ICT in the Classroom: Exploring ICT implementation in Norwegian Lower Secondary School English classrooms

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Abstract

As in most other countries, Norway has a national plan for schools; providing, amongst other things, a framework of learning goals, desired competencies and development of independent and classroom learning strategies. In recent years ICT has become a core competency that schools, teachers and learners are required to focus on as part of the curriculum framework in all subject areas. But how does a learner acquire new knowledge by the application of ICT in the learning process? And how is this done most effectively?

Based on the data from primary and secondary sources this study aims to look at some of the key developments integrating ICT in schools in Norway over the past decade and look at some of the challenges that lie ahead. The paper discusses the evolution and integration of ICT in learning environments, what kind of advantages and challenges teachers face with ICT-based learning and how we may interpret, understand and aim to practise the concept of digital competence.

Key words: ICT-based learning environments, learning, digital competence, ICT

Chapter 1 – Introduction

At present, Norway in proportion to the size of population and compared to other states allocates enormous resources to its Educational system in terms of investment and provision of ICT in schools. For many, this is in line with the National plan for schools and the framework of learning goals and strategies that now includes ICT as a core competency alongside reading, writing, speaking and numeracy. Research and figures up to this point, however, suggest that this does not seem to produce expected or desired learning outcomes.

This prompts the question: what connections, issues and challenges are currently central between investment in ICT in education and the results in terms of effective and pedagogically sound teacher implementation of ICT in the classroom to achieve suitable learning outcomes or objectives? As we will consider later, various research has shown that increased use or availability of ICTs in the classroom does not necessarily transfer into success for the learner. Hence, part of the aim of this thesis will be to explore some possible reasons behind this, including reasons like insufficient capacity or inconsistent competency amongst teachers leading to varied levels of success implementing ICT in a manner that prioritizes sound pedagogical practice and focuses on core learning objectives in a given subject. Part of the discussion shall be achieved through analysis of responses to questionnaires presented to a selection of 15 English teachers from different lower secondary colleges in Østfold, Norway.

1.1 ICT in Education – Overview of the challenges and central research questions

One of the (2006) directives stipulated in the Norwegian Education department's curriculum framework is that ICT competency shall be included as a core competency or basic skill focus area and that this shall contribute to the efficient acquisition of other core competencies. For some classrooms where the school and the teacher excel at combining ICT and other core competencies in the learning platform for a given subject this may the case. However, as we shall consider, efficient implementation of ICTs in the classroom is not always typical in all schools and municipalities despite similar economy and infrastructures. Subsequently, one of the aims of this paper shall be to raise and explore some key questions related to the overall

central question regarding challenges in integrating ICT into the Norwegian school curriculum. Some of the related questions to address include:

- What are the implications of inconsistent capacity to implement ICT in the classroom from region to region?
- Does inconsistency in terms of ICT implementation in the curriculum between municipalities, schools and teachers, increase the risk or potential for a great 'digital divide' or is the 'divide' already in the house?
- Is neglected, inadequate or inconsistent school and teacher capacity to effectively utilize massive state investments in ICT, 'bottlenecking' (Arnessen p.5) the potential for delivering higher quality learning outcomes?
- Should it be left to individual schools to ensure that all their teachers are adequately competent to use ICTs in the classroom?
- Should it be up to individual teachers to decide on how they can best implement the ICTs based on their interpretations of the Education department's framework?
- Further, even if they had the best intentions to include ICTs in a pedagogically sound and effective manner, do they have the competence to do so?
- Do teachers utilizing ICT in the classroom do so in a way that will maximize the potential and opportunity for the class to satisfactorily achieve learning objectives set for that particular subject?
- How does the ICT questionnaire data collected from a sample of lower Secondary teachers reflect competence and confidence in implementing ICT in their English classroom, and how can this be seen to reflect the broader situation for other teachers and schools around Norway?

The process for appropriately developing teacher competence to meet the challenges of ICT in the classroom and include it in the curriculum as a core competency seems to require addressing. Some schools may invest more in building the capacity of their staff for using ICT in the classroom and for applying it with sound underlying pedagogical strategy. Other schools may be less efficient or even remiss. Similarly, some individual teachers may embrace the challenge and possibilities and enjoy the extra competence, while other teachers are insecure, less enthusiastic or more skeptical; despite the Education department directives.

Hence, as a result of questions raised from my own experience, from the data collected through the sample of English teachers taking part in the study and from the literature focus in this study including the national reports, part of the focus of this thesis is to investigate and discuss some of the challenges of implementing ICT in Education with a view to further explore and develop understanding of the link between ICT and learning results.

The central research question in this regard therefore is: What are the main challenges impacting on effective implementation of ICT in Education in lower Secondary Schools and in Education generally in Norway?

1.2 Definitions and explanation of some key terms

Students in Norway today should be learning to use ICT from the beginning of their schooling. This is considered a basic skill (the '5th competency') to be implemented at all levels and in all subjects. The document outlining the overall framework for the national curriculum, LK 06, makes clear this obligation for schools and teachers. To commence our discussion of the main challenge of meeting this directive we can first consider how we may define ICT.

ICT is an acronym for Information and Communication Technology. It includes digital tools and hardware such as smartphones, laptops, pads or tablets, and other technologies such as audio visual equipment, projectors, smartboards and various technologies for use in education, development, information, travel and business. It also includes internet, blended learning, online learning, social media, cloud computing, flipped classrooms, learning management systems, email, and online learning opportunities. (*NMC Horizon Project*, 2013) ICT helps facilitate international learning opportunities through programs such as e-twinning, collaborative websites, web conference opportunities, international web-based projects. The list of possibilities is practically inexhaustible given that in addition to what already exists the amount of ICT Educational possibilities is constantly changing, evolving, transforming, progressing.

Arnesen notes that ICT, like culture, is an infinitely challenging concept to pin down to a specific definition since it encompasses so much and since it is constantly changing. (Arnesen, 2010). With such a broad base of possibility, for the purpose of this thesis, we shall use the term ICT in discussion. At times, however, we shall be more specific in reference toward some specific ICT areas; we shall also use the term 'digital tools' and 'digital competence' throughout the discussion. A key point to note here, however, is that the term 'digital tools' is only part of the overriding term 'digital competence' which is also the central focus for this study. Throughout the study we allocate ongoing discussion to the concept of 'digital competence'. As noted in the *ITU Monitor 2005* report:

> Digital competence is skills, knowledge, creativity and attitudes which everyone needs to be able to use digital media for learning and mastery in the knowledge society. (*ITU Monitor 2005* in Kvarstein 2008, p.13 - own translation)

Based on this broadening consideration of the terms digital tools and digital competence, it is important to make a clear distinction from the outset. Digital tools for the purpose of this study has limited range except to cover tools, equipment or resources that may be used and included as a measure within a person's level of digital competence. 'Digital competence' on the other hand is an infinitely more expansive term in this study, encompassing among other things tools, skills, knowledge, classroom management, social, cultural and ethical understanding and pedagogical competence. Given the extent of its importance to discussion of the topic, interpretation and understanding of this term will be taken up throughout.

Further, in *Monitor 2007* Arnseth notes that the 5th competency is not 'digital' but "rather a competency in using ICT and functioning in what we can call media rich societies and cultures." (*Monitor 2007*, p.14 - own translation). In particular in the chapters allocated to discussion and interpretation of 'digital competence' the overriding importance of this concept in terms of the integration of ICT in Education will become evident.

1.3 What is the 2006 curriculum framework position on ICT use in language teaching?

The reformed curriculum framework of 2006 has made ICT competence an obligatory learning objective for all subject areas. This makes ICT use in the classroom a responsibility of all teachers. According to the curriculum framework (LK06) the ability to use digital tools

is included as a basic skill along with oral communication, reading, writing and numeracy (LK06). Further to this one of the main objectives for inclusion of this policy directive is that the Norwegian school system "shall be exceptional in pedagogic application of ICTs and digital competency." ((UFD - Utdannings- og Forskningsdepartementet) from Arnesen, 2010, p.3). The introduction of ICT and digital competency in this regard, is referred to as the 5th basic competency. This gives the area enormous impetus in terms of how it should be regarded by schools, teaching teams and teachers when planning the curriculum outline and learning objectives for any of the given school subject areas.

Since ICT as the 5th competency has been defined as a basic and obligatory skill area to be implemented, naturally, this applies to language teaching as well. As a language teacher in the current system I am in a position to consider the implementation of this competency or skill in EFL (English as a Foreign Language) in an authentic school context interacting with teaching colleagues as well as in my own classes. In addition to my own experiences, part of the research sources shall include some local English teachers in lower Secondary schools who took part in the research and completed the questionnaire. Finally, a range of literature including reports and previous studies are an essential element of the research.

Naturally, the 5th competency directive is for the most part well accepted in classroom and curriculum planning nowadays, or in the least is common knowledge. Nonetheless, there remain many challenges regarding the way it is implemented. Further, there seems justification for some concern regarding the level of competency that teachers charged with the responsibility of including ICT in their subject area hold. Teacher competency benefits from appropriate training to create consistency in teaching standards and the impact of insufficient training or capacity building in this regard is a key focus of discussion. Despite the directives from the Education department regarding ICT implementation and despite the enormous amount of funding and provision of tools and infrastructure, without sufficient or standardized minimal levels of competency to use ICTs in the classroom, the delivery of the directives can vary between schools and even between individual classes. As reported in a comparative study of OECD school systems in 2010:

While Norway's results in the OECD's Programme for International Student Assessment (PISA) are at or above the OECD average depending on the subject, these outcomes are not considered satisfactory given Norway's high levels of spending on education. There are also indications that the quality of education provided varies between municipalities with otherwise similar characteristics.

The first publication of PISA results in 2000 was described by stakeholders in Norway as a "PISA shock", which has helped focus attention on the monitoring of quality in education. Over the past ten years, there has been a strong focus on building up national tools and procedures to monitor quality at different levels of the system with a view to improve practices and raise performance. This national agenda is coupled with efforts to build up capacity at all levels and support networking among schools and school owners to strengthen collective learning. This approach reflects Norway's well-established tradition of local autonomy, with individual schools being "owned" by municipalities and counties and accountable to them rather than more distant national bodies. (OECD REVIEWS OF EVALUATION AND ASSESSMENT IN EDUCATION: NORWAY: 'School education in Norway', p.13).

While well-placed funding and provision is vital to better integrate ICT in the learning arena, adequate training across the board for implementers is equally vital. Linking willingness to spend and willingness to learn aided by ICT opportunities is in many ways dependent on the capacity of teachers and schools to implement ICTs effectively, drawing both on competence as well as pedagogical skill and experience to implement the ICTs in a pedagogically sound way. Hence, the capacity to implement ICT in Education requires training and pedagogical grounding. Further, the capacity to implement effectively, to avoid a 'digital divide' (explored later), is dependent on teaching training in ICT in a quality assured, standardized manner avoiding variations from municipality to municipality, school to school and teacher to teacher. The responsibility for provision of adequate competency building is for the most part a mutual concern for schools, the Education department and municipalities responsible for schools and teachers. (*ITU Monitor 2013*, p.143)

1.4 Outline of paper

In this paper I will firstly, in chapter 2, present an overview of useful literature and information to help explore issues and develop discussion relevant to the thesis and the data collected from the questionnaire. Following this, in Chapter 3, I will give an overview of the methodology for collecting and analyzing the primary research data. Chapter 4 documents the

findings and analysis from the questionnaire. Each of the questions utilized in the study is presented in table form and accompanied by reasons for the question and some discussion and reflection on the data and findings. Next, in order to be able to appropriately develop analysis and discussion of the findings in the conclusion, Chapter 5 will further explore and discuss literature and issues relevant to implementing ICT in classroom; including reports and previous studies relevant to the thesis. Following this, in the chapter 6 conclusion I will sum-up findings, critically evaluate the method and results and the validity and reliability of the questionnaire. In addition, I will consider what may have been done differently and suggest other ideas for research as well as conclude with educational implications of the considerations raised in the thesis overall.

Chapter 2 – Literature Overview

In order to better explore, discuss and reflect upon the responses and data obtained from the questionnaire a range of texts including Education department goals, reports and previous studies needs to be considered and integrated in reflections regarding the collected data and responses. Following is an overview of some of the texts and literature that shall be drawn upon.

2.1 The Knowledge Promotion

What text could be more relevant to a thesis considering ICT in the classroom and a questionnaire collecting data from lower secondary school teachers regarding the success of ICT in the classroom than the text which lays out the guidelines and directives for teachers to do so? As has been mentioned the LK06 Education department directive was that ICT should be included as one of the key competencies. ICT is no longer an option but an imperative in the classroom and therefore the literature regarding new initiatives is necessary to develop discussion from the collected questionnaire data. (See appendix 2 for relevant LK06 Extracts)

2.2 ITU Monitor reports 2003-2013

These series of biennial reports (released every two years), map and address varying themes and areas related to ICT implementation. Themes include: monitoring changing definitions of key ICT terms such as ‘digital tools’ and ‘digital competency’; monitoring the extent of infrastructure and resource provision; or gauging the role of family background of students and socio-cultural factors in connection with the ‘digital divide’ evident in learning outcomes related to ICT. Through mapping or surveying of the digital situation in Norwegian schools the reports trace student, teacher and school leader digital usage, competency, professional development, needs, and confidence. In doing so they provide information regarding statistics, figures and trends to measure or compare among other things differences in ICT capacity and competence in terms of age, gender, ethnicity, geographical region or subject area. The reports always focus on grade 7, 9 and Vg2 students.

Additionally, the reports explore issues in ICT implementation such as how the investment in infrastructure compared with the amount of usage, correlates with learning outcomes. Despite the focus on similar issues over the years in the areas of ‘digital divide’, classroom management or the importance of building student, teacher and school capacity; variations on the issues emerge continually.

More lately reports have become focused on issues such as digital judgment, social issues like digital bullying, copyright and intellectual property rights, and even physical ailments like sight, sore shoulders and fitness. Throughout the decade of publications, focus has generally been on the ongoing divide in ICT competency as well as learning outcomes. The foundation, generally, is that the school has a responsibility to ensure all members of the society have the same learning opportunities, yet the research seems to show that the students who do well with learning outcomes have also done well with their digital competency, which, possibly, has much to do with background rather than explicitly with how schools and teachers alone manage to implement ICT in the classroom.

Over the years the paradigm shift in ICT implementation and the renewed emphasis has been from learning to use digital tools to using ICT as a learning tool; that is to say, using to learn rather than learning to use (Kvarstein, p.10). The monitor reports show how focus has shifted from operational usage over the years or lack thereof, to today, where the focus is learning to use wisely; for example in areas such as authorship, sourcing, copyright, respect for privacy, ethical usage, and using ICT as a learning tool. This includes the shift toward learning to use responsibly and ethically as well as in different contexts; not the least in a more pedagogically sound manner. This for some, like Arnesen, means a more subject specific manner, while for others, like Voogt, a more '21st century skills' or 'cross-curricular' manner.

2.3 *IKTPlan* Fredrikstad

This document sets out expectations and framework for effective and appropriate implementation of ICT in the classroom for the Fredikstad region. Much of the document is derived from another similar document put together by the Drammen municipal representatives for Education. The document is useful as a background text in that it applies to the teachers who took part in the questionnaire; as much as it does to anyone involved with education in the region including students, teachers, parents, school leaders. What can be found in the *IKTPlan* document, should in some ways correlate with data collected from participants in the study; if they have utilized the document.

2.4 Previous studies include:

2.4.i Arnessen - *The role of ICT in the teaching of English as a Foreign Language in Norwegian lower secondary schools* (2010)

Arnessen argues that ICT does not necessarily make for a good teacher. His viewpoint is that ICT is a tool to assist subject specific competent teachers. He is an advocate of standardization and the need for standardized training and professional development (PD) rather than leaving the responsibility to individual teachers. He argues for the need to build capacity of the teachers implementing ICT rather than simply injecting funds and providing infrastructure and resources or finance for it and is concerned that the subject as central focus gets lost between the argument or issue existing between technocratic views of the role of ICT in Education and the concept of 21st century skills.(Arnessen p. 5) ICT use, ICT competence

and attitudes towards use of ICT are all issues tackled by Arnessen which are relevant to issues in this thesis and relevant for helping develop discussion and reflection around the data collected from the questionnaire.

2.4.ii Kvarstein – *PedagogIKT – den digitale skole hverdagen* (2008)

Kvarstein advocates for a common definition or consensus regarding what digital competency entails. His text entitled '*Den Digital Skole Hverdagen'* is useful for this study in that, amongst other things, he defines and elaborates on important terms and concepts central to the theme including ICT, digital tools and digital competency. In particular he demonstrates the complexity of the term 'digital competency' and suggests that often schools, teachers and students have an unclear understanding of what it entails. In addition he covers ideas regarding the digital divide. He argues that when the state injects so much money and resources into the schools there needs to be a standardized system for how this is affected. His text notes that, as it stands, there is inconsistency in how different schools invest in hardware and infrastructure as compared to teacher training and staff capacity to implement the resources in a pedagogically sound and effective manner. The inconsistency in how different schools find the balance leads to differences in learning outcomes and an increase in the 'digital divide'. "Due to variation in access to resources and differing priorities, they end up with different pedagogical solutions." (Kvarstein p.88)

Naturally, this is not a definitive list of literature to help consider the broader national implications of the data collected from the questionnaire, nor is it described above in sufficient detail to lend anything more than an indication of how relevant secondary literature will be used to broaden and deepen exploration of the central theme and key questions for this thesis. Instead, the above overview represents a sample of reports and previous studies that consider ICT implementation broadly across Norway that may be used to help deepen the consideration of the data collected from the questionnaire for this study, taken from a regional sample of study participants. The method for collection of the primary data will be discussed in the next chapter regarding methodology. The descriptions above represent an overview of how these texts and other literature may be applied to the study, while a more detailed elaboration and exploration of the texts will be included in Chapter 5 "Theoretical framework and Debate" and included to some extent in discussion and reflection in Chapter 4 "Findings and Analysis" and to a greater extent in Chapter 6 the "Conclusion".

Chapter 3 – Methodology

3.1 Overview

The following chapter is an account of the method for this thesis exploring the implementation of ICT in classrooms in Norway. The method is twofold. Firstly, it focuses on primary data collected from a sample of lower Secondary English teachers from the Fredrikstad municipality in the region of Østfold, Norway. After agreeing to take part in the research the participants completed a questionnaire on the topic of ICT implementation in the classroom and other issues related to ICT implementation generally. Additionally, a selection of literature from state-funded reports and previous studies, related to implementing ICT in Norwegian schools, will follow 'Findings and Analysis' of the primary data and be used to deepen and broaden discussion and reflection of the topic issues generally.

The first element of the method addresses the first part of the central focus for the thesis; to use the data collected from a questionnaire completed by our sample of English teachers, to explore levels of competence and confidence implementing ICT in the classroom. Thereafter, the in-depth consideration of previous studies and reports, in chapter 5, helps to address the second part of the central problem which considers how the data collected may be seen to reflect the broader situation for other teachers and schools in Norway.

In the next part of this chapter I will outline and describe among other things, the participants, the materials used for the study, the procedure undertaken for collecting the data and the process for analysis of the data. In addition I will touch upon the way in which the secondary sources form an important role in the method in helping to broaden and deepen discussion.

3.2 Participants

The participants in the data collection consisted of 15 English teachers from lower Secondary schools from different schools in the same region. This type of sample was chosen because they came from different schools but taught in the same subject area and therefore, presumably, had some similar and comparable issues and experiences in implementing ICT in the classroom. As will be considered later in the findings, certain elements of the participant background including years of experience teaching and geographical region or school

placement in the given district were not included in the questionnaires, though in hindsight this information may have helped in the development of certain aspects of the discussion. At the same time this may have opened up the data too much for the limitations of the length of this study and inclusion of such factors may be more apt in another study.

3.3 Materials

The materials included a questionnaire related to English teacher implementation of ICT in the classroom. The questionnaire was titled “Teachers’ familiarity with ICT” and consisted of seven questions related to different elements of ICT implementation. Half of the questions beckoned qualitative data being open-ended and requiring some subjective, opinionative responses and even explanation. Other questions brought quantitative data being closed single response type questions, requiring specific concrete answers or ratings. The aim of seeking both qualitative and quantitative responses was to gather a mixture of data from the participants regarding both concrete programs, practice and rankings as well as some more subjective perspectives, interpretations and opinions.

The research method for the collected data is partly quantitative in that in questions 1, 2 and 3 gain a limited but relatively specific account of some types of ICT tools, resources and strategies used by the teachers participating in the study. Part of the aim of this was to develop some figures revealing the usage of LMS platforms and technology at a basic level such as equipment for presentation and visual aid to projects or learning focus areas as well as text production and, to a smaller extent, social networks, editing opportunities and synchronous and asynchronous interactions. Questions 1 and 2 sought information regarding skills, equipment, systems and programs in use while part of the aim for the question 3 ranking task was to try and obtain a figure for measuring the extent of confidence using ICT; among the teacher sample group.

At the same time the second half of the research questions, questions 4 to 7, were partly qualitative in that they are quite open-ended, seeking to gain understanding of concerns and motivations of the limited amount of targeted English teacher participants and to provide

insights into some of the local issues without necessarily being able to draw concrete conclusions based on figures. For the most part, the data is mostly non-statistical though there is some effort to nevertheless include in the answer more specific, qualitative style research questions in table form with some capacity to look at the results as figures.

The question topics pertained to 7 different areas or issues related to ICT implementation in the classroom. These areas included: question 1 – integration of ICT skills and equipment into English teaching; question 2 – listing of types of systems or software and online programs used; question 3 – personal, subjective opinion of own ICT skills on a 1-10 scale; question 4 – inclusion of ICT in teacher training; question 5 – participation in training or professional development in ICT after becoming licensed as a teacher; question 6 – personal/professional opinion regarding the usefulness of ICT as a pedagogical tool teaching English and question 7 – a description of ICT infrastructure at the participant's school. As can be seen these questions cover a wide range of ICT in the classroom topics, including:

- Methods and strategies for integration of ICT in the English classroom
- Types of systems and software used
- Self-perception and confidence using ICT
- Inclusion of ICT in Teacher Education
- Ongoing professional training opportunities to keep up with ICT developments
- Opinions regarding ICT as a pedagogical tool and request for explanations
- State of ICT infrastructure in schools

All materials were written and presented in English

3.4 Procedure

After the sample teacher target was established (i.e.: English teachers in lower Secondary Colleges in the local region) information and requests were sent to administrative personnel and leaders at lower Secondary Colleges in the local region. The leader or administrative persons responsible were informed of the purpose of the research and requested to sign and return an agreement allowing their teachers to take part in the study and complete the questionnaires. The relevant English teachers in the schools were then sent the questionnaire

forms with the choice of taking part in the research. Those who chose to do so were required to return the questionnaires within the given timeframe.

Once forms were returned and the due date for return had passed the information was sorted and compiled in tables for easier reference to the information and data collected. Even the open, qualitative questions with some (occasional) longer responses and explanations were placed in the tables; for easier reference.

Questions and tables can be found in the appendices at the end of this paper; appendix 1.

3.5 Analysis

As mentioned following the return of the questionnaires the data (which consisted of 15 separate questionnaires) was compiled into tables for easier reference. Though the participants were responding to a questionnaire and not part of an interview process, I remain inclined to describe the method used to categorise and analyse their responses as a 'cross-case analysis'. (Mckay 57). That is, rather than working with 15 separate completed questionnaires for each research participant, or compiling the separate responses for each individual on 15 separate tables, I have arranged all responses for each participant's questionnaire onto one document.

In total there are 7 questions on the compiled questionnaire response document and 1 table for each question making a total of 7 tables on the document. The tables for analysis have two characteristics. One type of table has each participant's individual answer for the set question. This is a multiple response table (MRT). The other type of table groups the responses into the relevant category such as "yes/no/not given" or rankings on a scale of 1 to 10. This shall be referred to as a single response table (SRT). (See appendix 2)

The responses for questions 1, 6 and 7, are recorded on an MRT. This means there were varied answer possibilities or multiple words or sentences from the different participants and therefore the 15 different participant responses are recorded on the table. For questions 2, 3, 4 and 5 which involve lists, ranking questions or "yes/no/not given" type questions, the answers

have been recorded on an SRT. This means that I have subsequently grouped each participant's response under its respective category.

To sum up there are 7 tables in total (one for each question) with a total 15 separate responses entered on the tables for questions 1, 6 and 7. The answers for questions 2, 3, 4 and 5 on the other hand are arranged into categories.

By arranging the data into tables in this way it is easier to cross-reference between participants and compare participant responses on the same question. This also helps to gain a sense of similar feelings among a majority of participants regarding a particular topic in the questionnaire or conversely a disparate or mixed feeling and reaction regarding a particular topic.

On all the tables the participants are not named but their questionnaires were labeled numbers 1 to 15 which meant that the person who, for example, who handed in questionnaire number 1 is answer number 1 on all of the MRT tables. The person who delivered questionnaire number 2 is represented as answer number 2 throughout and so on, right up until participant number 15 – in all 3 MRT tables. As well as making it easier to compare answers between participants on each individual question, this system also helps the analyst to detect patterns of response for individual participants in 3 of the 7 questions.

The data could be categorized into two areas: questions 1-3 representing more quantitative information listing specific types of activities and strategies for integrating ICT skills and equipment in the class; types of systems and programs utilized and the participant confidence rating in the use of ICT. Following this, questions 4-7 are lengthier and more subjective and varied in response but provide an impression of concerns and challenges of the teachers regarding ICT. As mentioned, the individual questionnaires were compiled onto one document with 7 different tables to enable more efficient comparison, reference and analysis between participants. At the same time this system is useful when including other literature such as previous studies and reports to further explore, broaden and deepen discussion.

3.6 Method part 2, Application of literature to analysis and discussion

As mentioned in the outline in Chapter 1, the exploration and discussion of literature including previous studies, government directives and the ITU Monitor reports also represents part of the method for this thesis. In Chapter 5 literature relevant to the thesis including the aforementioned literature will be further explored and discussed in order to deepen and broaden reflections drawn upon and expressed in the Chapter 6 concluding remarks.

Chapter 4 – Findings and Analysis

This chapter is organized using the questions presented in the questionnaire as the main chapter sub-headings. Each question or sub-heading is accompanied by a table showing the collection of data or responses to the given question. Following this there is some account of the reason for the question being placed on the questionnaire. Thereafter there is an account of the responses that the questions received and some discussion comparing the responses of other participants, as well as any relevant links to secondary sources and literature. Lastly, for each question, there is some reflection on the potential broader implications of the participant responses and overall ICT implementation in schools.

4.1 Q1:How do you integrate ICT into your English teaching?

Person	ICT integrated by questionnaire participants
1	Powerpoint and Fronter
2	Frequent user: You tube and Fronter for assignments
3	Powerpoint with Videoclips and Sound bites and Flashcards
4	Searching homepage and its resources (assignments, worksheets, video clips), fronter for glossary tests and hand-ins
5	Uses ICT sometimes
6	LMS (itslearning), Net-based and online course development, skype, smartboard, projector and sound equipment when no smartboard, web-based resources for four competencies as well as media sites
7	Writing texts, articles, powerpoints etc, smartboards, you tube, internet
8	Does not use ICT very much in English teaching

9	Uses ICT frequently in all subjects
10	Powerpoint in the teaching, youtube for presenting different accents and dialects in English
11	Smart board, PC for the students to do research, padlet-walls, students use powerpoint or prezi for presentations
12	As much as possible
13	Smartboard and computers in oral and written tasks
14	Writing texts and getting information
15	• Fronter for assignments and Powerpoint for oral presentations. • Skolearena for marking, textbook website, Quizlet, youtube, tv programs and film and kahoot. • Fronter for communicating with kids.sms and facebook for messages about changes.

Reason for the question: This question relates to the topic of methods and strategies for integration of ICT in the English classroom. The main objective for this question was to give individual subjects an opportunity to nominate how they integrate ICT in their English classes. The list is not intended to be comprehensive but to provide an overview of strategies and methods.

Description of Results and Discussion points:

From the data we can see that a couple of participants respond that they only use ICT occasionally or do not integrate ICT 'much' in their classrooms. Most of the participants, however, respond that they use it frequently or a lot. Those who use it frequently mention programs, websites and software that they commonly use in their classrooms. They nominate websites like youtube or Learning Management Systems (LMS) like 'Fronter' or language acquisition programs and software, but they don't mention for what purpose or how. None of the participants talk about long term or sustained pedagogical methods and strategies for integrating ICT in their learning plan overall. This seems to suggest some misunderstanding of what 'integration of ICT' may entail and some cross-over or doubling up with responses to question 2 on the questionnaire; which asks what systems/programs do they use.

LMSs, videos and websites are tools that may be used to compliment integration of ICT but it does not necessarily describe how a teacher may work with the ICT in the class, or how they include it in their planning or in their units. Nor does it show how they tie it together with the learning objectives in the curriculum (LK06) generally.

Subsequently, this means that, for the most part (as may be seen in the data in the table for the next question, question 2) most of the participants double up or repeat themselves in these two questions. This may demonstrate a flaw in the clarity of the research question, a reticence to write lengthy answers or it may indicate that understanding of how ICT may be integrated into the curriculum rather than added is not automatically understood.

Reflection:

The doubling up and the inclusion of ICT tools as representing how the participants integrate ICT in their English classroom suggests a mixed understanding or consideration of what integrating ICT involves. That is, integrating ICT suggests the sustained inclusion of pedagogically sound strategies or method by the teacher to engage the class in the subject matter using ICT as a tool to compliment their teaching platform.

Kvarstein and Arnesen point out the importance of differentiating between use of digital tools and having digital competency. Arnesen argues that the misunderstanding of the difference between the two concepts can interfere with effective long term planning to make ICT an effective means for achieving subject specific learning objectives. (Arnesen, 2010))

4.2 Q2.What systems/programs do you use?

Type of ICT tool	**Number of users from the sample group of 15**
Fronter: 13 of 15	**13**
Other learning platforms: its learning	**1**
Social media: Facebook:	**6**
Quizlet	**2**
Kahoot	**1**

Skolearena	**1**
Smartboard	**7**
Internet: Searching:1	**1**
Other ICT-systems/tools: • Classblog:1 • Power point:2 • Photostory:2	**5**
eTwinning:1	**1**

Reason for the question:

This question relates to types of systems and software used by the participants in their English classrooms. The main objective for this question was to give individual participants an opportunity to nominate systems and programs they use. The list is not intended to be comprehensive but to gather an impression of the breadth of systems and tools utilized.

Description of results and discussion points: From the data we can see there are only 12 different systems or tools nominated. This seems very little considering the number of participants. The main system nominated was an LMS, Fronter (13 participants). Also prominent was nomination of social media (6 participants) and a classroom apparatus, Smartboard (7 participants). Other tools and programs mentioned include software like Powerpoint, Photostory, Kahoot and Quizlet. However, it seems unlikely that Powerpoint is only used in 2 of the participants' classes. Possibly this means that the teacher is not using it, but that does not mean that the students are not. This, again, may be explained by the unclear nature of the question. Internet searching is only mentioned once, which seems unlikely and therefore suggests that not as much time as would ideally be desired has been invested in completing this part of the questionnaire. One teacher has a class blog and another is involved in interacting with another school in Turkey through eTwinning which seems the most inventive of the answers in that these programs involve collaboration, editing, publishing and a need to be aware of appropriate web etiquette and behavior, ethics and teamwork as a learning outcome.

Reflection:

In some ways it seems like this SRT (single response style table) would have been more effective as an MRT (multiple response table) in order to be able to compare and observe if one particular participant is more active using ICT.

Kvarstein notes in his study on digital competency in schools on the prevalence and variety of ICT tools that most teachers still use ICT mainly for internet searches and 'Office' programs but only a few teachers use video, camera, sound, blog and similar. This also correlates with the ITU findings of 2007. Nonetheless, that was 2007 and, no doubt there has been some changes. Still, the sample on this occasion does not demonstrate enormous change in this regard.

4.3 Q3.How would you evaluate your own ICT skills on a scale from 1-10?

1-2 Poor	2-3 Below average	4-5 Satisfactory	6-7 Quite Good	8-10 High competency
1	1	4	4	5

Reason for the question:

This question relates to self-perception and confidence of participants' skill levels using ICT. The main objective for this question was to gain an impression of individual participants' self-perceived level of ICT competence which, naturally, would affect their capacity to implement ICT in the classroom.

Description of results and discussion points:

The data shows that at least a third of the participants (5 participants) rank themselves as occupying the highest level of competency possible on the chart. Another third (4 participants) rank themselves on the second highest level on the chart. Two participants ranked themselves on the two lowest levels which seems to correlate with two suggesting that they did not use ICT much, though this is not necessarily the case. It is interesting to include in discussion of this question that a glance at the original questionnaire shows that one of the

participants who lists one of the highest amounts of tools still ranks him or herself as having the lowest competency of 1-2. This could mean that they feel they do not use it well or that she/he feels there is much more that can be achieved.

Reflection:

These results seem to show that the sample participants see themselves as sufficiently capable in terms of their ICT skills. It is more difficult to say if they feel the same way about implementing ICT in a pedagogically sound manner according to the standards outlined in the state and local guidelines or curriculum framework. Perhaps the question itself needed to be framed more carefully in order to obtain more adequately specific responses. For example, had it been framed as how the participant would evaluate their ICT skills as sufficiently adequate for use in the classroom so as to achieve subject specific learning outcomes with an example of a method or strategy to do so, then the rankings and explanation may have been less complimentary of perceived ICT capacity.

Additionally, it seems interesting that the responses to question 1 (integration of ICT in the classroom) did not seem to differ much from responses question 2 (tools used) in that both questions received responses listing systems, programs and ICT tools but none of the responses included discussion of methods or strategies used to integrate ICT. As mentioned above this could be due to misunderstanding of the question or lack of time to respond in fuller detail, or it could indicate lack of understanding of the definition of integrating ICT which is interesting given the high proportion of participants expressing high confidence in their competency in this question, question 3.

4.4 Q4Was the use of ICT in English teaching incorporated into your teacher education program?

Yes	No	A little	No response
2	11	1	1

Reason for the question:

This question relates to the importance or need for inclusion of ICT in Teacher Education. The main objective for this question was to gain an impression of the amount of participants who had the benefit of being presented with an opportunity to develop their skills for implementing ICT in the classroom as a part of their teaching training. This naturally, would

affect the standards of new teachers in terms of their capacity to implement ICT effectively in schools today.

Description of results and discussion points:

The data shows that the clear majority of participants had little or no experience of ICT implementation strategies in their teacher training. This most likely suggests that many of the participants were finished their teacher training before ICT was prioritized as it is today (one of the participants even mentions that he/she undertook his/her teacher training in 1968)! Possibly, this also means that many of the participants were teaching prior to the 2006 Education department directive that ICT shall take a role as the 5th essential competency. Less likely but more concerning, given the research presented by Kvarstein and Arnesen, it may indicate that teacher training tertiary institutions have some way to go to develop the ICT elements of their pedagogic practice programs sufficiently. This might be a good topic for another research paper.

Reflection:

Both the ITU 2013 monitor report and the previous studies suggesting that most teachers today seem to have developed their ICT skills not through formal professional development either in training or in PD after teacher training but through trial and error or through collegial guidance. What is therefore possibly concerning about this, is that the participant responses seem to at least confirm that they have not received the training whilst becoming teachers, but instead have developed as they went along which does not necessarily mean it occurred in the context of sound pedagogical application. The *Monitor report 2013* also suggests that based on research, the training available today does not seem suited to the teachers or circumstances or does not emerge as satisfying the teacher expectations or needs.

On the other hand, given that most participants rate their competence as quite good to high, perhaps trial and error and collegial advice is not so bad!

4.5 Q5. Have you attended courses to qualify you in the use of ICT after you received your teaching licence?

Yes	No	No Response
8	6	1

Reason for the question:

The question 5 topic is a similar topic to question 4 – training – but it is about ongoing training and professional development as a practicing teacher as opposed to being part of training to become a teacher. It relates mainly to the importance of continued career training in ICT implementation to keep up with changes and developments in delivering ICT in the classroom in pedagogically sound ways.

Description of results and discussion points:

The data shows that the majority of participants (8 participants out of 15) had some experience of professional development (PD) for ICT implementation as practicing teachers. This is clearly not a strong majority; hence, the figure seems inadequate given the importance of appropriate ongoing PD for effective and pedagogically sound ICT implementation. Further, this seems a contrast to the need given, as Kvarstein mentions in his study, there seems to be a lack of effective of collaborative effort and resource sharing opportunities to develop their ICT implementation capacity effectively (Kvarstein p88 Me p. 25)

Reflection:

As mentioned above in the reflection on question 4, the *ITU 2009 monitor* report and a selection of previous studies suggest that teachers at that period were developing their ICT skills not through formal training or PD but through trial and error or colleagues. Despite this the Monitor 2009 report also suggests that even though teachers expressed a desire or a need to undertake formal PD. In contrast to this expressed need, the more recent *ITU Monitor 2013* shows that despite new initiatives to provide more PD in the field, teachers were not taking up courses developed for this purpose.

4.6 Q6. Is ICT a helpful pedagogical tool in the teaching of English? Explain.

Person	Answer
1	Yes
2	Not more so in English than in other subjects, but it is useful in all to be able to incorporate videoclips etc in my teaching.
3	ICT is a helpful and quickly developing tool in English. More and more people are becoming aware of the advanced method ICT provides and have remarked accordingly. Lots of positive feedback on the ICT program as well as questions which are welcome as a way to inform parents, teachers and students as to the many positive outcomes of using ICT
4	Helpful for motivating students, lighten the workload with automated tests and sharing of assignments and worksheets.
5	Sometimes, esp. fronter, students find it a good tool to use.
6	ICT is a broad term and a sufficient answer to the above question is not easy to put in a nutshell for a short survey response. However, a general response might be that it is not a question of whether ICT is helpful in Teaching English but rather where or when it is most helpful in a way that facilitates and supports sound pedagogical practice. The challenge is to evaluate how useful and how relevant particular forms of ICT are to learning. I.e.: Is there anything pedagogically meaningful behind the device or program? Some games, sites and devices, for example, promise a lot and look very impressive at a glance- but need to be carefully scrutinized before they're utilized in class. They can be gimmicky, money focussed and lack apt pedagogical underpinnings, method or consideration. Other initiatives like the use of the flipped classroom or the use of an LMS to better monitor student participation and progress are useful.
7	Yes, when students are writing texts, delivering on fronter, getting them back and then doing them again. The participant notes she/he thinks it is useful.
8	"I don't know, as I don't use ICT in my own education. If I was comfortable and someone teached me how to use ICT, I would probably use it in my teaching."

	Translation: *I do not know because I do not use it in my teaching, I am not comfortable in using it as I do not know how to do it.*
9	Yes it is important in today's society.
10	Yes, it is an opportunity to visualize material and communicate with students In many different ways.
11	Yes and no. Yes because it is easy to use when the need to find information about certain topics can be readily found on the web. Pupils like using the word processing programs with spell-check as it makes life easy for them! We also use the word docs in addition to excel and geobra for handing in work (essays, homework assignments, powerpoints etc) as this is handed in to folders on fronter. No, because I believe that the human brain needs to connect to the finer motorized skills and by doing so (i.e. handwriting) research has discovered(or known all along) that there is a definite connection between learning(spelling and grammar in particular) and remembering when it is done physically by hand handwriting. ICT tools can be tricky as it is easy to stray and do other things (facebook, play games, check out websites not applicable to the task at hand) and in a class of let's say 27, it will be hard for the teacher to keep track of everything that happens…to make sure they do what they are supposed to do.
12	Yes but the equipment sometimes does not function the way it should or is not accessible.
13	Yes.
14	Text writing and finding information.
15	Yes and no. You have a wider range of activities that the students find interesting to work with, helpful for weaker students to learn, writing on pc good for the correction help. Challenge is that children today have grown up using a pc as entertainment and teachers want them to use it as a word processing tool. Social media and youtube can be a distraction as well a a learning tool and you can come across plagiarized texts. Important to establish good ICT habits In the classroom and vary ICT with more traditional methods.

Reason for the question:

This question relates to the participant opinions regarding ICT as a pedagogical tool and requests explanations. The main objective for this question was to give individual participants an opportunity to express some viewpoints on this very broad question to help establish culture and attitude regarding the ICT issue.

Description of results and discussion points:

From the data we can see this question received the largest response from individual participants. The majority of responses (8 participants) gave lengthy or detailed responses relative to the other questions. This may be partly because they were requested to explain their responses. At the same time, it is possible that the participants had some clear views on the topic already.

Naturally, most responses argue that ICT is for the most part is helpful as a pedagogical tool. This may be in part because its inclusion in the curriculum in the modern age is unavoidable. Some positives mentioned include:

- student engagement
- variety of good quality pedagogically sound programs and ICT tools that compliment achievement of learning outcomes
- possibility to monitor student achievement and coverage of the curriculum through monitoring elements of the LMS
- helpfulness in terms of preparing materials, preparing units and tasks for the classroom, organizing group project work and shared assignments, and organizing of of tasks for homework and assessment
- lightened workload with increased availability and easy access to automated tests, sharing of assignments and worksheets
- availability of programs like spell and grammar check, excel and geobra to help student draft or complete homework tasks and assignments
- ease of delivery of homework, assignments, powerpoints and projects using LMS systems like Fronter

- means of communicating with parents and other teachers on teaching team
- video, powerpoint and other tools for use in the classroom or for helping the students complete homework or prepare for class.

Some negatives mentioned include:

- classroom management issues including keeping the students on track when they stray off task and, among other things check social media, play games or view unrelated websites or videos
- lack of training to assist the teacher in choosing, using and implementing the ICT well
- technical issues, functionality or accessibility of equipment
- reticence of students to view using computers for writing or other less dynamic tasks when the students are used to using the technology for other pursuits in their personal time such as gaming or entertainment
- finding suitable, pedagogically sound tools and programs that help learning and best help students achieve desired learning outcomes.

Reflection:

Most participants identify more positives than negatives regarding ICT as a pedagogical tool. Issues like classroom management, engagement and motivation of students and technical competency represent both the positive and negative aspects. The benefits of the LMS Fronter in terms of classroom management (delivering assignments, groupwork, monitoring) is the most often mentioned as positive. At the same time, classroom management in terms of students straying off-task or technical issues interrupting effectiveness in the classroom is mentioned as the main negative.

4.7 Q7.Describe the ICT infrastructure at your school:

Person	Answer
1	Internet
2	O.k. - Access to computers in all classrooms and a designated computerroom

	that has to be booked in advance.
3	No Answer
4	Fairly good but there are a lot of outdated computers. Not unusual for computers to be not working or network to be off-line. This can cause problems if the teacher is too dependent on digital tools.
5	We have around 80 PC's at our school.
6	We use an LMS, an intranet, we manage our own webpage, we have computer rooms, smartboards and a decent system and amount of computer equipment and projectors for staff and students. Overall, there's sufficient software and equipment for current needs (could always be more – but there's sufficient). The main challenge, however, is the ongoing need for a plethora of teaching ICT experts or 'superbrukers' to help other teachers (and students) use the equipment, software and online resources available. There's a certain recalcitrance, especially amongst some older teachers, about properly integrating ICT possibilities into the teaching platform and this to a small extent, hinders the potential for a more effective collaborative process in integrating ICT in the classroom according to student expectations; expectations that are growing exponentially…
7	Some teachers are above average but some especially mature women, 10% could use some training.
8	A computer room and a computer in the classroom.
9	At the moment it's not very good. A new school is being built and in a couple of years it will be terrific.
10	Smartboardroom with 30 computers. Computer and projector in every classroom. Some laptops that can be brought to the classroom.
11	School has its own network. PC's are available to all students. Smartboards in all classrooms. PC's available at school library, in the specialist rooms there are projectors and screens. Pupils are not allowed to bring their own computers. Laptop to all teachers. All messages , feedback assessment and homework are communicated through fronter or 'skolearena' accessed through approval by the teacher.
12	The school I work in is right now in the middle of a transition period, as the building of a new and modern school is in place. The infrastructure is

	somewhat lacking due to a building process which will change when the new school is ready(Plan for a flagship school in ICT).
13	50 computers distributed in two rooms.
14	No answer
15	All teachers and students have their own laptop, there is a stationary PC in every classroom. A majority of the classrooms have smartboard with projector and speakers, the other classrooms have a roll-down screen and projector. Auditorium with large rolldown screen and a big touchscreen PC and sound system. Language lab and computer lab. Also. Students and teachers have access to colour copymachines/printers. All teachers and students must use fronter and skolearena. Some classes uses NDLA and other digital textbooks in stead of printed ones. Some classes also use specialty software such as Autocad.

Reason for the question:

This question relates to the state of ICT infrastructure in schools which other studies report is for the most part is leader internationally. The main objective for this question was to give individual participants an opportunity to describe their own school infrastructure as this allows for some discussion when comparing the importance of facilities and resources with pedagogical effectiveness and usefulness of ICT and considering the importance of training over investment.

Description of results and discussion points:

From the data we can see most participants expressed a fair to reasonable level of satisfaction with the facilities at their school with the exception of a couple who report high expectations given that their school is in a period of transition and soon they will have an entirely new school and technical infrastructure.

Reflection:

Some of the participants mention good quality facilities and some mention a new school being built. At the same time there was not a great deal of reflection in question 1 regarding methods or strategies to integrate ICT in the classroom, (outside of the use of ICT tools).

Further to this, there were only 8 participants out of 15 who reported having engaged recently in some kind of ICT professional development (PD) activity. According to the reports and studies explored and discussed in more detail in the next chapter, (Chapter 6), appropriate training and access to effective PD is an important element in ICT implementation effective in helping students achieve desired learning outcomes.

Up until now, the reports suggest that individual teachers are largely responsible for their PD choices rather than PD being part of a standardized process that helps facilitate effective ICT implementation (Kvarstein 2008 and Arnesen 2010). This seems interesting given the idea that this particular questionnaire reveals that even though a good deal of ICT infrastructure is currently available or is being newly built, the reported level of PD among the participants is not high. It is especially interesting given that studies we will look at next suggest that it is often effective teaching training that determines overall success of such ICT implementation. No doubt this would make an interesting situation to follow up in a new study in this region.

Chapter Five - Theoretical Framework and Debate –Elaboration on secondary source materials to build the capacity for drawing concluding remarks

This next section, chapter 5, further explores issues related to ICT implementation raised in some of the literature referred to in chapter two and other relevant studies and texts. The purpose of further analysis is to broaden and deepen the scope of discussion and reflection regarding key research questions outlined in the introduction and to better facilitate consideration of educational implications relevant to the implementation of ICT, in the conclusion; Chapter 6. Finally, further exploration of the literature and issues raised, will help to more effectively draw some conclusions regarding the thesis overall.

5.1 Integrating ICT in learning - Planning, expectations for ICT users; teachers and learners

Successful implementation of ICT in schools among teachers and learners depends in part on clear plans regarding important skill and knowledge focus areas, learning strategies and understanding of how ICT impacts on society culturally. Following are some expectations

and component areas that have been set out for schools and teachers to include in plans. It shows key concepts for ICT implementation from authorities and research bodies as well as an overview of local municipal authority guidelines taken up based on the national standards and Education department directives as set out in the National Education plan (K06). As the questionnaire data (included in Chapter 4 and appendix 4) focuses on teachers from some schools in the same region, consideration of both the national and local authority plans is important.

After going through some of the elements considered key in effective ICT implementation in schools there will be discussion regarding how these terms and concepts are not only important for developing effective ICT practice in classes but they also provide a means by which to evaluate why some schools succeed more than others. The varied effectiveness with which concepts in ICT may be understood (or misunderstood), means plans may be implemented by different schools in different ways, due to being over-general or vague. This makes the ICT plan for Education more vulnerable to misinterpretation and therefore more open to gaps in the level of success achieved from integration of ICT in different schools. For example one school might see developing digital competency as providing students and teachers with the infrastructure, online opportunities and software tools to use in class to engage students but neglect appropriate and ongoing teaching training in strategies and methods to integrate the technology and achieve subject specific learning outcomes. On the other hand a different school might use allocated funds to prioritize training teachers and develop a pedagogic culture of integrating the technology with emphasis on sound pedagogical strategies and methods to do so.

ITU 2007 defines digital competence into different “dimensions” that include skills, subject knowledge, independent learning strategies and understanding of the cultural development and impact of ICT on society. These are held in equal relative importance (Kvarstein, p.14 – Own translation). Yet at the same time such concepts are constantly changing. Some fundamental ethical and cultural considerations that underpin the ideas remain in place, but, inevitably the categories and organisation will be adapted to meet the ongoing shifts in social organisation and technological and cultural evolution. For example a new shift in technological or information change will first need to build the foundation such as supply of

the tools and infrastructure and this will be the first priority. After that, effective ways to use the tools and infrastructure to help achieve certain ends or results will become the focus. Thereafter gauging, understanding and reacting to the effects on the society culturally, might become more of a focus. In some ways this has been the process reflected in the ITU Monitor reports from 2003 to 2013.

5.2 Components in digital competency

There are a number of key areas which may be considered in development of an effective ICT implementation scheme. At the same time, as Erstad mentions in *ITU-Monitor 2005* these key concepts in digital competence may be used to evaluate aspects of the success of ICT implementation. Erstad lists the following set of components which students and teachers can be evaluated by, adding that they can change over time and that new 'components' can be added. (Kvarstein,2008, p.14-Own translation). The components represent a point of reference by which regional authorities may evaluate development of digital competency in local educational practise.

- **Basic skills** – Being able to open software, sort through and save information on the computer and other simple skills related to the use of computers and software.
- **Download -** Being able to download different types of information from the internet
- **Search -** Know about and how to access information
- **Navigate -** Being able to use orientation skills in digital networks, that is, learning strategies for using the internet.
- **Classify -** Being able to organise information relative to a classification, genre or similar
- **Integrate -** Being able to compare and compile different types of information relative to complex texts (multimodality)
- **Evaluate -** Being able to check and evaluate whether one has arrived where one wanted through the internet search. Being able to evaluate the quality, relevance, objectivity and usefulness of the information one has found (source criticism).

(Erstad in Kvarstein, 2008, p15 (own translation))

The dimensions and components in Erstad's list above, remain useful for establishing foundations for evaluation of digital competence development amongst teachers and learners and as Erstad notes will change over time.

Kvarstein (p.87) observes that interpretation of the components by which we evaluate change, influences how we see the issues in implementing ICT. This, in turn, effects the way we define concepts like 'Digital competency'. In many ways the issue is not so much related to teacher competency, but how we define digital competency generally; which involves how schools prioritize and acquire resources, how and what kind of training they provide and what kind of ICT access they allow teachers and classes. Kvarstein notes: "Due to variation in access to resources and differing priorities, they end up with different pedagogical solutions." (Ibid, p.88)

Hence, because of this and because of a lack of clear and consistent guidelines in terms of ethical concerns, focus areas and prioritised learning goals, naturally there ends up being different competencies achieved and different levels of competency generally. In addition there also ends up being differences in skills developed and gaps in knowledge between schools and students regarding different competencies.

There are many ideas for better use of ICT in the classroom that can easily be selected and presented but a process to implement such programs tied to the actual curriculum and assessment which teachers are obliged to follow, is essential in order to motivate engagement with such programs. As observed in the TALIS report 2008:

> Norway comes out poorly in regards to teachers' relations to school leaders, in particular regarding feedback on teaching practise and the wish for capacity building and subject specific professional development. This suggests that Norway is suffering from a weakly developed school culture and an even stronger individual culture. Both the daily teaching and teachers' professional development is primarily seen as an individual responsibility. This is concerning, since 70% of Norwegian teachers wish for professional development. (*ITUMonitor*, 2009, p.16 – My translation)

Naturally, another concern that arises from this scenario is that when individual teachers are left responsible for their own professional development then it remains less likely that schools and the education system as a whole will be left with a consensus plan or a common strategy for achieving effective implementation of ICT that builds competency equally between students, teachers, schools and regions. With more teachers choosing and following their individual development plans, without necessarily being followed up, there is greater risk for differences in competency levels and directions and therefore greater risk of ongoing 'digital divide'.

Further to this, more than a digital divide, such ideas also show growing divide in terms of schools that manage cooperative relations organisationally and in terms of strategic planning and charter, and schools less effective in this regard. As noted in the *ITU Monitor 2009* "The findings … makes visible, in our opinion, the divide between schools that have a functional dialogue between leadership and colleageum and those who do not." (*ITU Monitor 2009*, p.16 – own translation) The implication of lack of dialogue and agreement leads to a difference between schools that have a clear, focussed plan and those whose plan is potentially unclear and even confusing to the collegium, the students and the community. In the studies concerned it is evident that schools that "function organisationally and pedagogically show systematically higher results on the test in digital competency." (Ibid,p.16).

The *ITU Monitor 2009* suggests that there is link between learning outcomes and the socioeconomic background of the students as well as teaching competency. Weak and strong students get different skills and uses out of the technology but the learning divide continues broadening (*ITUMonitor 2009*, p.11). The monitor report shows that "individual student traits such as home environment, school performances and motivation, driven from mastering a particular skill, has meant a lot for their digital competency". (Ibid, p.5,) It continues, "we see digital divides in students in this study, both in terms of usage of the computer and digital competency. Divides in digital competency are possibly related to student achievements in school and relations at home expressed in the parent's education. The results from this monitor are interesting in that they shed light on some important relations between the students' digital competency, their family background or 'social position' and organisational characteristics of the school they attend." (Ibid, p.12) In this this way it seems that digital

competency may be seen as both an individual characteristic, as well as an organisational and structural characteristic or trait shaped to some extent by school leadership choice in terms of priority and pedagogical outlook.

Kvarstein's overall position is that there needs to be a proper plan. There needs to be a common definition or consensus regarding what digital competency entails and a common agreement or consensus regarding how this should be implemented and achieved. One idea he puts forward is a call for a more effective professionalised common area for sharing resources and skills to enable a more collaborative and more effective implementation of ICT in classrooms. In the very least a collaborative platform for sharing resources, strategies and expertise might begin to gather some degree of the digital divide and growing polarisation of skill and competency across the board. (Kvarstein, p.88)

The implementation of ICT at ground level; in schools, in many ways, is the key point of interaction to tackle the issue of the digital divide and the inconsistent development of ICT or digital competency between people and places. The local school implementation is subject to the guidelines laid out by their overriding local municipalities who in turn remain subject to national directives (K06). The local authority for the focus groups included in this study is the local municipality. This municipality has laid out guidelines for schools in the district called the "IKT plan" based on the national plan.

5.3 Fredrikstad 'IKT Plan'

'Digital skills' development is considered one of the basic skills to be incorporated into all the school subjects at all levels according to the national plan. These are defined both as an individual skill with different criterion for levels of achievement and as an integrated part of the learning plans and goals for all subjects.

The skills required for the various age levels are set out in a standard framework and are interpreted on the regional and local level. An example of how this is done is the '*IKTplan*' which was first developed in Drammen council as a guide for how to bring the national plan into the school on a regional level. The Drammen example has been adapted by other councils and provides a form of standardization for how and what should be taught in terms of digital skills in Norwegian schools.

The 'IKTplan' provides a range of tools for both schools and teachers and gives the necessary theoretical link to the national framework. The 5 main areas of important skill areas for year 10 students, described in the Fredrikstad council IKTplan for example, are as follows:

1. "Students should be able to use search strategies and refer to sources in their own work.
2. Students should be able to produce and edit multimodal texts with receiver consciousness.
3. Students should be able to make spreadsheets and systemize numerical data.
4. Students should be able to communicate and interact in digital media.
5. Students should know that they are their own editors and be aware of the responsibility this involves." (Fredrikstad *IKTPlan* – own translation)

A more detailed outline of this plan and details complete with examples of how teachers can implement the principles of the plan has been included in Appendix 5. The *IKTplan* shows how the regional level compares with the national framework. It also represents a good example of how the guidelines can be useful to assist teachers with more effective integration strategies in ICT implementation in their classroom.

There are ICT competency descriptions that the local government authority includes in the guidelines for its '*IKTPlan*' issued to schools within its jurisdiction. Awareness of these guidelines, for the purpose of this thesis, is important in that it demonstrates in part what is expected of teachers in the municipality in terms of meeting the learning objectives for ICT in schools. This in turn, helps define an element of one subject area (English) that is considered essential knowledge in a teacher's overall digital competency.

The definitions and frameworks included in the tables in appendix 5, help convey understanding of the challenges of managing the scope of appropriate digital competency. As raised in discussion throughout the thesis, and in particular in the following pages, the level and quality of guidelines, support and training that teacher's receive is a vital element in effective ICT implementation. The summary layout of the guidelines (appendix 5) that teachers are required to be aware of, understand and follow, demonstrates some of the challenges of implementing ICT in the classroom.

5.4 Language acquisition from ICT in daily life

ICT creates new learning arenas with better access to authentic language in written texts and audio. In this respect it seems important that the school should reflect the students' reality that is becoming increasingly digitized. Younger people master a very complex life through different types of social software in which they use their own and foreign language actively (though, as mentioned, research shows that it is quality of time spent rather than quantity of time that is the determiner in achievement of desired learning results). As mentioned in the ITU Monitor 2009 regarding quantity of computer time in school, "Even though it is necessary to have time and practise by a computer it is not so that time used has any linear connection to the level of competency and subject results" (Monitor 2009, p.6, own translation) Whether in school or out of school, increased access, (particularly for personal recreational use) can be seen to some extent, as giving students the motivation to learn and practice their own language and to learn foreign languages because they increasingly see the practical benefits of being able to communicate in several languages. With the advent of new arenas ICT has also created new and more effective ways to learn languages and vast opportunities to individually tailor training and education generally using more flexible solutions. For those born digital native (90's and after) compared to the digital immigrants (pre-90's) there may be high skill level using some aspects of ICT, depending on what resources the individual has access to and has used. However, digital native or not, actual learning objective achievement or increased digital competency does not necessarily follow greater quality of usage.

5.5 Integrating ICT in Pedagogical Practise

In 2007 to 2009 the ITU Monitor reported a decrease in the use of ICT and as Arnesen notes this was also a period when teachers were blamed for not applying or including sufficient ICT in their teaching. "The project manager blamed the teachers for failing to integrate ICT in their teaching; they were the bottlenecks in the efforts of digitalising Norwegian classrooms". (Arnesen, 2010, p.5). Further, Arnessen points out that the Directorate for Education "…insinuated that teachers who do not use ICT in class are less conscious about their theory of practise than their ICT using colleagues". "'Lektorlaget' on the other hand pointed out that "teachers' lack of willingness to change can in some areas spring out of a well-founded theory of practise and a very conscious reflection on their own practise." (Arnesen, p.5 – own translation of quotation). This issue raised two contrasting concerns regarding quality in ICT in Education. One was a technocentric view suggesting that in order to keep up with ICT changes in the rest of the world a more radical view was needed that all integration is good, which in turn suggests "frequency of ICT use as a measure for quality." (Ibid, p.5)

On the other hand, the other perspective was that we need both sound pedagogical practise and clear learning objectives and we have to include ICT in this as well. In order to piece all this together, therefore, we need a 'radical' pedagogical plan for the 21st century that is, according to Lund perhaps cross-curricular (Lund, 2004, p.276) and Vavik involves 21st century ICT skills (Vavik et al., 2010, p.18) integrated in the learning platform. Arnessen on the other hand points out that the view in his study is that:

> *"the value of ICTs must primarily be assessed according to the degree to which it promotes the attainment of central subject specific objectives. This view is based on international research findings and trends. The trends in the literature show that researchers increasingly turn their attention to characteristics of teachers and curriculum subjects to understand the proper role and function of ICTs in complex educational contexts. One obvious reason is that teachers play a crucial role in relation to the quality of pupils' learning (Hattie, 2009), and are the ones who decide what actually takes place in the individual classroom.*(Ibid, p.6)

In this way, Arnessen places the role and competency of the teacher back in the arena as the most important factor in successful attainment of desired learning results for the learner in the specific subject. He suggests that where ICT integration can possibly be most successful is when the technology correlates with subject specific learning goals. In some ways one could

also look at Harmer's viewpoint which notes that the emphasis should be on pedagogical practise and learning objectives that use ICT to help achieve learning results (Harmer 2012) or use them as Nick Hockly mentions; as a means to an end (Dudeney and Hockly 2007). This means that that more responsibility could be left with individual teachers to decide how ICT might be integrated in the classroom so long as this is accompanied by more effective professional development processes and opportunities. Without the necessary capacity building and training, there remains the ongoing risk of variation among students, classrooms, regions and even states and an increase in the digital divide locally and more broadly.

Arnessen's study suggests that building teachers' digital competence in terms of knowledge and awareness of pedagogical platforms for integrating ICT could help teachers make effective professional choices in terms of planning ICT integration in the class. He suggests there may be a link between pedagogical platform and the way ICT is practised in the classroom. For example, depending on their theoretical pedagogical outlook some Teachers prefer using an IPIM (ICT for Production and Information Management) model with regard to ICT and others an IDAP (ICT for Drill and Practise) model.(Arnesen,2010):65. He writes behaviourist type teachers usually prefer IDAP involving "subject specific software and web resources and teacher led use of presentation tools." On the other hand constructivist type teachers usually prefer IPIM involving "open-ended use of general internet resources, pupils use of presentation tools and word processors, also fairly frequent use of LMS and digital portfolios". (Arnesen,2010):97. Both represent different approaches to the class and the difference is reflected in how they may use ICT in the class. Regardless of whether the teacher prefers IPIM or IDAP, access to this kind of professional development will inevitably improve digital competence of the teacher. As mentioned above, some research suggests that the more successful integration of ICT in the class often emerges when the teacher utilises tools or practises that they feel most comfortable with. By being more aware of the range of approaches, methods and platforms and the ICT that tends to compliment their teaching platform in particular, teachers become more suitably digitally competent in integrating ICT.

Successful integration of ICT in Education requires a broader understanding of what such a term encompasses. Above we can see that in the least it requires an understanding of some key issues affecting guidelines and directives set out by the state regarding what constitutes sound policy. Technocentric viewpoints regarding the role of ICT in the classroom differ

substantially from subject specific pedagogues who again differ from cross-curricular supporters.

Knowledge of pedagogical theory and platforms is an important aspect of digital competence. Depending on the teacher's professional platform this may also influence choices in terms of ICT tools and resources adopted for integration in the classroom. Choosing ICT tools and resources to suit one's platform from presentation tools, to collaboration possibilities, to software to hardware and the way in which the various options shall be used, in turn, requires another element of digital competence. In the next section, that explores briefly how different theories in language teaching may accommodate ICT integration in the learning process, we will explore how other challenges in digital competence such as classroom management, planning, task choice and further theoretical elements may be considered.

5.6 ICT in language teaching

Language teaching is rich with theories and pedagogical approaches, most of which contain some elements suited to a range of engaging and effective practices for integration of ICT tools, resources and practices. As mentioned earlier, the process by which ICT is implemented or integrated is more than merely providing the digital tools to be used. Individual teachers, institutions and even leadership generally have in mind a pedagogical platform or approach or methodology underpinning their classroom or institutional outlook.

Naturally, for most facilitators and teachers, the ICT component of the course plan is included to help achieve the learning goals and the ICT digital competency expectations. To some extent, however, funds are often thrown into the purchasing of ICT tools and infrastructure in the hope that quantity of usage and the latest technology will help achieve the goals and placate authorities. Erstad and Kvale in Monitor 2009 cast doubt over this strategy suggesting that, it is less the case that schools do not have the infrastructure or hardware, but more the case that "schools and teachers should use ICT as a didactical tool in Education" (Erstad and Kvale – *ITU Monitor 2009,* p.14) and should aim to purchase according to need. That is, acquisition of tools and resources for ICT needs should be related to learning goals in the

knowledge promotion, in individual subjects, in teaching method and in learning activities. At the same time, Erstad and Kvale argue that to achieve optimal implementation of ICT as a 'didactic tool' it remains necessary to develop teacher competency. This requires cooperative, collaborative sharing of resources to promote ongoing effective use of existing infrastructure and good quality subject specific learning resources.

ICT can be used effectively in areas like language acquisition when accompanied by sound pedagogical methods. When considering a learning platform or teaching method to employ, it is important, as Harmer suggests, to consider and decide the desired learning objectives and find the ICT to compliment it (Harmer 2012). Communicative Language Teaching is a learner focussed platform involving amongst other things, collaboration, use of authentic texts, varied tasks and engagement between learners in pair and group work type tasks based on contemporary, functional situations and scenarios. In these areas ICT has much to offer. ICT can be applied to CLT asynchronously in tasks such as reading or using authentic texts, or developing texts together in an asynchronous collaborative process on an LMS (learning Management System like 'Fronter' or 'Itslearning'. Participants can potentially work on a group project or submit work on the LMS, build a journal together using a blog, communicate through a social media based project or eTwinning. Interestingly all three of these activities listed directly prior are mentioned by a couple of the questionnaire participants; including a blog, group project work on the class LMS, eTwinning and use of social media.

One perceivable issue, however, is that a communicative method is based on an authentic communicative exchange between 2 or more people (as the name suggests) and technology cannot always substitute perfectly well in the place of face to face interactions. Nonetheless a CLT class can communicate synchronously in pairwork or small groups using skype or other web conference facilities, and the variety, flexibility and authenticity of the CLT classroom in these instances lends itself well to ICT integration. Certainly as will be mentioned in the next Chapter, Chapter 6, the conclusion, there could be more research on ways in which CLT can be adopted to enhance ICT implementation effectively in a pedagogically sound manner to achieve learning outcomes.

Chapter 6 – Conclusion

6.1 Summary of Findings – collected data

Overall the data collected from the sample of English teachers from different lower Secondary schools in the same region of South East Norway, produced a broad range of responses that reflect in many ways discussion and issues in the Monitor reports and previous studies regarding effective implementation of ICT in Norwegian schools more broadly. Some of the issues and elements relevant to ICT implementation mentioned in the literature are raised in the participant responses in the questionnaire. Some of the elements included in responses were positive such as satisfaction and confidence using ICT tools like Fronter, Smartboard, Social Media, and interactive media like Quizlet and eTwinning. Other elements of concern included relatively low incidences of PD and little mention of comprehensive methods and strategies for integrating ICT in the classroom outside use of tools. However, as mentioned in the discussion in Chapter 4, this may well have had more to do with the way the question was framed and a clearer impression of the participants' engagement and knowledge regarding ICT implementation may have come out better in an interview situation.

Nonetheless, some of the issues that did seem to emerge in the questionnaire, reflecting descriptions and concerns in the various reports and studies discussed in Chapter 2 and 5, include:

- Understanding of key terms such as "Digital Tools", "Digital Skills" and importantly "Digital Competence".
- Strategies and methods for integrating ICT
- Professional development
- Infrastructure and technical issues
- Variations in self-perception of competence including variations in confidence

Perhaps one of the more interesting observations to make about the collected data is the broad range of differences in participant responses, among this relatively small sample group of teachers from a similar region and similar area of teaching. Variation in responses included: significant differences in the type and amount of ICT tools listed, the proportion of PD undertaken, different levels of participant satisfaction with infrastructure, differences in the way each of the participant perceived their own competence in ICT, and the different opinions

regarding the way they saw ICT as a 'helpful' pedagogical tool. When so much variation in response can be found in a small group, what does this suggest for a broader national setting? Various secondary sources explored in this study such as the monitor reports and previous studies from Arnesen and Kvarstein consider some of the complexities of this question when they raise the issue of the 'digital divide'. Perhaps one of the positives of the questionnaire, therefore, is that it may add to the body of evidence showing that despite enormous investment in infrastructure and resources, local and state guidelines, professional development initiatives and individual motivations of teachers, there still remains a way to go in effective implantation of ICT in Education.

6.2 Criticism of Method and Result and what I would have done differently.

Naturally, in hindsight and in reflection of the study there are some ways that the method and result could have been set up or completed differently. Some afterthoughts include:

1. It would have been useful to compliment the questionnaire with interviews or a focus group session. This would have provided an opportunity to have participants clarify their answers or explain ideas more specifically. Additionally, it would have provided an opportunity to frame or reframe the questions to convey a clearer intended meaning.
2. In terms of the questionnaire, some of the questions could have been framed more clearly or specifically and some extra explanation could have been included. In the least, for example, it might have been useful to point out what was the intended meaning of question 1 regarding integration of ICT or it might have been useful to have the participant explain the importance they place on PD on the topic of effective ICT implementation.
3. It might have been useful to have include a question or two regarding pedagogical outlook and how this applies to their implementation of ICT. Perhaps the question could have included a request that the participant focus on or describe the method or strategy they use to integrate ICT, so as to avoid inclusion of tools or systems only.
4. The tables could have been arranged to compare more easily how a given participant answered each of the questions. This would have allowed the audience to compare, for example, how the participant rated him or herself in terms of ICT competence in comparison with his or her other answers.

6.3 Other ideas – further research

As mentioned above in Chapter 5, given opportunity, some interesting further research might be a study looking at a range of different methods and strategies for implementing ICT effectively in the classroom with the aim of achieving desired learning outcomes in language learning. An example of this would be to explore the range of ways that CLT methods might be used in combination with ICT tools and at the same time enhance effective ICT implementation in the lower Secondary school setting.

6.4 Educational Implications and Final Concluding Comments

Building ICT competence and coming to an understanding of how to use new technologies in a pedagogically sound manner as well as accepting and adapting to the major changes in education brought on by the rapid development of ICT generally, remains a major challenge shared in all schools. Despite ongoing development in competency levels among teachers, especially in the use of basic tools such as production tools for writing, presentation tools like powerpoint and organisational tools such as learning management systems like 'Fronter', there remains an enormous leap to better manage the changes that accompanies the use of ICT in education. The expectations evident from investment in provision of ICT infrastructure and tools in schools and the impetus created by the directives of the department can only begin to become effective when consistent standards of teacher competency enables consistent understanding of how to combine technology with pedagogically sound strategies to achieve learning objectives. The inclusion of the internet, web-based education and technology in schools has had a major impact on educational environments and continues to reshape the way we teach and learn, but in many ways holding back the process is the capacity and digital competence of those responsible for it.

With this in mind, ongoing research and development into how teachers relate to the use of ICT in their school environment and how they use the resources they have available is a central issue in view of ICT's overwhelming, comprehensive and increasing presence in Education today. Teaching methods using ICT, organization both in administration as well as in implementing the curriculum, and analysis including evaluating and achieving learning objectives for individuals or groups, are all examples of areas where ICT in Education continues to develop but raises issues and questions.

As mentioned above, the reformed curriculum of 2006 also focuses on how the 5th basic skill or competency area; "to use digital tools", is equated with the other basic skills, like being able to read, write, calculate and express themselves verbally. Use of ICT is included in the competence aims in all subjects at all levels, and all students in Norwegian schools have the right to use ICT in their subjects. There are no schools or teachers who may waive this requirement and, naturally, schools aiming to prepare students to adapt and fit in with the rest of society are compelled to take up the ICT in schools challenge.

6.5 Conclusion

The introduction of ICT in schools has led to major changes for both students and teachers. Not the least, it may be argued, it has increased digital literacy prominence in Norwegian schools and at the same time has challenged but also broadened and deepened the knowledge bank and pedagogical and learning approaches among staff and students presented with an imperative to use the tools available. However, adaptation and evolvement in the modern world means that the implementation of ICT in Education is a basic skill and a high priority competency area that has also raised some challenging questions regarding our school system; our pedagogical approach and our learning platforms in the future. How schools and teachers shall rise to meet the challenges has raised some interesting key research questions.

References:

- Arnesen, Thomas, "*The role of ICT in the teaching of English as a Foreign Language in Norwegian secondary schools – a study of ICT use and patterns of associated factors*", Masterspesialisering I Engelsk, ILS,UiO, 2010.

- Dudeney,G. and Hockly,H., "*How to teach English with technology*", Pearson Education Limited, Harlow, England, 2007.

- Erstad, Ola, *Digital kompetanse i skolen*. Oslo: Universitetsforlaget, 2005

- European Schoolnet, *Norway - Country report on ICT in Education*, Brussels, 2013.

  http://www.eun.org/observatory/country-reports

- Harmer, Jeremy, "Teacher knowledge – core concepts in English language teaching", Pearson Education Limited, Harlow, England, 2012.

- Hatlevik, O., Egeberg, G, Gudmundsdottir, G.,B., Loftsgarden, M., Loi, M., *Monitor skole 2013. Om digital kompetanse og erfaringer med bruk av IKT i skolen* (Senter for IKT I utdanningen), 2013.
  https://iktsenteret.no/sites/iktsenteret.no/files/attachments/monitor_skole_2013_4des.pdf

- Hatlevik, O., Egeberg, G, Gudmundsdottir, G.,B., Ottestad,G., Skaug, , *Monitor skole 2011. Skolens digitale tilstand* (Senter for IKT I utdanningen), Unipub, 2012.
  https://iktsenteret.no/sites/iktsenteret.no/files/attachments/monitor2011.pdf

- Hattie, J. *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. London: Routledge. 2009

- IEA (International Association for the Evaluation of Educational Achievement), *International Computer and information literacy study – Assessment Framework(ICILS)*, Amsterdam, 2013.
  http://www.iea.nl/fileadmin/user_upload/Publications/Electronic_versions/ICILS_2013_Framework.pdf

- ITU (Forsknings - og kompetansenettverk for IT I utdanning) *ITU Monitor 2009 Skolens digitale tilstand 2009*, Gazette, Oslo, 2009. http://www.itu.no/filestore/Rapporter_-_PDF/ITU_monitor09_web.pdf

- ITU (Forsknings - og kompetansenettverk for IT I utdanning) *ITU Monitor 2007 Skolens digitale tilstand 2007*, Universitetsforlaget, Oslo, 2007. http://www.itu.no/filestore/Rapporter_-_PDF/ITU_Monitor_07.pdf

- ITU (Forsknings - og kompetansenettverk for IT I utdanning), *Digital skole hver dag – om helhetlig digital kompetanse i grunnopplæringen*, Gazette, Oslo, 2005. http://www.itu.no/filestore/Rapporter_-_PDF/DK_utredning.pdf

- ITU (Forsknings - og kompetansenettverk for IT I utdanning), *Monitor 2003, Skolens digitale tilstand*, Gazette, Oslo, 2004 https://iktsenteret.no/sites/iktsenteret.no/files/attachments/itu_monitor2003.pdf

- Iktplan for Fredrikstad kommune http://fredrikstad.iktplan.no/index.php?pageID=9&page=M%26aring%3Bl+etter+10.+trinn

- IKT senteret http://iktsenteret.no/sites/iktsenteret.no/files/attachments/quality_criteria_dlr.pdf

- Kvarstein, Anders, "PedagogIKT – den digitale skolehverdagen", Masteroppgave I yrkespedagogikk, Avdeling for yrkesfaglærerutdanning, Høgskolen I Akershus,2008.

- KD(Kunnskapsdepartementet), *Læreplanverket for Kunnskapsløftet,* Utdanningsdirektoratet, Oslo, 2006.

- Lund, A., *The teacher as interface: Teachers of EFL in ICT-rich environments : Beliefs, practices, appropriation*. Universitetet I Oslo, 2004.

- McKay, Sandra, L. *Researching Second Language Classrooms*, Routledge, London, 2006.

- NMC Horizon Project, *Technology Outlook – Norwegian Schools 2013-2018*, Austin, Texas 2013

- OECD (2014), *PISA 2012 Results: Students and Money: Financial Literacy Skills for the 21st Century*, (Volume VI), PISA, OECD Publishing. http://dx.doi.org/10.1787/9789264208094-en

- OECD (2014), *PISA 2012 Country note*, PISA, OECD Publishing. http://www.oecd.org/pisa/keyfindings/PISA-2012-results-norway.pdf

- *OECD REVIEWS OF EVALUATION AND ASSESSMENT IN EDUCATION: NORWAY: 'School education in Norway', OECD, 2011.*

- Vavik, L., Andersland, S., Arnesen, T., Arnesen, T., Espeland, M., Flatøy, I., Grønsdal, I., Fadnes, P., Sømoe, K., & Tuset, G., *Skolefagsundersøkelsen 2009 - utdanning, skolefag og teknologi*. Høgskolen Stord/Haugesund, 2010.

- Voogt, Joke and & Natalie Pareja Roblin*, 21st Century Skills – discussion paper*, 2010. http://opite.pbworks.com/w/file/fetch/61995295/White%20Paper%2021stCS_Final_ENG_def2.pdf

Appendix 1 – Questionnaire template

Teachers` familiarity with ICT

1) How do you integrate ICT skills and equipment into your English teaching?

……

2) What systems/programs do you use? E.g.:

Fronter

Social media (Twitter, Facebook, Instagram)

Other learning platforms (explain)

Smartboard

Other ICT-systems/tools (explain)

……

3) How would you evaluate your own ICT skills on a scale from 1-10?

1-2

2-3

4-5

6-7

8-10

4) Was the use of ICT in English teaching incorporated into your teacher education program?

……

5) **Have you attended courses to qualify you in the use of ICT after you received your teaching license? If so, describe.**

……

6) **Is ICT a helpful pedagogical tool in the teaching of English? Explain.**

……

7) **Describe the ICT infrastructure at your present school.**

……

Appendix 2 – Tables of collected data for each question

1:How do you integrate ICT into your English teaching?

Person	ICT integrated by questionnaire participants
1	Powerpoint and fronter
2	Frequent user: You tube and fronter for assignments
3	Powerpoint with Videoclips and Sound bites and Flashcards
4	Searching homepage and its resources (assignments, worksheets, video clips), fronter for glossary tests and hand-ins
5	Uses ICT sometimes
6	LMS (itslearning), Net-based and online course development, skype, smartboard, projector and sound equipment when no smartboard, web-based resources for four competencies as well as media sites
7	Writing texts, articles, powerpoints etc, smartboards, you tube internet
8	Does not use ICT very much in English teaching
9	Uses ICT frequently in all subjects
10	Powerpoint in the teaching, youtube for presenting different accents and dialects in English
11	Smart board, PC for the students to do research, padlet-walls, students use powerpoint or prezi for presentations
12	As much as possible
13	Smartboard and computers in oral and written tasks
14	Writing texts and getting information
15	• Fronter for assignments and Powerpoint for oral presentations. • Skolearena for marking, textbook website, Quizlet, youtube, tv programs and film and kahoot. • Fronter for communicating with kids.sms and facebook for messages about changes.

2.What systems/programs do you use?

Type of ICT tool	Number of users from the sample group of 15
Fronter: 13 av 15	**13**
Social media: Facebook: 6	**6**
Other learning platforms: • its learning:1	**1**
Quizlet: 2	**2**
Kahoot:1	**1**
Skolearena:1	**1**

Smartboard: 7	**7**
Internet Searching:1	**1**
Other ICT-systems/tools: • Classblog:1 • Power point:2 • Photostory:2	**5**
eTwinning:1	**1**

3.How would you evaluate your own ICT skills on a scale from 1-10?

1-2 Poor	2-3 Below average	4-5 Satisfactory	6-7 Quite Good	8-10 High competency
1	1	4	4	5

4.Was the use of ICT in English teaching incorporated into your teacher education program?

Yes	**No**	**A little**	**No response**
2	11	1	1

5. Have you attended courses to qualify you in the use of ICT after you received your teaching licence?

Yes	**No**	**No Response**
8	6	1

6. Is ICT a helpful pedagogical tool in the teaching of English? Explain.

Person	Answer
1	Yes
2	Not more so in English than in other subjects, but it is useful in all to be able to incorporate videoclips etc in my teaching
3	ICT is helpful and quickly developing tool in English. More and more people are becoming aware of the advanced method ICT provides and have remarked accordingly. Lots of positive feedback on the ICT program as well as questions which are welcome as a way to inform parents, teachers and students as to the many positive outcomes of using ICT
4	Helpful for motivating students, lighten the workload with automated tests and sharing of assignments and worksheets.
5	Sometimes, esp. fronter, students find it a good tool to use.
6	ICT is a broad term and a sufficient answer to the above question is nort easy to put int a nutshell for a short survey response. However, a general response might be that it is not a question of whether ICT is helpful in Teaching

	English but rather where or when it is most helpful in a way that facilitates and supports sound pedagogical practice. The challenge is to evaluate how useful and how relevant particular forms of ICT are to learning. I.e.: Is there anything pedagogically meaningful behind the device or program? Some games, sites and devices, for example, promise a lot and look very impressive at a glance- but need to be carefully scrutinized before thei're utilized in class. They can be gimmicky, money focussed and lack apt pedagogical underpinnings, method or consideration. Other initiatives like the use of the flipped classroom or the use of an LMS to better monitor student participation and progress are useful.
7	Yes when students are writing texts, delivering on fronter, getting them back and then doing them again, she likes this process.
8	"I don't know, as I don't use ICT in my own education. If I was comfortable and someone teached me how to use ICT, I would probably use it mor in my teaching." **Translation:** *I do not know because I do not use it in my teaching, I am not comfortable in using it as I do not know how to do it.*
9	Yes it is important in today's society.
10	Yes, it is an opportunity to visualize material and communicate with students In many different ways.
11	Yes and no. Yes because it is easy to use when the need to find information about certain topics can be readily found on the web. Pupils like using the word processing programs with spell-check as it makes life easy for them! We also use the word docs in addition to excel and geobra for handing in work (essays, homework assignments, powerpoints etc) as this is handed in to folders on fronter. No, because I believe that the human brain needs to connect to the finer motorized skills and by doing so (i.e. handwriting) research has discovered(or known all along) that there is a definite connection between learning(spelling and grammar in particular) and remembering when it is done physically by hand handwriting. ICT tools can be tricky as it is easy to stray and do other things(facebook, play games, check out websites not applicable to the task at hand) and in a class of let's say 27, it will be hard for the teacher to keep track of everything that happens…to make sure they do what they are supposed to do.
12	Yes but the equipment sometimes does not function the way it should or is not accessible.
13	Yes.
14	Text writing and finding information.
15	Yes and no. You have a wider range of activities that the students find interesting to work with, helpful for weaker students to learn, writing on pc good for the correction help. Challenge is that children today have grown up using a pc as entertainment and teachers want them to use it as a word processing tool. **Social media and youtube can be a distraction as well a a learning tool** and you can come across plagiarized texts. **Important to establish good ICT habits In the classroom and vary ICT with more traditional methods.**

7.Describe the ICT infrastructure at your school:

Person	Answer
1	Internet
2	O.k. - Access to computers in all classrooms and a designated computerroom that has to be booked in advance.
3	No Answer
4	Fairly good but there are a lot of outdated computers. Not unusual for computers to be not working or network to be off-line. This can cause problems if the teacher is too dependent on digital tools.
5	We have around 80 PC's at our school.
6	We use an LMS, an intranet, we manage our own webpage, we have computer rooms, smartboards and a decent system and amount of computer equipment and projectors for staff and students. Overall, there's sufficient software and equipment for current needs (could always be more – but there's sufficient). The main challenge, however, is the ongoing need for a plethora of teaching ICT experts or 'superbrukers' to help other teachers (and students) use the equipment, software and online resources available. There's a certain recalcitrance, especially amongst some older teachers, about properly integrating ICT possibilities into the teaching platform and this to a small extent, hinders the potential for a more effective collaborative process in integrating ICT in the classroom according to student expectations; expectations that are growing exponentially…
7	Some teachers are above average but some especially mature women, 10% could use some training.
8	A computer room and a computer in the classroom.
9	At the moment it's not very good. A new school is being built and in a couple of years it will be terrific.
10	Smartboardroom with 30 computers. Computer and projector in every classroom. Some laptops that can be brought to the classroom.
11	School has its own network. PC's are available to all students. Smartboards in all classrooms. PC's available at school library, in the specialist rooms there are projectors and screens. Pupils are not allowed to bring their own computers. Laptop to all teachers. All messages , feedback assessment and homework are communicated through fronter or 'skolearena' accessed through approval by the teacher.
12	The school I work in is right now in the middle of a transition period, as the building of a new and modern school is in place. The infrastructure is somewhat lacking due to a building process which will change when the new school is ready(Plan for a flagship school in ICT).
13	50 computers distributed in two rooms.
14	No answer
15	All teachers and students have their own laptop, there is a stationary PC in every classroom. A majority of the classrooms have smartboard with projector and speakers, the other classrooms have a roll-down screen and projector. Auditorium with large rolldown screen and a big touchscreen PC and sound system. Language lab and computer lab. Also. Students and teachers have access to colour copymachines/printers. All teachers and students must use fronter and skolearena. Some classes uses NDLA and other digital textbooks in stead of printed ones. Some classes also use specialty software such as Autocad.

Appendix 3:

Kunnskapsløftet Extract re digital tools and 5th competency (Primary resource)

- National Curriculum Framework for basic skills (Digitale ferdighet som grunnleggende ferdighet). http://www.udir.no/Stottemeny/English/Curriculum-in-English/_english/Framework-for-Basic-Skills/

Extract from National Curriculum Framework for basic skills (Digitale ferdighet som grunnleggende ferdighet) (my translation).

http://www.udir.no/Stottemeny/English/Curriculum-in-English/_english/Framework-for-Basic-Skills/

Digital skills on the national level:

2.4 Digital skills as basic skills

What are digital skills?

Digital skills involve being able to use digital tools, media and resources efficiently and responsibly, to solve practical tasks, find and process information, design digital products and communicate content. Digital skills also include developing digital judgement by acquiring knowledge and good strategies for the use of the Internet. Digital skills are a prerequisite for further learning and for active participation in working life and a society in constant change. The development in digital technology has changed many of the conditions for reading, writing and oral forms of expression. Consequently, using digital skills is a natural part of learning both in and across subjects, and their use provides possibilities for acquiring and applying new learning strategies while at the same time requiring new and increased powers of judgment.

Sub-categories

Search and process means being able to use different digital tools, media and resources as well as to search for, navigate in, sort out, categorize and interpret digital information appropriately and critically.

Produce means being able to use digital tools, media and resources to compose,

reapply, convert and develop different digital elements into finished products, e.g. composite texts.

Communicate means using digital tools, resources and media to collaborate in the

learning processes, and to present one's own knowledge and competence to different target groups.

Digital judgement means being able to use digital tools, media and resources in a

responsible manner, and being aware of rules for protecting privacy and ethical use of the Internet.

How are digital skills developed?

Developing digital skills means learning to use digital tools, media and resources and learn to make use of them to acquire subject-related knowledge and express one's own competence. This implies developing increased independence and judgement in the choice and use of digital tools, media and resources relevant to the task.

Norwegian Directorate for Education and Training 2012 – Framework for Basic Skills:

Digital skills as basic skills (competence levels in digital skills**):**

Search and process

Level 1	Can read hypertexts and simple interactive information. Can use picture- and iconbased navigation.
Level 2	Can make simple digital searches, and read and interpret information fromdigital sources. Can use simple digital resources and tools for information processing and learning.
Level 3	Can choose and use search strategies and assess information from digital sources. Can use different digital tools and resources for information processing and learning.
Level 4	Can filter, transform and collate information from digital sources. Can use relevant search tools and master search strategies in subject-related tasks.
Level 5	Can find, organize and update digital information. Can use advanced search strategies and sources in subject-related work.

Table 1.1 – "Search and Process" (Own layout and translation) derived from National Curriculum Framework for basic skills (Digitale ferdighet som grunnleggende ferdighet).

Produce

Level 1	Can write simple texts on keyboard and produce simple composite texts.Knows simple digital use of sources and copyright rules.
Level 2	Can produce digital composite texts following simple formal requirements.Can make use simple use of digital sources observing copyright rules, also in re-use, and further development.

Level 3	Can make digital composite texts with linked content.Can understand and use digital formal requirements in one's own texts. Can refer to digital sources and apply copyright rules.
Level 4	Can produce and edit complex digital texts. Can refer to and assess digital sources in relevant subject-related situations.
Level 5	Can choose and use target group relevant digital tools and digital formal requirements.

Table 1.2 – "*Produce*" (Own layout and translation) derived from National Curriculum Framework for basic skills (Digitale ferdighet som grunnleggende ferdighet).

Communicate

Level 1	Can use simple digital tools and media for presentation and communication.
Level 2	Can use a selection of digital tools and media for presentation and communication.
Level 3	Can make varied use of different digital tools and media to convey a message both in one-to-one and group communication.
Level 4	Can use digital media and tools to convey a clear and detailed message for communication and documentation.
Level 5	Can choose, assess and apply digital communication tools according to different subjectrelated needs.

Table 1.3 – "Communicate", (Own layout and translation) derived from National Curriculum Framework for basic skills (Digitale ferdighet som grunnleggende ferdighet).

Digital judgement

Level 1	Can follow basic rules for digital interaction. Knows basic rules for protection of personal privacy on the Internet.
Level 2	Can apply basic netiquette and knows about rules for protection of

	personal integrity on the Internet
Level 3	Can apply netiquette and follow rules for protection of personal integrity on the internet and in social media.
Level 4	Can use the Internet and social media efficiently and appropriately.
Level 5	Can reflect ethically on and assess the Internet and social media as a communications and information channel.

Table 1.4 – "Digital Judgement", (Own layout and translation) derived from National Curriculum Framework for basic skills (Digitale ferdighet som grunnleggende ferdighet).

Digital skills in the English subject:

http://www.udir.no/kl06/ENG1-03/Hele/Grunnleggende_ferdigheter/?lplang=eng

Digital skills in English means being able to use a varied selection of digital tools, media and resources to assist in language learning, to communicate in English and to acquire relevant knowledge in the subject of English. The use of digital resources provides opportunities to experience English texts in authentic situations, meaning natural and unadapted situations. The development of digital skills involves gathering and processing information to create different kinds of text. Formal requirements in digital texts means that effects, images, tables, headlines and bullet points are compiled to emphasise and communicate a message. This further involves using digital sources in written texts and oral communication and having a critical and independent attitude to the use of sources. Digital skills involve developing knowledge about copyright and protection of personal privacy through verifiable references to sources.

Table 1.5 – "Digital skills in the English subject", (Own layout and translation) derived from National Curriculum Framework for basic skills (Digitale ferdighet som grunnleggende ferdighet). http://www.udir.no/kl06/ENG1-03/Hele/Grunnleggende_ferdigheter/?lplang=eng

Appendix 4:
Extract from Fredrikstad IKTplan (own translation)
http://fredrikstad.iktplan.no/index.php

1. "Students should be able to use search strategies and refer to sources in their own work". That is, they should be able to use the tool TONE (troverdig, objektiv nøyaktig, egnet) when searching for information to evaluate how trustworthy, objective, neutral and suitable the source is and be aware of the importance of citation and plagiarisation as well as privacy laws and copyright. Students should also consider the challenges involved regarding the personalization of searches for source criticism and the advantages and challenges in social book marking.

2. "Students should be able to produce and edit multimodal texts with receiver consciousness"

That is, they should know about different ways of publishing on the internet(home page, wiki, blog, commentary, etc.) They should be able to add sound and video to a composed text, animate text in a presentation program and edit video, sound, and picture. They should also be able to make a "clickable" table of contents with different levels

3. "Students should be able to make spreadsheets and systemize numerical data"

That is they should be able to set up a budget, to move cells, to set up formulas etc.

4. “Students should be able to communicate and interact in digital media”

That is they should know how to use different types of syncrone and asyncrone communicaon tools, be able to use social media, and at the same time be aware of the limitations and legal implications of filesharing and downloading

5. “Students should know that they are their own editors and be aware of the responsibility this involves”

That is, they need to be aware of themselves as publishers of sometimes sensitive information and follow the “Vær varsom plakaten” which describes a guideline for how the press needs to consider issues regarding freedom of speech, print and information in relation to ethics and privacy. They should be responsible and show digital judgement in terms of what they write especially in respect to comments that may be considered racist or prejudiced.

http://fredrikstad.iktplan.no/index.php - (own translation)