
2. Using It's Learning gives me more control over my school work.	10	23 %	11	25 %	8	18 %	12	27 %	3	7 %	2.70	1.65
3. It's Learning addresses my school work related needs.	15	34 %	11	25 %	10	23 %	8	18 %	0	0 %	2.25	1.26
4. Using It's Learning allows me to accomplish more work than would otherwise be possible.	17	39 %	14	32 %	12	27 %	1	2 %	0	0 %	1.93	0.76
5.Using It's Learning reduces the time I spend on unproductive activities.	12	27 %	16	36 %	8	18 %	7	16 %	1	2 %	2.30	1.24
6.It's Learning enchances my effectiveness in my school work.	17	39 %	18	41 %	8	18 %	1	2 %	0	0 %	1.84	0.65
7. It's Learning improves the quality of my school work.	21	48 %	13	30 %	10	23 %	0	0 %	0	0 %	1.75	0.66
8. It's Learning increases the productivity in my school work.	17	39 %	14	32 %	11	25 %	2	5 %	0	0 %	1.95	0.84
9. It's Learning makes it easier to do my school work.	15	34 %	10	23 %	9	20 %	10	23 %	0	0 %	2.32	1.38
10. Overall, I think It's Learning is useful in connection with my school work.	12	27 %	9	20 %	11	25 %	12	27 %	0	0 %	2.52	1.37

USER-FRIENDLINESS (From part 2)	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. I often become confused when I use It's Learning (R).	2	6 %	13	38 %	4	12 %	14	41 %	1	3 %	2.97	0.91
2. I make errors frequently when using It's Learning (R).	1	3 %	17	50 %	7	21 %	7	21 %	2	6 %	2.76	0.79
3. Interacting with It's Learning is often frustrating (R).	0	0 %	2	6 %	9	26 %	11	32 %	12	35 %	3.97	0.67
4. I often need to consult the user manual when using It's Learning (R).	23	68 %	9	26 %	2	6 %	0	0 %	0	0 %	1.38	0.28
5. Interacting with It's Learning requires a lot of my mental effort (R).	4	12 %	7	21 %	12	35 %	9	26 %	2	6 %	2.94	0.93
6. I find it easy to recover from errors encountered while using It's Learning.	9	26 %	12	35 %	8	24 %	5	15 %	0	0 %	2.26	0.81
7. It's Learning is inflexible to interact with (R).	1	3 %	1	3 %	7	21 %	17	50 %	8	24 %	3.88	0.64
8. I find it easy to get It's Learning to do what I want to do.	4	12 %	9	26 %	16	47 %	4	12 %	1	3 %	2.68	0.68
9. It's Learning often behaves in unexpected ways (R).	1	3 %	4	12 %	7	21 %	18	53 %	4	12 %	3.59	0.70
10. I find it cumbersome to use It's Learning (R).	0	0 %	3	9 %	7	21 %	12	35 %	12	35 %	3.97	0.72
11. My interaction with It's Learning is easy for me to understand.	1	3 %	4	12 %	14	41 %	12	35 %	3	9 %	3.35	0.65
12. It is easy for me to remember how to perform tasks using It's Learning.	1	3 %	6	18 %	3	9 %	20	59 %	4	12 %	3.59	0.80
13. It's Learning provides helpful guidance in performing tasks.	4	12 %	9	26 %	20	59 %	1	3 %	0	0 %	2.53	0.43

14. Overall, I find It's Learning easy to use.	4	12 %	6	18 %	16	47 %	8	24 %	0	0 %	2.82	0.67
SOCIAL INFLUENCE (Part 1)	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. I use It's Learning voluntary.	12	27 %	16	36 %	8	18 %	8	18 %	0	0 %	2.27	1.13
2. My lecturer/teaching supervisor does NOT require me to use It's Learning.	3	7 %	6	14 %	14	32 %	14	32 %	7	16 %	3.36	1.26
3. Although it might be helpful, using the system is NOT mandatory in my subjects.	3	7 %	8	18 %	13	30 %	12	27 %	8	18 %	3.32	1.38
4. My friends/colleagues think I should use It's Learning.	22	50 %	6	14 %	14	32 %	2	5 %	0	0 %	1.91	1.01
5. My lecturer/teaching supervisor think I shall use It's Learning.	8	18 %	5	11 %	20	45 %	10	23 %	1	2 %	2.80	1.14
6. The university/university college has been supportive in the use It's Learning.	-	-	-	-	-	-	-	-	-	-		
FACILITATING CONDITIONS (Part 2)	S. Disagree		Disagree		Neither		Agree		S. Agree			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
1. I have the knowledge neccesary to use It's Learning.	-	-	-	-	-	-	-	-	-	-		
2. I have the resources neccesary to use It's Learning	-	-	-	-	-	-	-	-	-	-		
3. It's Learning is compatible with other systems I use in connection with my schoolwork.	-	-	-	-	-	-	-	-	-	-		
4. It's Learning is well integrated with my subjects at the university/university college.	19	56 %	12	35 %	3	9 %	0	0 %	0	0 %	1.53	0.34
5. I was offered good training in using It's Learning when I started at the university/university	21	62 %	11	32 %	2	6 %	0	0 %	0	0 %	1.44	0.29
6. I can get help if I have problems with It's Learning.	-	-	-	-	-	-	-	-	-			
TOTAL ASSESSMENT (Part 2)	V.Dissatisfied		Dissatisfied		S. Satisfied		Satisfied		V. Satisfied			
	N	P	N	P	N	P	N	P	N	P	Avg.	SD
Total assessment	8	24 %	14	41 %	9	26 %	3	9 %	0	0 %	2.21	0.64

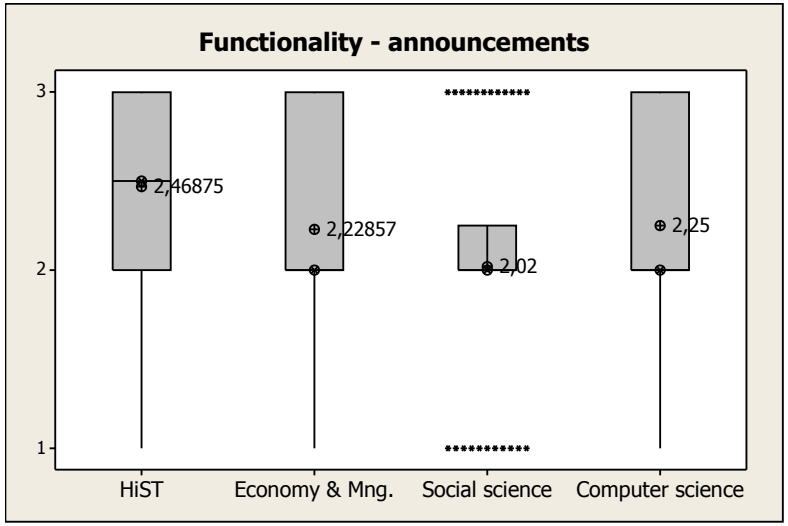
Appendix D

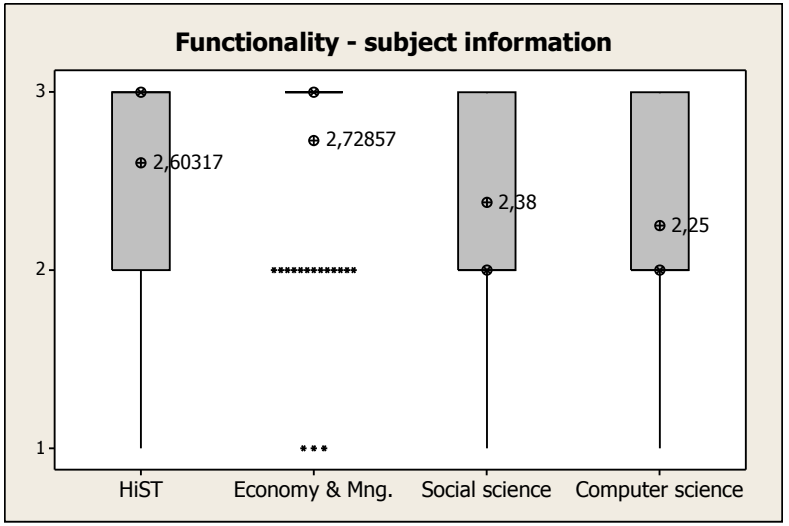
Survey - box-plot graphs

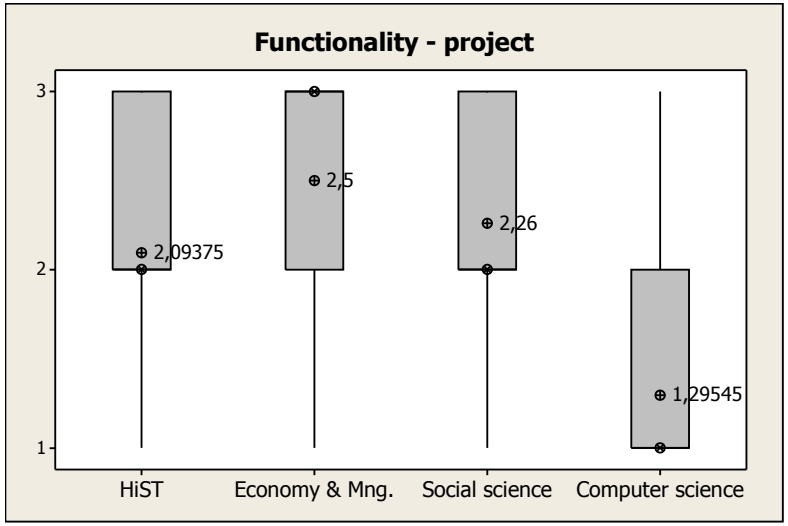
This appendix contains the box-plot graphs for all the statements that are used in the research model and the survey. The box-plot graphs show the distribution of the answers.

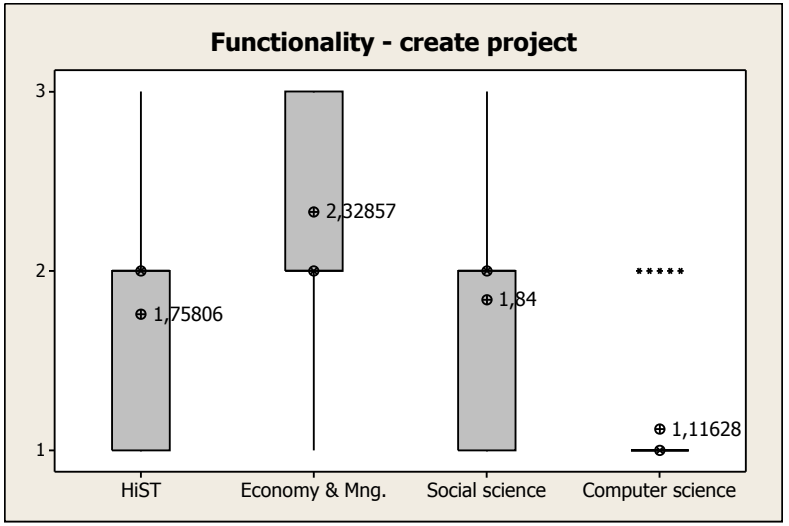
Here follows an explanation of the elements in box-plot graph:

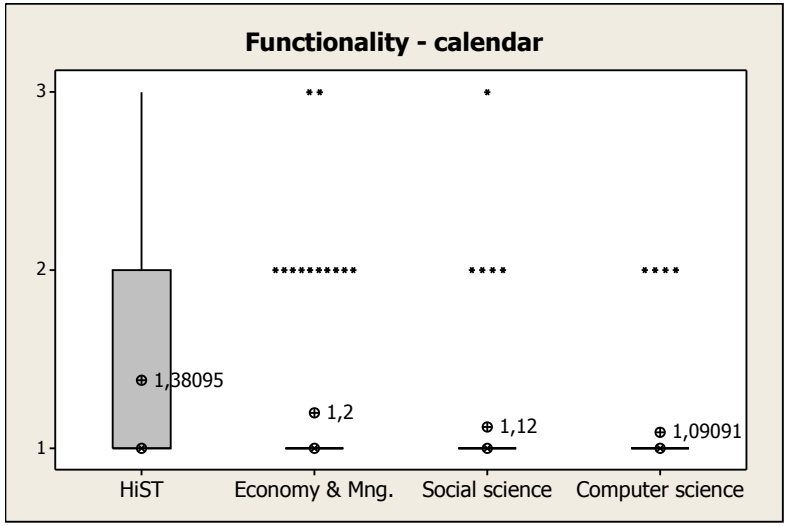
- X-axis: Student group
- Y-axis: Likert scale
- The box: The length of the box represents the difference between the 25th and 75th percentile. The larger the box, the greater the spread of the data.
- The whiskers: Draws the line from the end of the box to the largest and smallest values that are not outliers.
- Stars: Represents the outliers (unusual values).
- Median: The median is marked with a horizontal line and a dot.
- Mean: The mean is marked with a number and a dot .

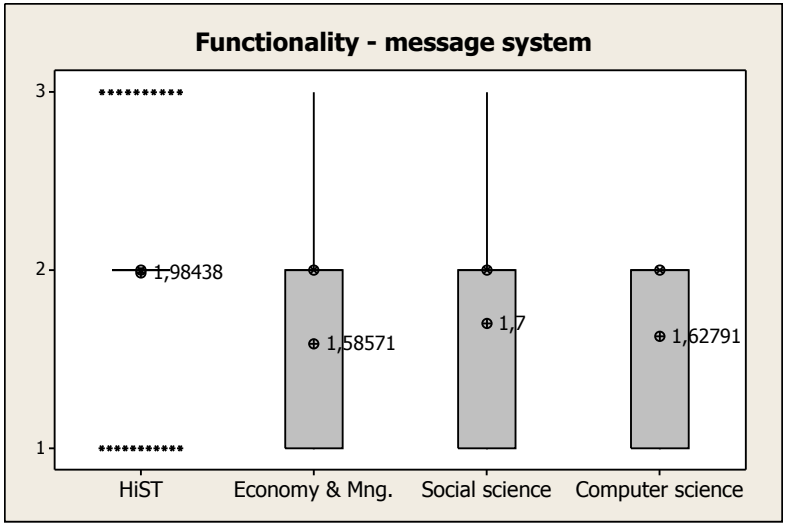

Functionality - announcements
3
2
1
2,46875
2,22857
2,02
2,25
HiST
Economy & Mng.
Social science
Computer science

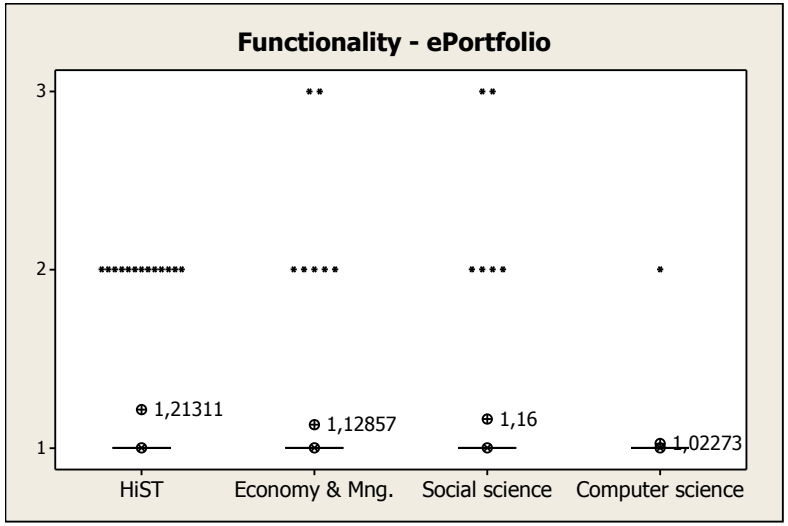

Functionality - subject information
3
2
1
2,60317
2,72857
2,38
2,25
HiST
Economy & Mng.
Social science
Computer science

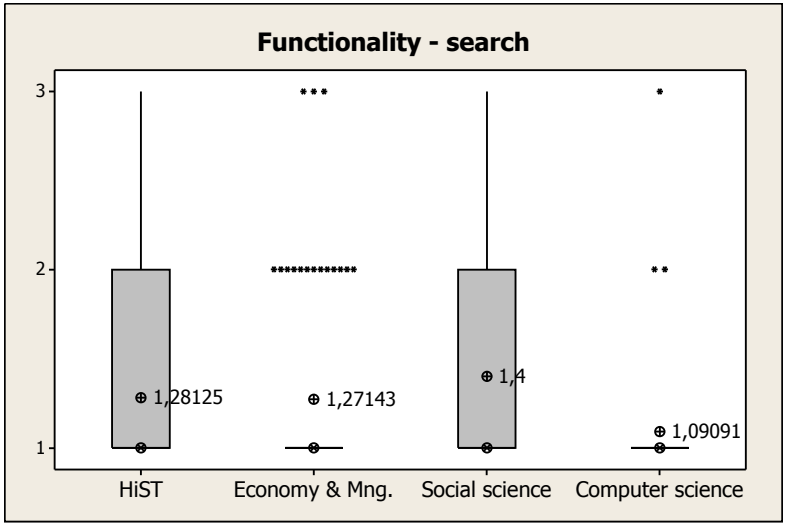

Functionality - project
3
2
1
2,09375
2,5
2,26
1,29545
HiST
Economy & Mng.
Social science
Computer science

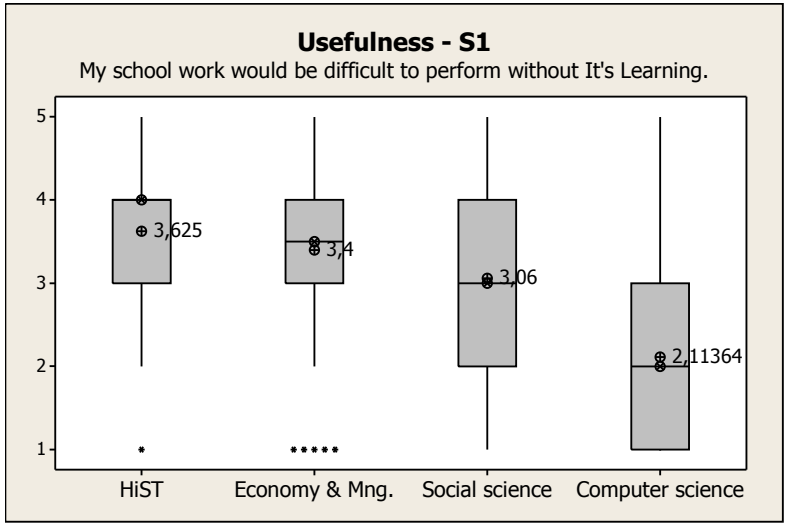

Functionality - create project
3
2
1
1,75806
2,32857
1,84
1,11628
HiST
Economy & Mng.
Social science
Computer science

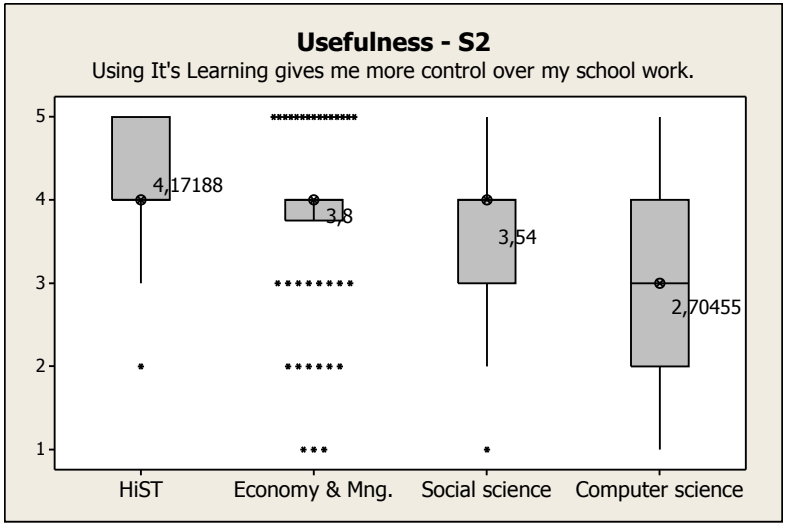

Functionality - calendar
3
2
1
1,38095
1,2
1,12
1,09091
HiST
Economy & Mng.
Social science
Computer science

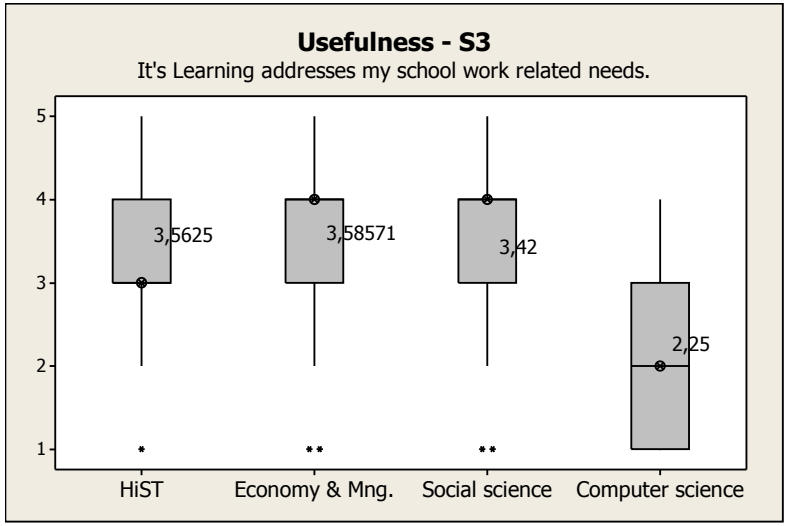

Functionality - message system
3
2
1
1,98438
1,58571
1,7
1,62791
HiST
Economy & Mng.
Social science
Computer science

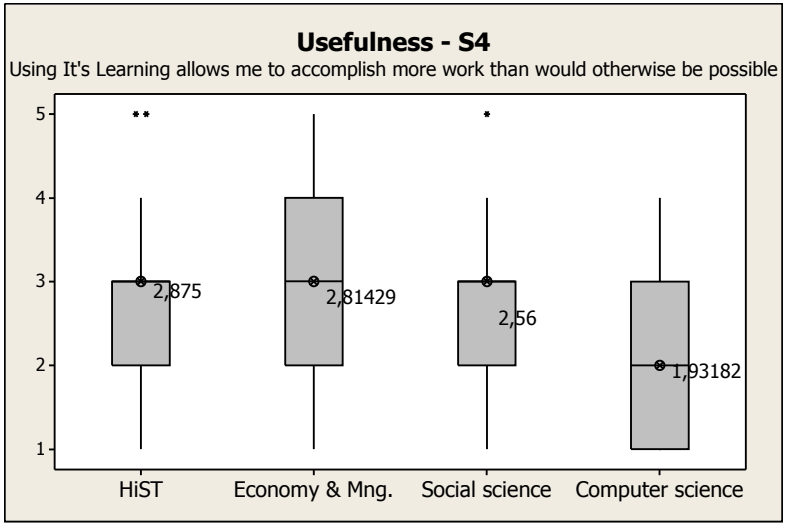

Functionality - ePortfolio
3
2
1
1,21311
1,12857
1,16
1,02273
HiST
Economy & Mng.
Social science
Computer science

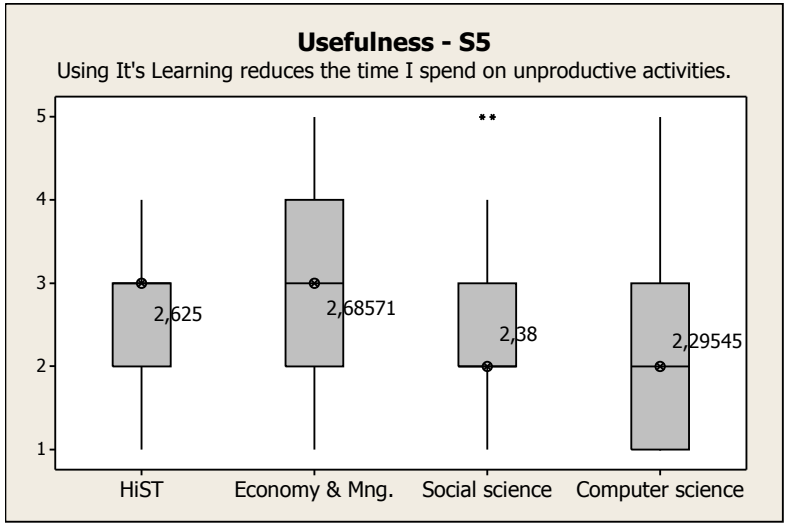

Functionality - search
3
2
1
1,28125
1,27143
1,4
1,09091
HiST
Economy & Mng.
Social science
Computer science

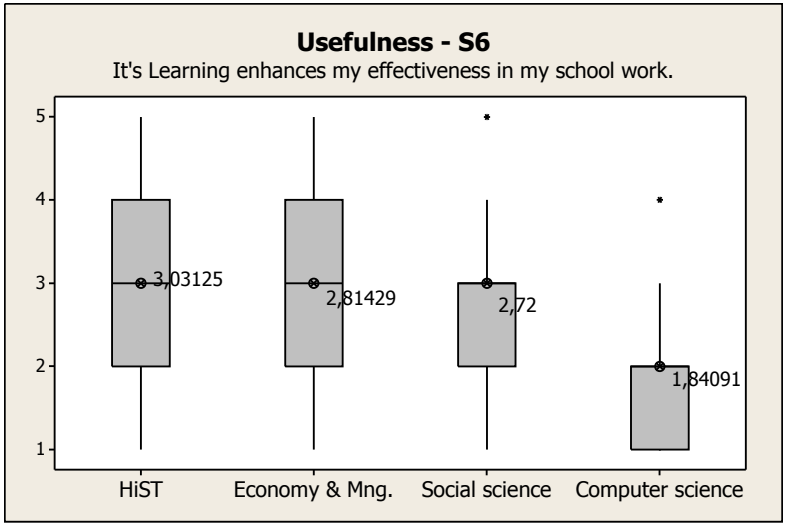

Usefulness - S1
My school work would be difficult to perform without It's Learning.
5
4
3
2
1
3,625
3,4
3,06
2,11364
HiST
Economy & Mng.
Social science
Computer science

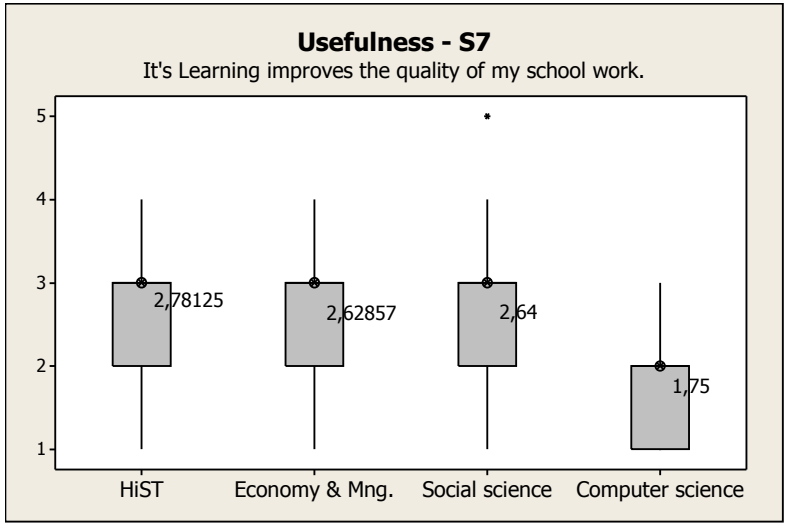

Usefulness - S2
Using It's Learning gives me more control over my school work.
5
4
3
2
1
4,17188
3,8
3,54
2,70455
HiST
Economy & Mng.
Social science
Computer science

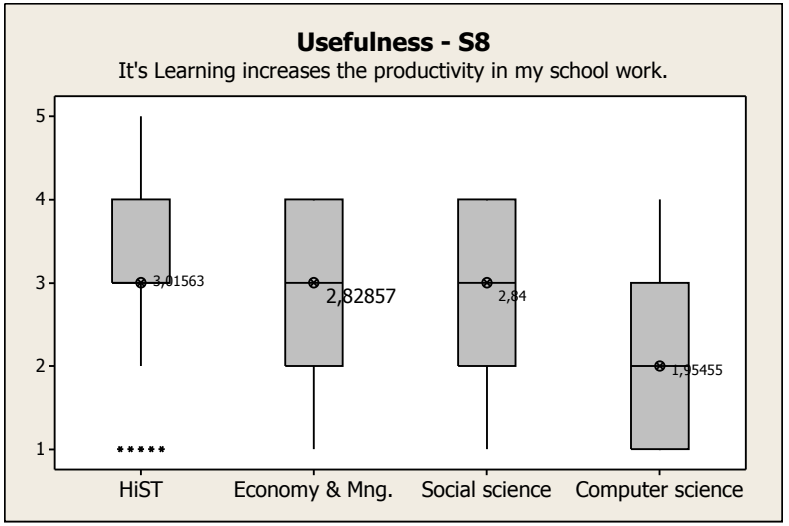

Usefulness - S3
It's Learning addresses my school work related needs.
5
4
3
2
1
3,5625
3,58571
3,42
2,25
HiST
Economy & Mng.
Social science
Computer science

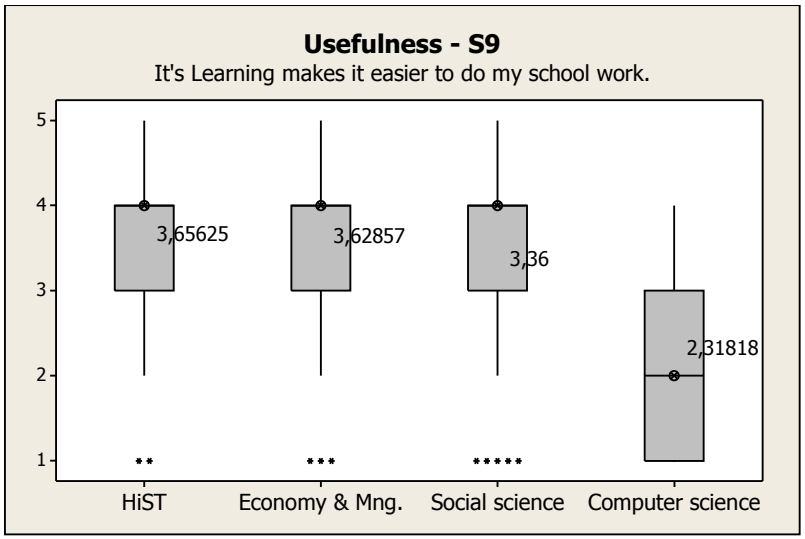

Usefulness - S4
Using It's Learning allows me to accomplish more work than would otherwise be possible
5
4
3
2
1
2,875
2,81429
2,56
1,93182
HiST
Economy & Mng.
Social science
Computer science

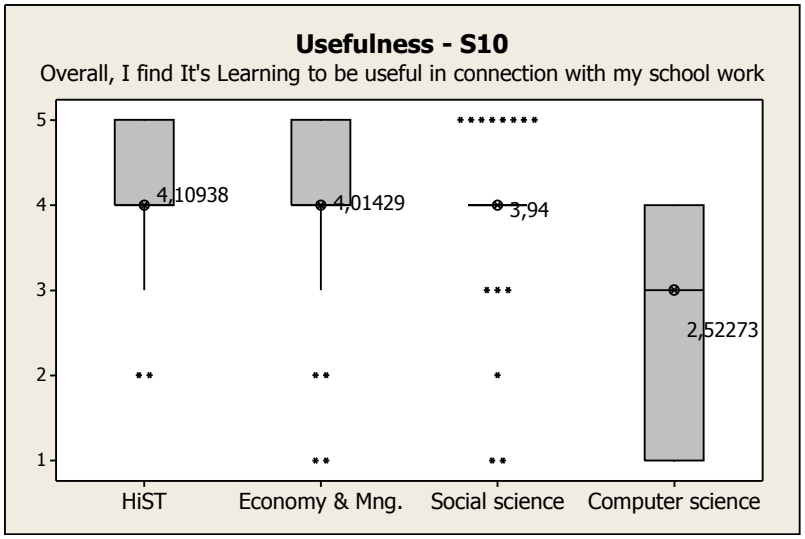

Usefulness - S5
Using It's Learning reduces the time I spend on unproductive activities.
5
4
3
2
1
2,625
2,68571
2,38
2,29545
HiST
Economy & Mng.
Social science
Computer science

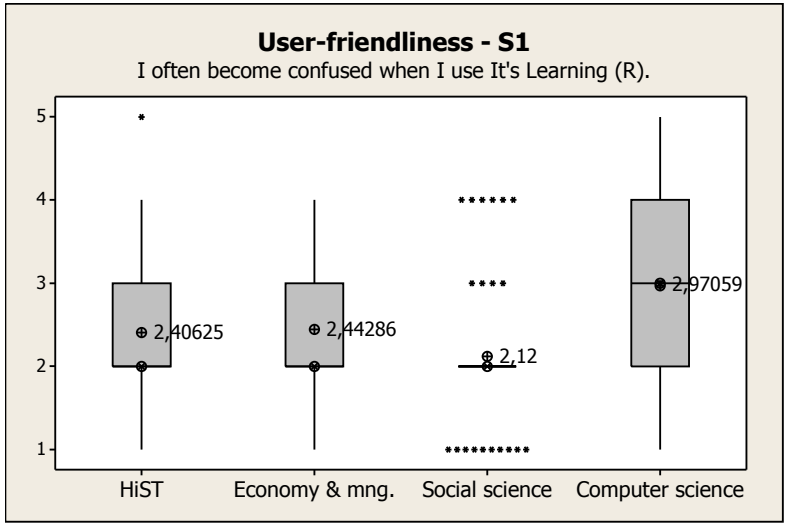

Usefulness - S6
It's Learning enhances my effectiveness in my school work.
5
4
3
2
1
3,03125
2,81429
2,72
1,84091
HiST
Economy & Mng.
Social science
Computer science

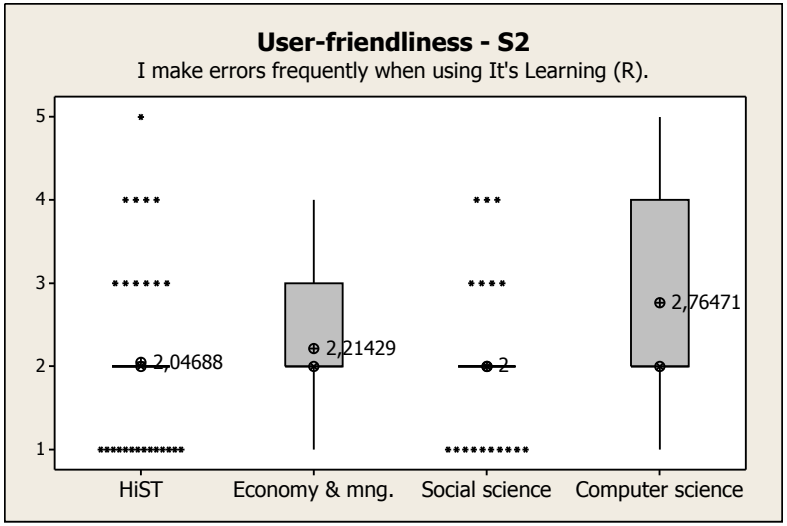

Usefulness - S7
It's Learning improves the quality of my school work.
5
4
3
2
1
2,78125
2,62857
2,64
1,75
HiST
Economy & Mng.
Social science
Computer science

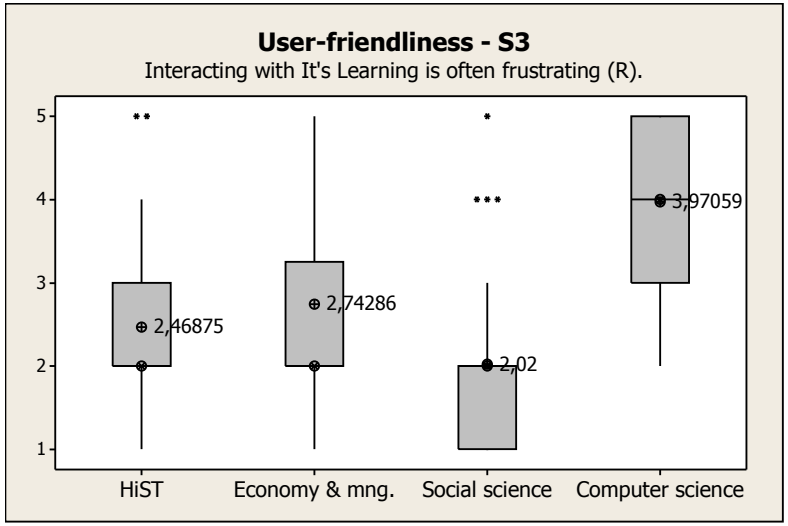

Usefulness - S8
It's Learning increases the productivity in my school work.
5
4
3
2
1
3,01563
2,82857
2,84
1,95455
HiST
Economy & Mng.
Social science
Computer science

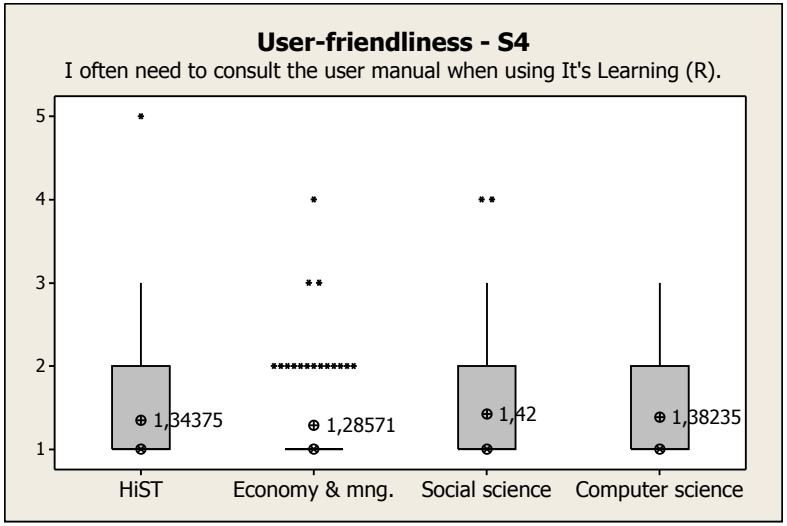

Usefulness - S9
It's Learning makes it easier to do my school work.
5
4
3
2
1
3,65625
3,62857
3,36
2,31818
HiST
Economy & Mng.
Social science
Computer science

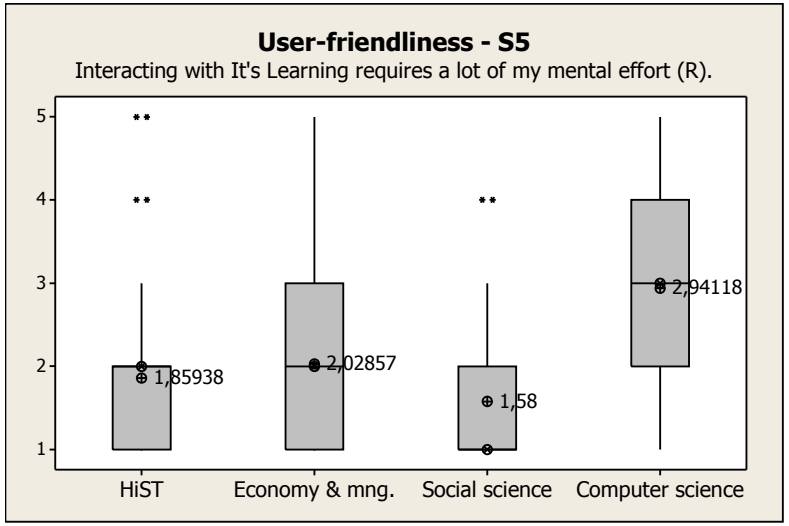

Usefulness - S10
Overall, I find It's Learning to be useful in connection with my school work
5
4
3
2
1
4,10938
4,01429
3,94
2,52273
HiST
Economy & Mng.
Social science
Computer science

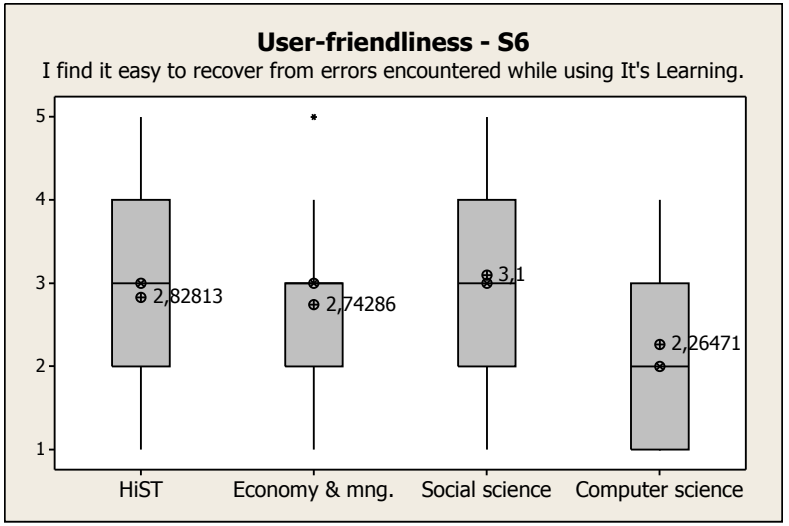

User-friendliness - S1
I often become confused when I use It's Learning (R).
5
4
3
2
1
2,40625
2,44286
2,12
2,97059
HiST
Economy & mng.
Social science
Computer science

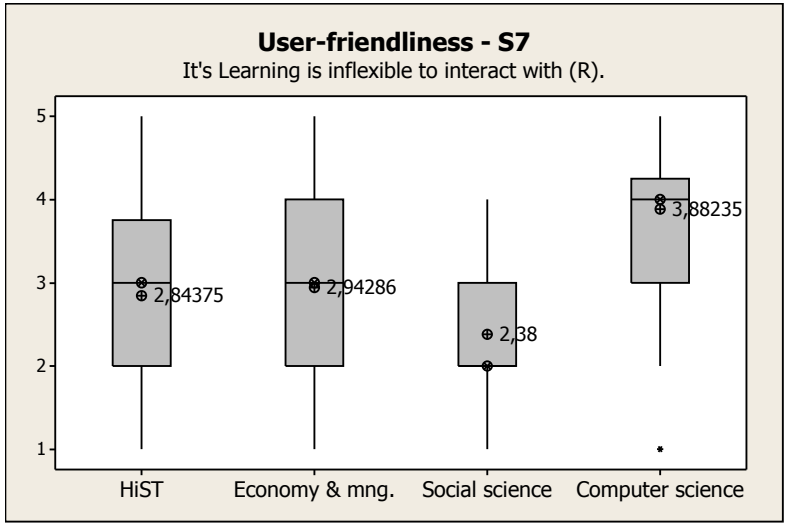

User-friendliness - S2
I make errors frequently when using It's Learning (R).
5
4
3
2
1
2,04688
2,21429
2
2,76471
HiST
Economy & mng.
Social science
Computer science

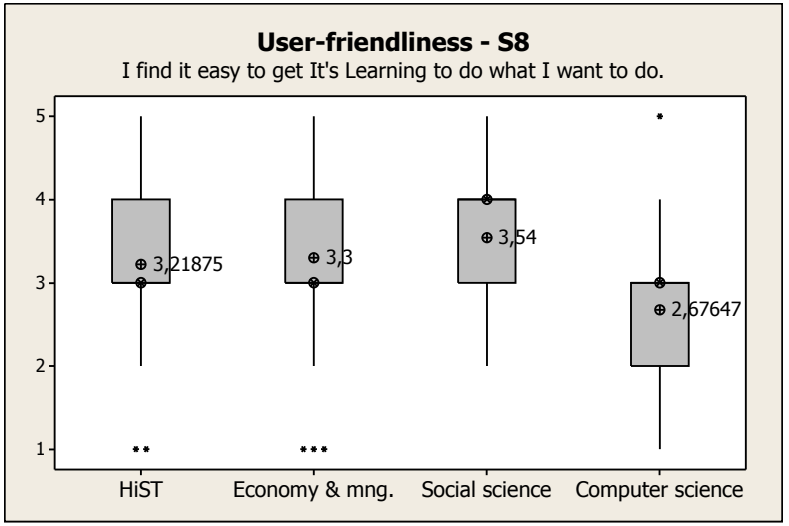

User-friendliness - S3
Interacting with It's Learning is often frustrating (R).
5
4
3
2
1
2,46875
2,74286
2,02
3,97059
HiST
Economy & mng.
Social science
Computer science

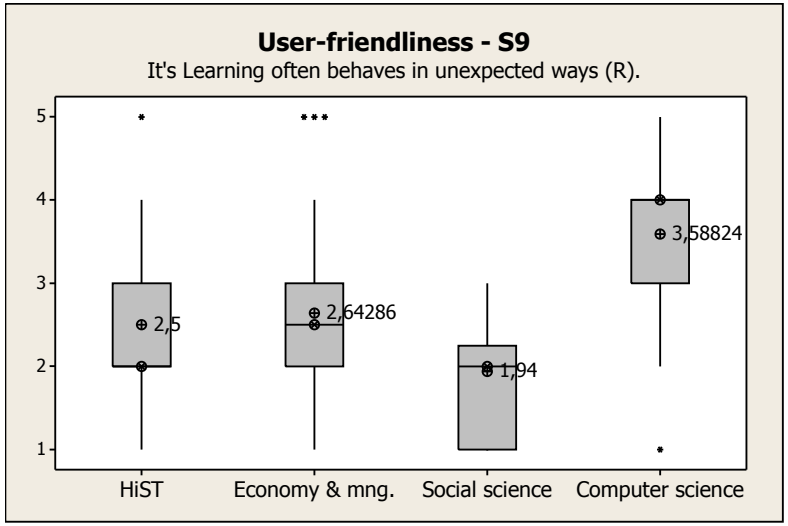

User-friendliness - S4
I often need to consult the user manual when using It's Learning (R).
5
4
3
2
1
1,34375
1,28571
1,42
1,38235
HiST
Economy & mng.
Social science
Computer science

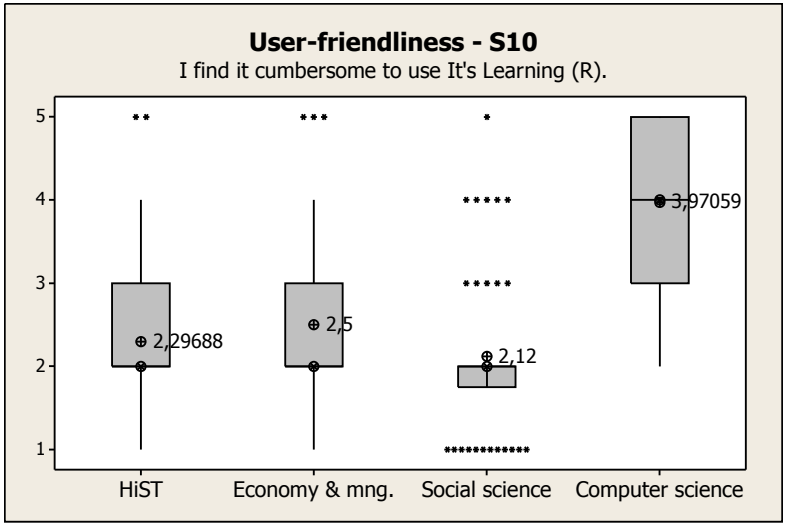

User-friendliness - S5
Interacting with It's Learning requires a lot of my mental effort (R).
5
4
3
2
1
1,85938
2,02857
1,58
2,94118
HiST
Economy & mng.
Social science
Computer science

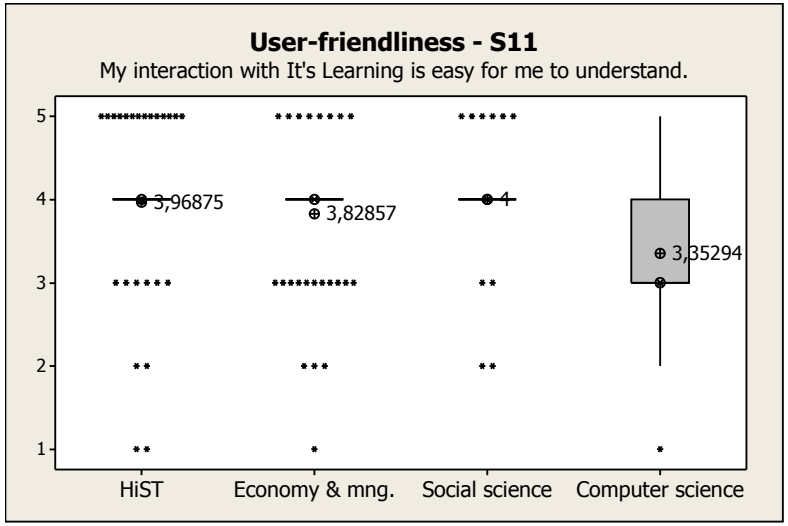

User-friendliness - S6
I find it easy to recover from errors encountered while using It's Learning.
5
4
3
2
1
2,82813
2,74286
3,1
2,26471
HiST
Economy & mng.
Social science
Computer science

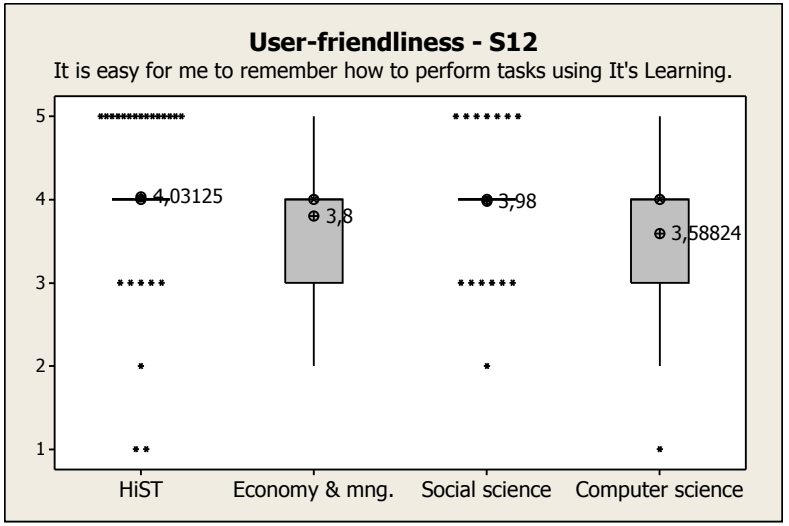

User-friendliness - S7
It's Learning is inflexible to interact with (R).
5
4
3
2
1
2,84375
2,94286
2,38
3,88235
HiST
Economy & mng.
Social science
Computer science

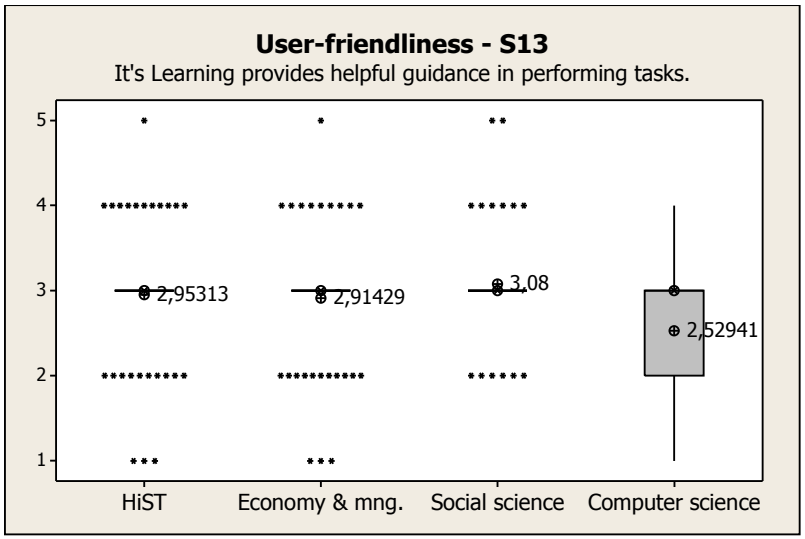

User-friendliness - S8
I find it easy to get It's Learning to do what I want to do.
5
4
3
2
1
3,21875
3,3
3,54
2,67647
HiST
Economy & mng.
Social science
Computer science

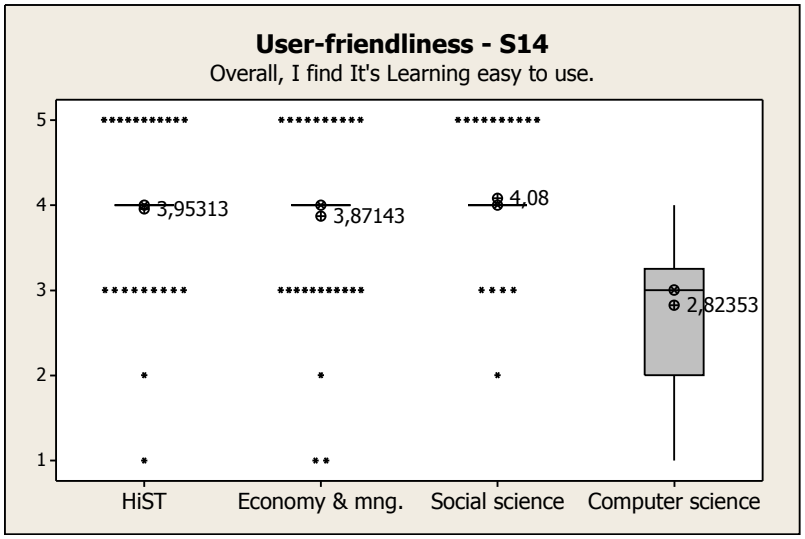

User-friendliness - S9
It's Learning often behaves in unexpected ways (R).
5
4
3
2
1
2,5
2,64286
1,94
3,58824
HiST
Economy & mng.
Social science
Computer science

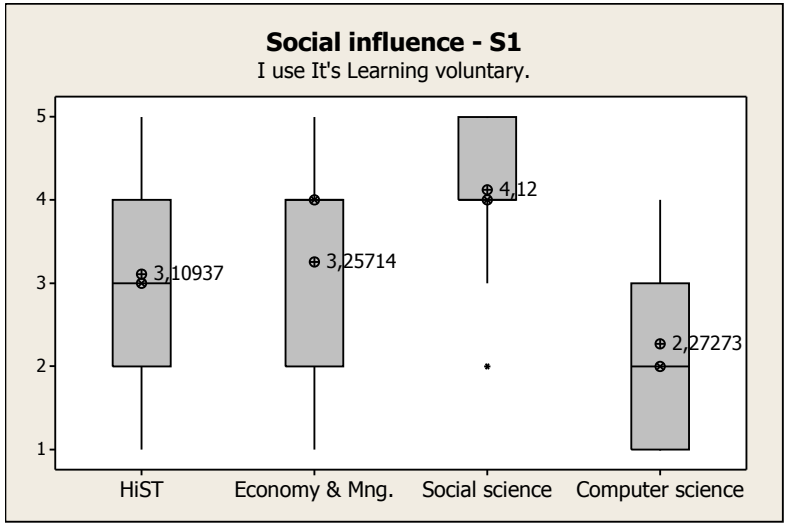

User-friendliness - S10
I find it cumbersome to use It's Learning (R).
5
4
3
2
1
2,29688
2,5
2,12
3,97059
HiST
Economy & mng.
Social science
Computer science

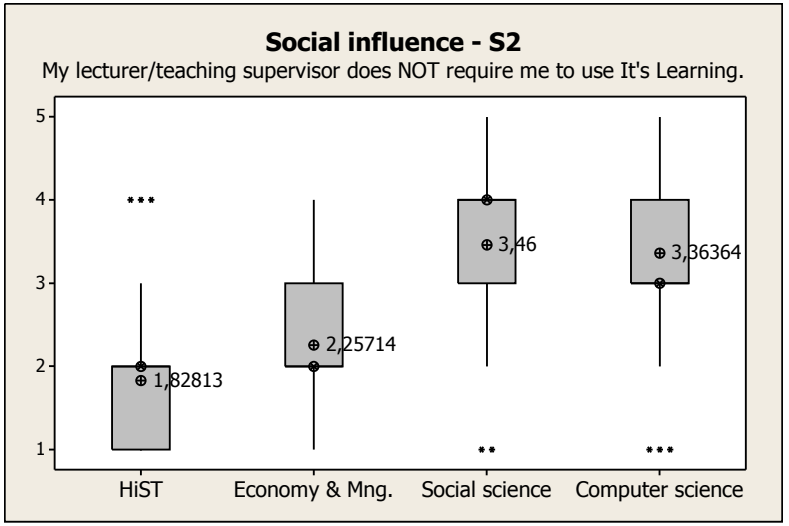

User-friendliness - S11
My interaction with It's Learning is easy for me to understand.
5
4
3
2
1
3,96875
3,82857
4
3,35294
HiST
Economy & mng.
Social science
Computer science

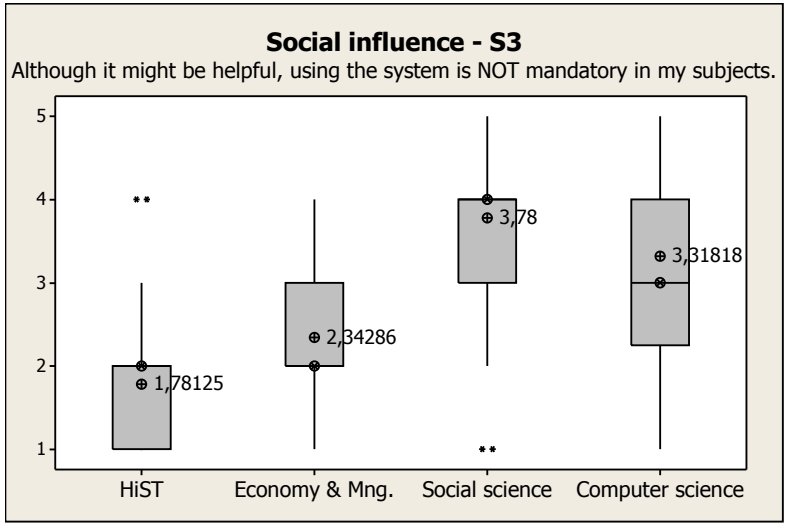

User-friendliness - S12
It is easy for me to remember how to perform tasks using It's Learning.
5
4
3
2
1
4,03125
3,8
3,98
3,58824
HiST
Economy & mng.
Social science
Computer science

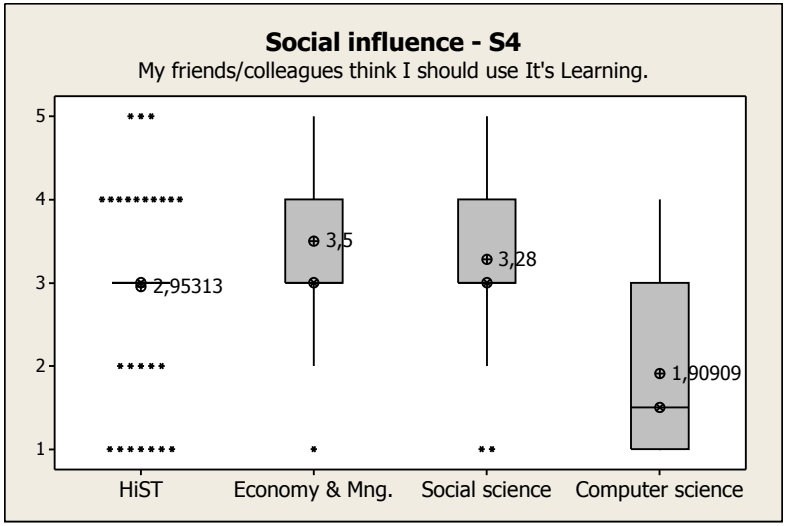

User-friendliness - S13
It's Learning provides helpful guidance in performing tasks.
5
4
3
2
1
2,95313
2,91429
3,08
2,52941
HiST
Economy & mng.
Social science
Computer science

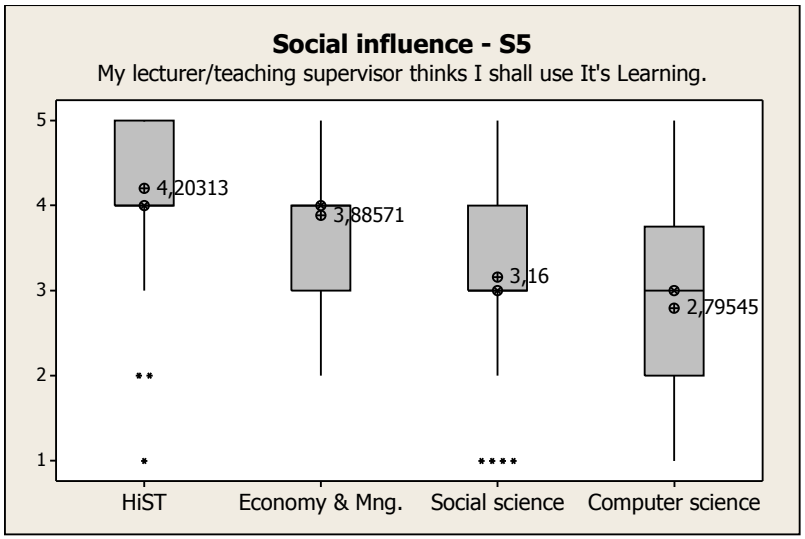

User-friendliness - S14
Overall, I find It's Learning easy to use.
5
4
3
2
1
3,95313
3,87143
4,08
2,82353
HiST
Economy & mng.
Social science
Computer science

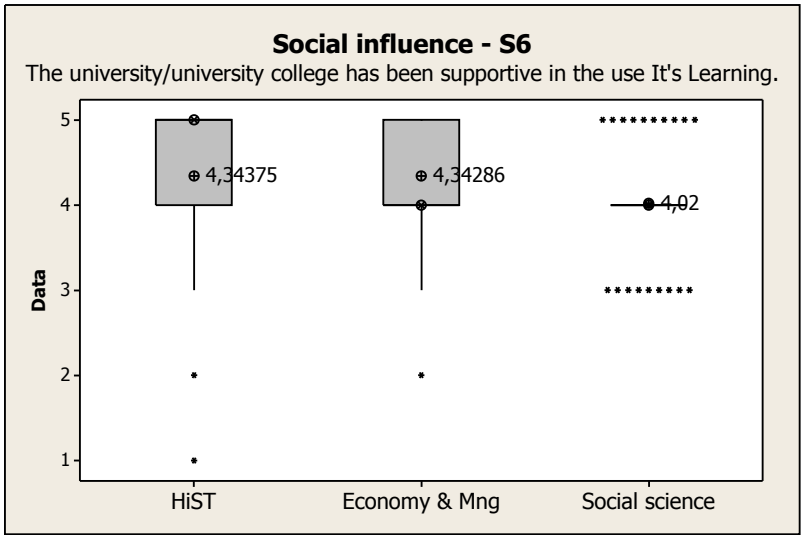

Social influence - S1
I use It's Learning voluntary.
5
4
3
2
1
3,10937
3,25714
4,12
2,27273
HiST
Economy & Mng.
Social science
Computer science

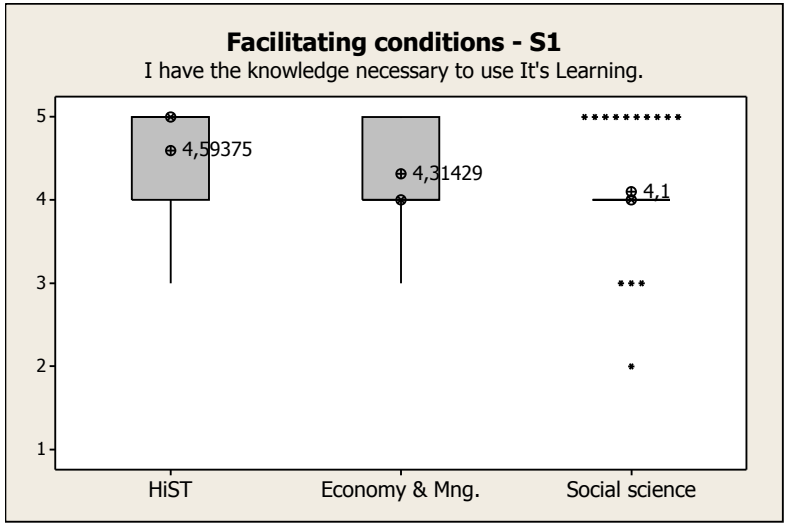

Social influence - S2
My lecturer/teaching supervisor does NOT require me to use It's Learning.
5
4
3
2
1
1,82813
2,25714
3,46
3,36364
HiST
Economy & Mng.
Social science
Computer science

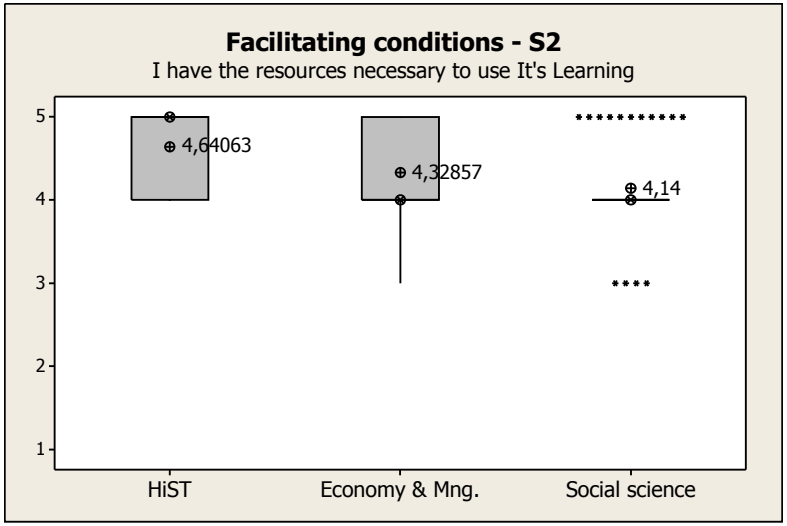

Social influence - S3
Although it might be helpful, using the system is NOT mandatory in my subjects.
5
4
3
2
1
1,78125
2,34286
3,78
3,31818
HiST
Economy & Mng.
Social science
Computer science

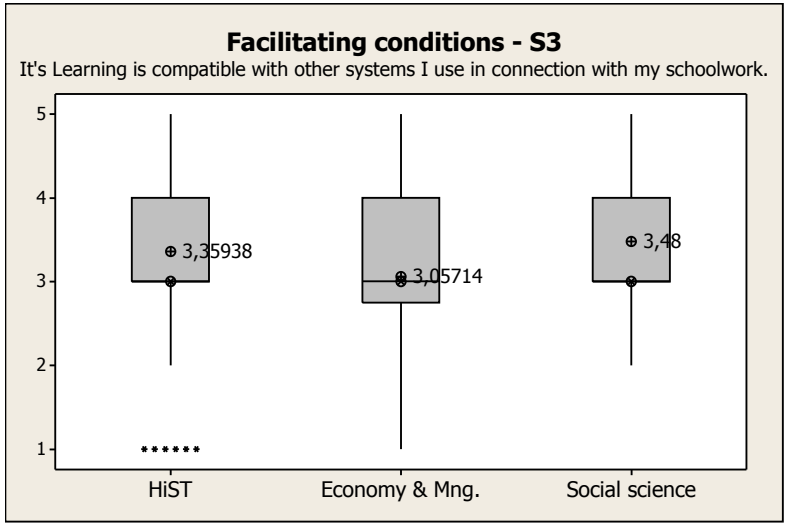

Social influence - S4
My friends/colleagues think I should use It's Learning.
5
4
3
2
1
2,95313
3,5
3,28
1,90909
HiST
Economy & Mng.
Social science
Computer science

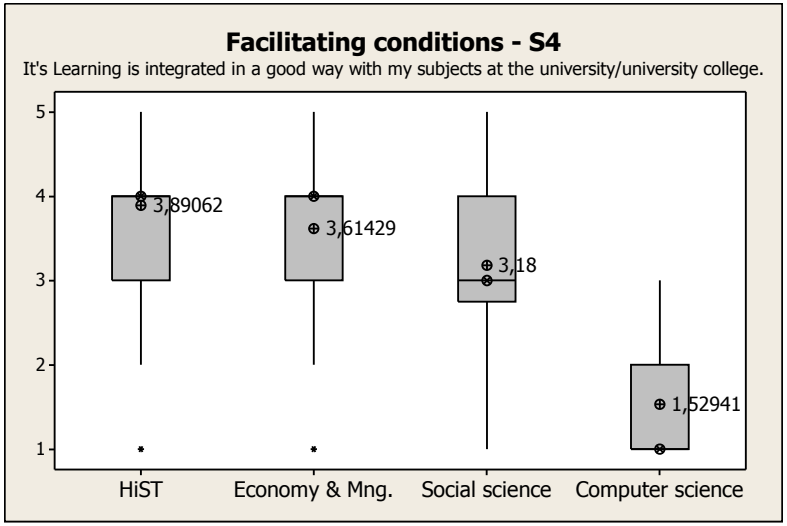

Social influence - S5
My lecturer/teaching supervisor thinks I shall use It's Learning.
5
4
3
2
1
4,20313
3,88571
3,16
2,79545
HiST
Economy & Mng.
Social science
Computer science

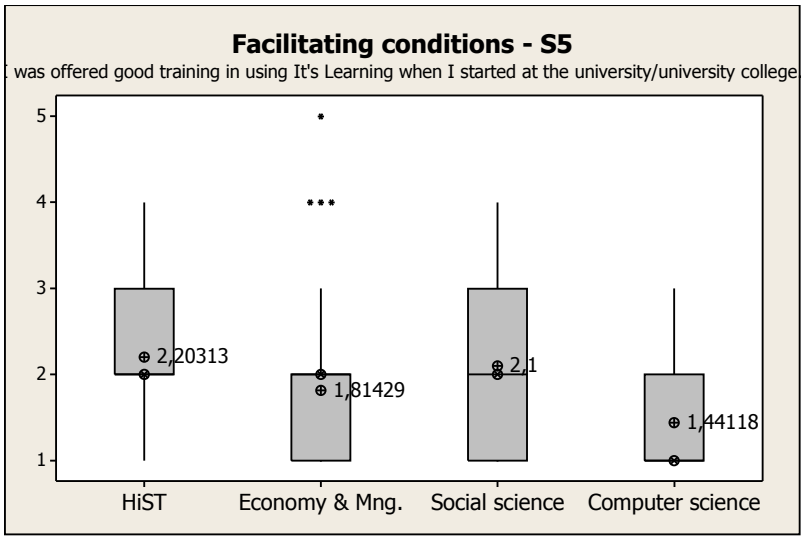

Social influence - S6
The university/university college has been supportive in the use It's Learning.
Data
5
4
3
2
1
4,34375
4,34286
4,02
HiST
Economy & Mng
Social science

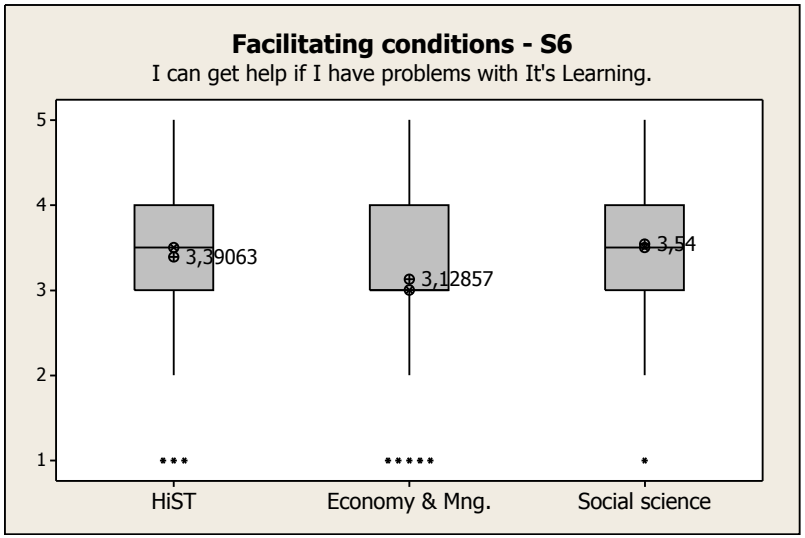

Facilitating conditions - S1
I have the knowledge necessary to use It's Learning.
5
4
3
2
1
4,59375
4,31429
4,1
HiST
Economy & Mng.
Social science


Facilitating conditions - S2
I have the resources necessary to use It's Learning
5
4
3
2
1
4,64063
4,32857
4,14
HiST
Economy & Mng.
Social science


Facilitating conditions - S3
It's Learning is compatible with other systems I use in connection with my schoolwork.
5
4
3
2
1
3,35938
3,05714
3,48
HiST
Economy & Mng.
Social science


Facilitating conditions - S4
It's Learning is integrated in a good way with my subjects at the university/university college.
5
4
3
2
1
3,89062
3,61429
3,18
1,52941
HiST
Economy & Mng.
Social science
Computer science


Facilitating conditions - S5
I was offered good training in using It's Learning when I started at the university/university college.
5
4
3
2
1
2,20313
1,81429
2,1
1,44118
HiST
Economy & Mng.
Social science
Computer science


Facilitating conditions - S6
I can get help if I have problems with It's Learning.
5
4
3
2
1
3,39063
3,12857
3,54
HiST
Economy & Mng.
Social science

Appendix E

Interview guide

This appendix contains the interview guide which was used in the interviews about It's Learning. The text is written in Norwegian.

Intervjuguide – ansatte om It's Learning

1 Generelt

1. Bruker du It's Learning i forbindelse med undervisning?

2. Hva er administrasjonen på NTNUs holding i forbindelse med bruken av It's Learning? Er det valgfritt/obligatorisk/anbefalt?

3. Har du fått god opplæring i bruken av It's Learning? Hvordan opprette fagsider osv.

2 Svar = NEI

1. Hvorfor ikke? Hva er grunnen til at du ikke bruker It's Learning? Hovedårsaker.

2. Hvilke alternativer benytter du i dine fag? Hvorfor? Hvorfor er alternativet bedre enn It's Learning?

3. Hva kan få deg til å bruke It's Learning?

4. Hva slags oppfatning har du rundt hvordan It's Learning fungerer på NTNU i dag?

5. Hvorfor fungerer ikke It's Learning skikkelig på NTNU? Hvorfor er folk negative til It's Learning? Hovedårsaker. (bakgrunn fra prosjekt i høst)

6. Hva ville du synes hvis det ble obligatorisk å bruke It's Learning på NTNU for alle fag?

3 Svar = JA

1. Hvor godt fornøyd er du med It's Learning som e-læringsplattform?

2. Fornøyd? Hvorfor?

3. Ikke fornøyd? Hvorfor ikke? Nytteverdi, brukervennlighet eller noe annet?

4. Hva er bra med It's Learning?

5. Hva er dårlig med It's Learning? -> spesifikke problemer..

6. Utnytter du deg av all funksjonaliteten som It's Learning tilbyr (kalender, meldingssystem, gjøremål inkl. innlevering og lignende, forum, test/undersøkelsesverktøy)

7. Synes du man klarer å utnytte potensialet til It's Learning godt nok på NTNU?

8. Hvordan skal man klare å bedre utnytte potensialet til It's Learning på NTNU?

9. Hvilke alternativer finnes til It's Learning? Finnes det et bedre?

10. It's Learning er ment å skulle dekke alle behov for en læringsplattform til høyere utdanning. Dekker It's Learning alle behov innenfor ditt fag? Hva kan du ikke bruke It's Learning til?

11. Hva kan gjøres for å bedre It's Learning? (endre folks holding etc.)

12. (Har du et inntrykk av at studentene som tar dine fag er fornøyd med It's Learning?)

13. Funksjonalitet du er fornøyd / ikke fornøyd med?

Appendix F

Interview transcriptions (full text)

Interviewee Alpha

Alpha is not using It's Learning, but rather regular web pages for his subjects. He says that he has not been recommended to use It's Learning by the administration at NTNU and has neither had any form of training in using It's Learning.

Alpha had heard that there was much fuss and problems with It's Learning in the beginning, but that it is possible that the system is better now. The reason why Alpha did not start to use It's Learning was because the teaching assistants did all the work by adding information, files and other material on the subject web page. Alpha did not see any reason for changing to It's Learning as it was easier and quicker to send an email with subject information to the teaching assistants.

One of the reasons why Alpha has not changed to It's Learning is that the web pages cover all the needs for the subjects he is teaching. Another reason is that he can market his subject through an open web page which is available for everyone. This way, people can easily acquire information, files etc. without being part of the subject.

If Alpha shall start using It's Learning it has to be easier for him to use It's Learning than regular web pages. This means that it would have to be simpler to administrate It's Learning than sending emails to the teaching assistants with subject information. As long as the teaching assistants believe that it is okay to use regular web pages, he will continue using it. Alpha would like do as little as possible when administrating his subject pages. He would of course start using It's Learning if it was mandatory, since there would be no other alternative.

Alpha's comprehension about It's Learning is that it is a little cumbersome to work with, but he also knows people who like it. Even though It's Learning might be cumbersome he believes that it gets easier to use the more you use it, as it generally

is with information systems.

Alpha believes that there might be better alternatives to It's Learning, but that the important thing is that the system must have a high degree of usefulness if people shall use it. If we shall use a new system it has to be better than what we are already using. Younger people may want to try new systems just because they look good and has a good reputation, without caring about the usefulness or user-friendliness of the system. As you get older and more experienced it is important to see a utility value in using a new system.

Interviewee Beta

Beta has used It's Learning at an earlier occasion, but does not use now as he is not doing that much teaching at the moment. He says he got some sort of recommendation or hint to start using It's Learning when NTNU decided to use the system. He comments that there may have been some changes since the last time he used It's Learning.

Beta is somewhat satisfied with It's Learning. There was some fuss and difficulties in the beginning, but he have the impression that people get more and more satisfied with It's Learning. He also believes that the students' opinion about It's Learning have changed in a positive direction.

A problem with It's Learning is that people/students who are not registered in the student register at NTNU cannot access It's Learning. It usually takes some time to register the students, especially foreign students who are going to take a subject which is administrated through It's Learning. Beta has experienced this when teaching doctorate students where some of the participants are new at NTNU. Since the registering process takes time, the students will not be able to access subject material as It's Learning does not have any option for releasing public material.

Beta believes that a positive side of using It's Learning is that the students have one system to focus on. It is cumbersome for the students to have some subjects that use It's Learning, and other subjects that use their own web pages. By using It's Learning, the students have all the information in the same place and gets notified when there have been updates within a subject.

When it comes to the functionality in It's Learning Beta believes it should be possible to transfer subject material from semester to semester for the same subject. At the beginning of a new semester the It's Learning subject page is always empty and all the information has to be uploaded again. Beta believes that another negative issue is that there is difficult to define groups from the participants in the subjects. Approving of exercises can also be cumbersome in It's Learning as exercises can only be defined as mandatory or not mandatory. It would be convenient to have a combination where you for instance can define that five out of eight exercises have

to be approved. Beta believes that an advantage of using It's Learning is that it is practical to send messages to the students from the It's Learning message system. By using the message system he does not have to create an e-mail list and add participants manually. The functionality for publishing general information and exercises is also satisfactory.

Of the functionality that It's Learning offers, Beta uses the most basic functionality like publishing information, curriculum and slides. He has also used the survey tool that It's Learning offers to get feedback from the students at end of the semester.

Of possible improvements, Beta believes that there should be a better dialogue between It's Learning AS and the users of It's Learning (at least the major users) concerning updates and maintenance in the system. NTNU experienced that a large It's Learning update took place in the beginning of a semester which involved big problems and a lot of complaints from the students. Beta believes it is a problem that It's Learning is a closed system, without any decent feature to make educational material public. The students have to be subject participants to get information about the subject. This makes it impossible for students, who do not take the subject, to get information when deciding which subjects to take in a given semester. Beta says this may also be a problem for other professors who are going to base their own subject on another subject and need information about it. The same applies to professors from other universities and schools who are interested in the subject information. As It's Learning is a closed system, Beta believes that it can be improved by an enhanced access control system with different access levels, for instance "public", "partly public" and "closed". This way subject information, exercises and old exams can be public material while exercise solutions, lecture schedules etc. is only available for students who attend the subject. The possibility to generate a public web page for a subject would also be a nice feature, according to Beta.

Interviewee Charlie

Charlie uses It's Learning in his teaching. He attended a course about It's Learning when NTNU decided to use It's Learning, but in his opinion it is better to get familiar with the system by exploring it on our own. He says that it is easy to get an overview of It's Learning and that people should use some time to explore the features which it offers. Charlie does, however, lack a more active attitude from the management at NTNU concerning It's Learning. He says that there is not specified anything about the use of It's Learning in the strategy document for the Department of Computer and Information Science or the management at NTNU.

Charlie started using It's Learning relatively late in his teaching, but the use has been more and more extensive. Before starting to use It's Learning, Charlie used regular web pages for his subjects. The transition to It's Learning for his largest

subject (approximately 500 students) was done by making a checklist of all the needed functionality. Most of the needed functionality was covered by It's Learning's features in some way, and the subject was gradually transferred to It's Learning. One of the immediate advantages of using It's Learning was the possibility to easily create a discussion forum where teachers, teaching assistants and students could discuss various topics and problems. Charlie had previously used a frequently asked questions (FAQ) system where each question had one key answer available for the students. There was no possibility to trail the discussion on a problem or add comments. A problem for Charlie was that It's Learning had no decent feature for group division and assigning of teaching assistants to each group. Thus, a separate web page was used for this purpose for a while. The problem was later solved by creating group folders for each teaching assistant were all students were added. An unforeseen and positive effect of doing this was that each teaching assistant created a discussion forum where he could communicate with the students that were assigned to his group. Charlie says that it took some time to assign all students manually to a group, but that the reward was a system that was much easier to administrate.

Charlie uses a feature called "grade book" to administrate the exercises in the subject. With this feature it is easy to choose between mandatory and non-mandatory exercises and register scores per exercise. Charlie says that an advantage of the "grade book" feature is that all the information is available for the subject responsible, and that he can create reports for each student, giving him a summary of the student's activities in It's Learning. In that way he is not dependent on his teaching assistants to get information about exercise deliveries and exercise scores for the students. A problem with the exercise system is that there is no search function to find a student for approving an exercise. Charlie says that last year the teaching assistants had to browse through a list of 500 students (20-30 per page) to find a student. There have, however, been continuous improvements in It's Learning in this area. It is now possible to filter students by group, so each of the teaching assistants can filter out his own group.

Of the functionality that It's Learning offers, Charlie uses discussion forum, the calendar, test tool and survey tool in addition to the basic functionality for publishing information, exercises etc. Charlie believes that the exercise system in It's Learning is flexible, and that it is far less time consuming than a manual setup on a web page. Charlie has the impression that the students in his subject are satisfied with his use of It's Learning.

Charlie believes that the use of regular web pages have some advantages over It's Learning. It is easier to administrate student groups and register exercises. Another advantage is that a regular web page is available for everybody. The only possibility to create public material from It's Learning is to generate a public page with information inside It's Learning, which is not very good. A disadvantage of using regular web pages is that you have to use a lot of time maintaining the web page. Earlier he needed to have a full-time employed teaching assistant for operating and

administrating the web page. As Charlie sees it, there is little value added for the features that is not in It's Learning. In most cases you only duplicate features which are already in It's Learning.

Charlie believes that the advantage of using It's Learning instead of a regular web page is that the structure and tools are arranged for you. All the functionality is in place and you only have to add the data. It will also be easier for the teaching assistants if everybody uses It's Learning, as they do not have to learn a new exercise system for each subject. The subject responsible will also get more control over exercise deliveries and do not have to ask the teaching assistants for this information.

Other advantages of using It's Learning that Charlie mentions is that you can copy teaching material from an earlier semester from the archived subjects. The survey tool is also convenient for evaluation of each individual exercise and the subject as a total. The results from these surveys can be used to improve the subject. A negative issue with It's Learning, that Charlie mentions, is that the system is closed and that it may take a while before students get access to the system. The students have to be registered in a central system at NTNU and then be registered for a subject in It's Learning. This is an automatic process, but it takes time. It is, however, possible for Charlie to register students manually, but this is a cumbersome method. Charlie believes that it should be possible to make parts of the It's Learning web page public, so that "anonymous users" can access subject information and material without having to register as a user. Different levels of access control would be suitable. He also believes that there should possible to define a "teaching assistant" role, not just "student" and "teacher".

When it comes to the potential of It's Learning, Charlie believes that you gain the most out of It's Learning for large subjects (without saying that it should be not used for smaller subjects). There is a lot of work with regular web pages when the subject has many participants. Much of the functionality which is featured in It's Learning takes time to replicate on a regular web page. Some features in It's Learning could have been better, but overall the system is easy to handle. Charlie believes that people have to use some time to get to know It's Learning. A system does not have to be perfect for people to start using it. It is important to try to make the most out of the poor parts of It's Learning. Charlie believes that much of the problem is that the teachers do not find any reason for changing to It's Learning as they believe that regular web pages cover the needs for their subjects. Some do not make use of the potential for easy administration of exercises, discussion forums and calendars with tasks. He believes that it is all about giving It's Learning a chance.

Charlie also tells about the software development kit (SDK) which has been developed for It's Learning. This SDK gives the user an opportunity to applications for It's Learning and customize the system. It's Learning AS is not a large enough company to customize It's Learning to each individual school, so he believes that

NTNU can utilize the resources they have to expand and customize It's Learning for specific subjects. He also emphasizes the need to have a running dialogue between It's Learning AS and the major users of their system to benefit from the use of the SDK.

To get all the professors to use It's Learning Charlie believes that it has to be mandatory to use the system. To benefit more from using It's Learning he suggest that maybe the course schedule for each subject could be registered automatically into the calendar in It's Learning. Another suggestion on how to improve the use of It's Learning at NTNU is for the professors to learn from each other by exchanging experiences about It's Learning. The professors share knowledge when it comes to research, but there is little knowledge sharing when it comes to the practical methods in daily work.

Charlie has not tried any alternatives to It's Learning, but is aware that there exist open source alternatives. An open source variant would be easier to customize and alter to fit the needs for NTNU, but it would require a lot of resources to operate. With It's Learning and similar systems it is the opposite; paying for a package of functionality and the operation of the system. The flexibility to customize the system will be lower, but you do not have to use resources on operating and maintaining the system.