UNIVERSITY OF OSLO

Department of informatics

EssayCritic. A Pilot Study of a Computer Supported Essay Critiquing System

Master thesis

60 credits

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February 1st, 2008

Acknowledgments

Writing this master thesis has been a more challenged experience than I expected one year ago. I did expect it to be challenging professionally, but unfortunately it has been challenging on the personal level as well.

After months of struggling against cancer my father passed away October 3, 2007 and I want to dedicate this master thesis to him.

There have been several people helping me trough a tough time and first of all I want to thank my supervisor Anders Mørch who has been supportive throughout this period. Both as a professional, giving me helpful and proficient guidance, and as a human being, backing me up when needed. I want to thank my fellow students and especially Shazia Mushtaq and Renate Andersen for discussions and other conversations during my work. Also special thanks to Man Kam Chan, William Cheung and Kelvin Wong from Hong Kong Baptist University, who have been very supportive whenever I needed quick answers to difficult questions regarding EssayCritic.

Besides these there are also a number of persons I have to thank. Andreas Lund at InterMedia who helped finding the teacher/school where we did the experiment and of course a special thanks to the teacher Eli Huseby at Skien High School and her class that was enthusiastic about my research. My internal supervisor at Department of Informatics, Jo Herstad, especially for informal talks about living onboard a sailboat, either he knows it or not, he was a contributing factor when I decided to by my own. At the final stages, Sten Ludvigsen and Ivar Solheim gave me and my supervisor some hints for how to make sense of the subtleties of common ground and intersubjectivity Also, other personnel at InterMedia have all been very helpful.

Finally I want to thank my family and friends, which mean a lot to me and have helped me through this period. When this thesis is just a vague memory, you will still be there.

Oslo, February 1st, 2008

Jan Are Otnes

Abstract

This predominantly qualitative case study has been concerned with the use of a student essay critiquing system, named EssayCritic, in a collaborative setting with 26 students aged 16-17, at a Norwegian high school. It was done in close co-operation between InterMedia at the University of Oslo, Norway and Hong Kong Baptist University, Hong Kong. The goal has been to study how EssayCritic can help students writing essays in general, and the effect of collaboration in pairs, particularly. EssayCritic uses Latent Semantic Analysis, LSA, to compute feedback (critique) by comparing the students' essays toward model essays collected and prepared by teachers or domain experts.

All the students found the system useful in the role of providing critique, whereas the praising part was slightly less appreciated. The suggested sub themes were especially beneficial for the low-achieving students because it had the effect of stimulating those who experienced writing block. For all the students organization of the essay was underprioritized, even if this was stressed prior to the writing. The focus group organized their work in two different roles, "driver and navigator," which can be classified as collaboration pattern, and the majority of the students were positive towards working in pairs. Feedback from the students about collaboration frequently included terms like stimulating "different ideas" and "discussion".

In sum, EssayCritic provided a valuable feedback for the students to reflect upon their essay and to give them suggestions for further writing. The system affords collaboration and was a positive element for the students when they wrote their essays. It seems like EssayCritic is especially useful for low-achieving students, but also high-achieving students seems to appreciate the use of EssayCritic, despite the fact that they also were critical to its use (believed it hindered individual creativity).

Table of Contents

List of figures

1. Introduction

In this chapter I will describe the problem, my approach to the problem and a short thoroughfare of the rest of my thesis.

1.1. What is the thesis about and how it became like this

Technology can provide a rich set of tools for learning both in general and for second language learning, but we need to know how to build these tools and how to use them in a way that enrich the outcome of the learning process. In worst case, using technology can hinder learning when used the wrong way.

This master thesis is part of a collaborative research project between Hong Kong Baptist University and InterMedia at University of Oslo, regarding EssayCritic. EssayCritic is a computer supported English essay critiquing system using Latent Semantic Analysis (LSA) to compute feedback to students about their essays. LSA is a mathematical technique to compare two text segments and EssayCritic uses this to compare a student essay with text collected by teachers or other professionals in the field the essays are about.

EssayCritic is a critiquing system with a design approach to the task of essay writing (English composition). It has been evaluated in Hong Kong with students working alone at the University level (first year students). More recently they have adopted the system for use by high school students. This thesis reports the first high school study of EssayCritic, using students in Norway working in pairs, writing an essay and evaluating the feedback to this provided by EssayCritic. The reason for this change in research design is partly as a result of cultural differences in the way teaching and learning is accomplished in Norway and Hong Kong. In Norway it is more common for students to work in groups (e.g. project-based learning) than it is in Hong Kong. Which of these two forms of learning is better or worse is a complex problem that is outside the scope of this thesis to address.

A case study was accomplished at a high school in Skien, Norway (a medium sized Norwegian town) with 26 students at the age of 16-17 years where one focus group was videotaped over some time for later interaction analysis. Also observation, interviews, and questionnaires were used as a part of the analysis, which have helped

me through triangularization (multi methods approach) to answer the research questions. In the thesis I have also compared results from my study with results from the first study in Hong Kong.

There has been little research of the skill of writing and producing textual artifacts in the field of (second) language learning. Some authors even comment that writing skills is difficult to achieve using computers (Lai and Kritsonis 2006, pg:130). This master thesis is one contribution to this field of research.

1.2. Short thoroughfare of each chapter

In this section I will give a short thoroughfare of the rest of the chapters in the thesis.

Chapter 2 is about language learning and essay writing issues. In this chapter I also give a brief overview of Technology Enhanced Learning (TEL). The research questions are also presented in this chapter.

Chapter 3 is about research design and the methods used in the thesis. My main method for data collection and analysis has been interaction analysis of a videotaped session where two students used the system. I have one and a half hours of videotaped data material. The session was videotaped for later revision and transcription. I have also used other methods, most importantly interviews, observation, document analysis, and questionnaires. This was done to get richer data and to be able to triangulate my results. I also explain advantages and disadvantages of methods and why I choose them.

Chapter 4 is the theory chapter, which is divided in two main parts. First I present the theory of Latent Semantic Analysis (LSA), which is an important component of EssayCritic. I also present the theory of “Common ground” and “Intersubjectivity,” which I use in chapter 6 in the analysis of interaction data.

Chapter 5 is about the EssayCritic. I present the system architecture and show how the system is prepared with the different topics students can write essays about. Also user interfaces of both the teacher and student is shown, illustrated with a typical use of the system.

Chapter 6 is the analysis chapter where I analyze the video from the session with the two students using EssayCritic, and also make use of data sources, such as interviews,

questionnaires, observation and text analysis. I make use of triangulation for the different data to ensure my analysis is valid and can be cross-correlated.

In chapter 7 I summarize the findings from the analysis and compare them to a pilot study performed in Hong Kong. This comparison is done based on data from the questionnaire only.

Finally, I will give my conclusions and suggestions for further work in chapter 8.

Appendixes are added at the end, containing the information handed out to the students, questionnaire with answers, a “How-To” guide distributed to the students, and broader context material (supporting transcripts).

2. Language Learning and Essay Writing Issues

In this chapter I will say something about the motivation for the thesis, language learning and essay writing. Then I present some paradigms of Technology Enhanced Learning and show how EssayCritic is an instance of a critiquing system used for helping students in the process of writing essays in a second language learning setting. Even if I treat this as a theme regarding second language learning, it is clear that these concepts for computer support can also be used to teach children their first language. And, of course, it is neither limited to English as second language, it can be used for other languages as well.

English is often the preferred language when learning a second language and learning it can be done in several ways. Often the first knowledge of English as a second language is through television, watching movies at cinemas or on the World Wide Web, for instance YouTube. This is common for young people who often spend considerable amount of time watching on the screen. Watching a movie may lead to better understanding of the spoken English, but to write and speak correctly there are other aspects of language that has to be mastered as well. In fact, previous studies, for instance Rice (1990) , have shown that learning a language in this way may have negative effects on vocabulary development. This means that learners are not as good in writing and reading as they are in listening and speaking. It is neither a surprise that writing skills are deteriorating because they are not practiced enough and mostly at school, supported by homework assignments solved with the aid of parents at home and teachers at school. These resources for the learners are important, but also limited. As a result there is not enough training for this important skill of mastering a second language.

Essay writing can be modeled as a design process (Cheung et al., 2007), and the result of this process is a document with content and structure. Content is building blocks represented by words and phrases that is sequenced into sentences. Paragraphs and sections help to structure the meaning by putting it at different levels of abstraction, thus helping the readier to focus on one theme at a time. This can be seen as parallel to what Schön (1983) has called *action*, which corresponds with content production and *reflection* that corresponds with structure (viewing a document from different

levels of abstraction). When this is done without external disruption it is called "reflection-in-action" (Schön 1983). A good design process will consist of continues shifts between action and reflection until a document and its design has been completed. In the following section I will describe four paradigms of instructional technology (Koschmann 1996) and show in particular how critiquing can help in the design process of writing essays (Fischer, Lemke *et al.* 1991).

2.1. Technology Enhanced Learning, research and development

The use of computers in education has both advantages and disadvantages for second language learning (Lai and Kritsonis 2006). For instance computers can give learners the opportunity to work independent of the classroom and the possibility to work on their learning material at any time of the day. They are not restricted to be at school in ordinary lectures. Also, once computer technology is implemented it can be expected that the cost is considerably lower than face to face teaching in a classroom (Lai and Kritsonis 2006). When computers are used as a supplement to traditional language learning the teacher can focus their efforts on supporting students in ways computers are not well suited for. Lai (2006) lists several areas that computers are not well equipped to support for learning purposes: pronunciation, work on spoken dialogue, presentation and training for essay writing. If this is true in general is difficult to say, but we would like to address the last point and take on the challenge of essay writing. EssayCritic is a system that is meant to support essay writing. This has prompted one of the research questions. How can EssayCritic improve essay writing?

2.1.1. Four paradigms of instructional technology

Over the past decades there have emerged several paradigms in the field of instructional technology. Koschmann (1996) list four paradigms that can be arranged in history after the time they arise: Computer-aided instruction, intelligent tutoring systems, microworlds, computer supported collaborative learning.

The first one is the *Computer-Aided Instruction* (*CAI*) that emerged around 1960 with the system Coursewriter 1 from IBM. This is a paradigm that is rooted psychological in behavioral science and is about support for instructions in teaching situations with the computer. These teaching situations can for instance be in a classroom. The role of the teacher is to find efficient ways to share acquired knowledge with the students and

today it is often associated with instructional design. CAI often has its focus on individual learning.

In 1970 the next paradigm emerges and this is called *Intelligent Tutoring Systems* (*ITS*). This paradigm started when researchers from the field Artificial Intelligence "immigrated" to the educational arena and have its psychological roots in cognitive science. Still the focus is on individual learning and computer support for that, like in Computer-Aided Instruction. ITS has its emphasis on the learner, not on the teacher as in CAI and the computer try to provide a cognitive model of human information processing and an expert advice to students while they try to solve problems in a well defined domain.

The next paradigm that arise in 1980 Koschmann (1996) name *Logo-As-Latin* because much of the effort is focusing on the learning to program and is an illustration of Logo that is a powerful programming language. The Logo-As-Latin paradigm can also be named the *Microworld* paradigm and I will use this designation for my thesis. The Microworld paradigm take a constructivist approach and focuses not on learning by being taught, but rather on learning by doing. It has its psychological roots in the developmental psychology and philosophy of education by Piaget and Dewey respectively.

The last of the four paradigms are called *Computer Supported Collaborative Learning*, (*CSCL*) and many consider a NATO-sponsored workshop in Maratea, Italy, in 1989, as the birth of this paradigm (Koschmann 1996, ; Stahl, Koschmann *et al.* 2006). CSCL is built on research motivated by social sciences and is socially oriented toward learning in the light of theories from Vygotsky, G.H. Mead and other scholars in the socio-cultural and pragmatist traditions. CSCL views learning as a social issue and research on this is the central phenomena while the CAI, ITS, and Microworld paradigms are concerned with psychological ways of learning and also psychological research. Koschmann (1996) describes three (of several) important movements in the socially oriented research, and these are the *Socially Oriented Constructivist Viewpoints,* the *Soviet Sociocultural Theories* (with Vygotsky and his zone of proximal development (Vygotsky 1978) as one of the best known), and the *Theories of Situated Cognition.* These three movements provide the intellectual heritage that CSCL have emerged from.

Even if these four paradigms have emerged in a sequence, they are all present today, the "younger" one has not replaced the older as they emerged.

I have now presented four paradigms presented by Koschmann (1996) as the most important for instructional technology and will continue with another approach I will call *The critiquing approach.*

2.1.2. The critiquing approach

First I will try to place critiquing systems with reference to the four paradigms suggested by Koschmann (1996). To my best knowledge critiquing systems as described in Fischer (1991) and Robbins (1998) can be seen as containing elements from both the two paradigms Koschmann (1996) named Intelligent Tutoring Systems and Logo-As-Latin (Microworld). The computational approach is to integrate Microworlds with Intelligent Tutoring Systems bases. I have not found any explicit articles or research about this, but have tried to read between the lines in the two articles mentioned.

Fischer (1991) define critiquing as "*presentation of a reasoned opinion about a product or action*" while Robbins (1998) use a broader but similar definition on design critic:

> *"A design critic is an intelligent user interface mechanism embedded in a design tool that analyzes a design in the context of decision-making and provides feedback to help the designer improve the design." (Robbins 1998, pg:5)*

As mentioned earlier, writing an essay can be seen as designing a document by adding structure/content and critiquing systems can be seen as particularly well suited for such design tasks (Fischer, Lemke *et al.* 1991). Computational support for design-as-action and design-as-reflection (Schön 1983) can help learners in doing this design. Critics can "back talk" to the user signaling that the essay has some shortcomings and thereby trigger reflection of the product and possible revision. Figure 2-1 shows the "critiquing approach" from Fischer (1991). In the case of writing essays and using EssayCritic as the critiquing system the students are supposed to write an essay about

a predetermined topic. In the figure we see there are two agents, the user at the left and the computer at the right.

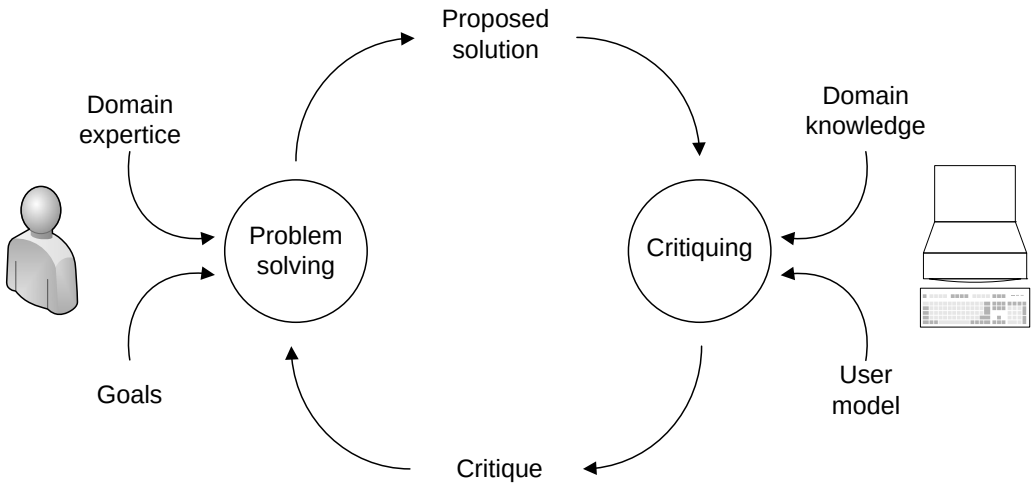

Figure 2-1 The critiquing approach (Fischer, Lemke et al. 1991)

EssayCritic is a web-based system, but for this explanation there is no need to differ where the actual computation takes place, the user deal with the computer. Both are working in cooperation to solve the task given. The user primarily generate and modify solutions (in this case producing text with content and structure) while the computer analyses those productions to produce a critique. The user can then reflect upon and chose to act on or not. This process can then be repeated until the user is satisfied with the product. Fischer (1991) and Robbins (1998) gives examples of several critiquing systems. JANUS which is a critiquing system for kitchen floor plan layouts, LISP-CRITIC which is a system to support programmers, TraumaTIQ which is a system to critic plans for treatment of medical trauma cases, and KRI/AG intended to support designers of graphical user interfaces.

2.1.3. Critiquing Applications of LSA

In this section I will go through some critiquing systems that make use of LSA and will mainly focus on LSA in an educational setting. Because my master thesis will be carried out in collaboration with a school and using a system for essay critiquing, the applications are all designed to help writing an essay or summarize some text. The topic of the essays can be of any subject.

In school, assessing and giving feedback on essays are a particular time consuming activity for teachers. This is a pity, because to obtain good language skills we need to practice writing. It cannot be taught only by speech, examples and textbooks. For schoolteachers there has always been a choice between giving fewer writing assignments to be able to give proper feedback, or more writing assignments and less thoroughly feedback. There are several applications for spellchecking and for checking the structure of sentences, like MS Word spellchecker, but until recently there have been few systems for checking the semantic similarity of texts. Applications with LSA as a method for this is now available and these systems can give quick and easy feedback for both learners and teachers.

The following summary of different essay assessment technologies using LSA is mainly based on an article from Miller (2003). The systems I will cover are "Intelligent Essay Assessor", "State the Essence" (and its follower "Summary Street"), "Apex" and "Select-a-Kibitzer". All of these systems are web-based systems where learners are submitting their essays through a web based interface for immediate feedback and this can be done several times, until they are satisfied with the result and finally deliver the essay to the teacher. I will now sum up some of their reported working methods and results:

Intelligent Essay Assessor

Intelligent Essay Assessor (IEA) is used in essay writing and based upon the corpus it can help students write essay of a varied field of expertise. IEA gives feedback regarding content, mechanics (misspelled words and grammatical errors) and style (redundant sentences and organization). It also has components for validation and plagiarism. After submission the students receive an estimated score and suggestions for revision. The students' reception was successful and 98% "*expressed satisfaction with the system and a desire to use it again for other courses*". (Miller 2003)

State the Essence and its follower Summary Street

State the Essence is used for essay summarization and was "*designed to improve elementary school students' summarization skills" (Miller 2003)* and gives feedback regarding content (topic coverage/irrelevancy/redundancy) with a numeric score and comments. When using State the Essence students seems to forgot about

style/structure, and were happy when content gives a high score at the system. (Miller 2003) Summary Street was then developed as a new version and students improved their way of using the system, but still no findings of higher skills after using the system on easy text. For difficult text there were significantly higher grades. (Miller 2003) To show an example of one of the applications of LSA, I have copied a screen sample of Summary Street, see *Figure 2-2.* The screen sample is of the latest version of Summary Street where the horizontal bars represent how well the summary covers each section and the triangle above each bar represent the level of the bars in the previous delivery.

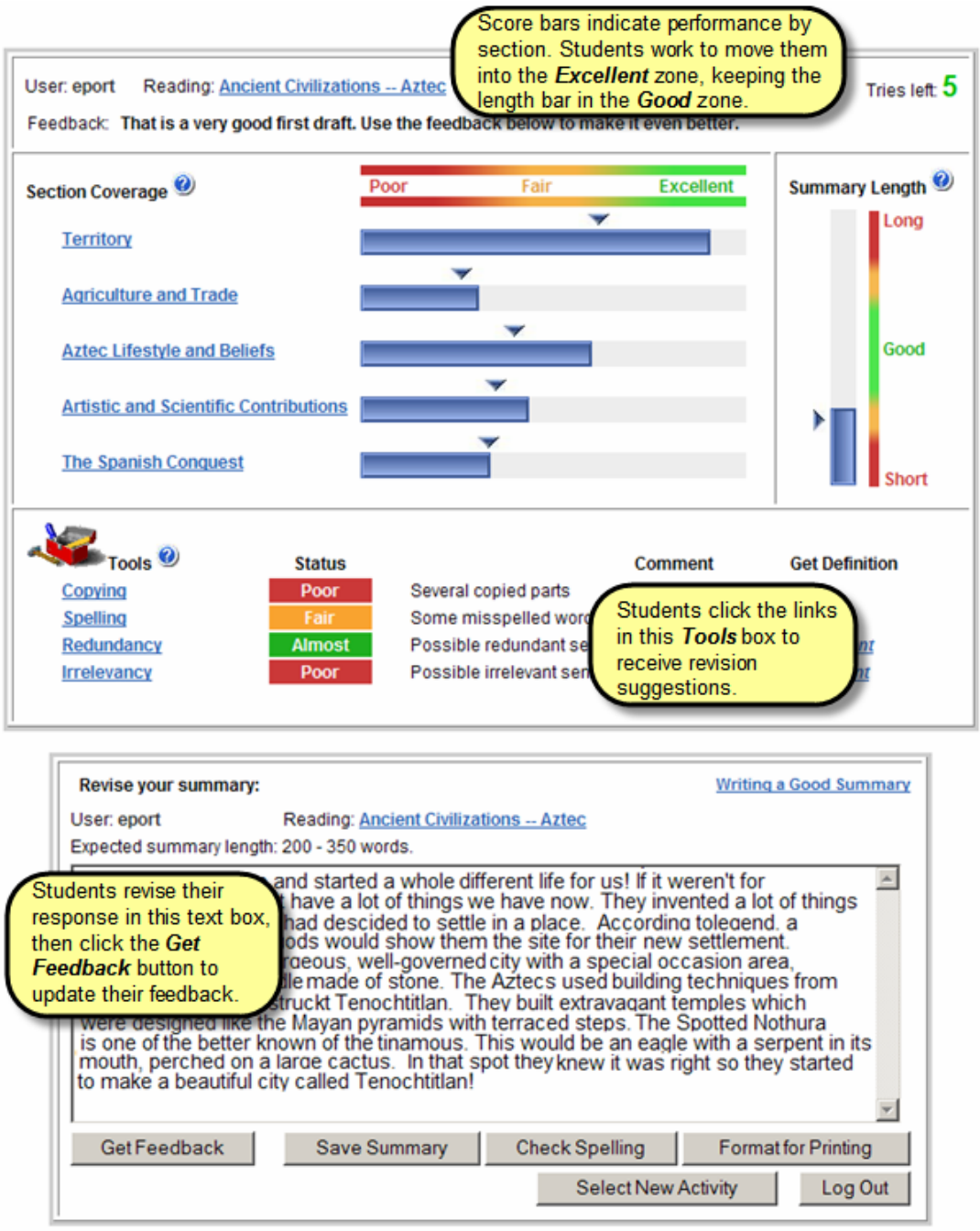

Figure 2-2 Sample screenshot of Summary Street (http://www.summarystreet.com/)

In the figure it shows improvement in all sections but the one at the bottom. At the right hand side there is also a column to show the length of the summary, if it is too short, good or too long. In the tools section of the page students can see feedback on copying, spelling, redundancy and irrelevancy. It is possible to click the links for revision suggestions. The bottom of the page contains a textbox where students revise their summary and either type in their corrections or copy/paste it from for instance a

word processor like Microsoft Word before they click the **Get Feedback** button for updated feedback.

Apex

Apex is assessing essays "*on topic coverage, discourse structure, and coherence*" (Miller 2003) and uses much more fine-grained topics from the corpus than IEA and Summary Street. Apex was originally developed for French language teaching, but since LSA is independent of language, there was little modifications needed. It is also able to create an outline of the essay helping students *"planning his discourse and highlighting areas of concern"*.(Miller 2003)

Select-a-Kibitzer

Select-a-Kibitzer give critique using "kibitzers" for each area of critiquing, for example semantic, stylistic and grammatical. It *"breaks new ground in the area of automatic summarization."(Miller 2003)* Select-a-Kibitzer does not use a reference text; instead it *"uses clustering methods on the LSA semantic space to identify discrete topical chunks in the corpus."* (Miller 2003) Clustering text with related meaning and then provides one sentence of the chunk in the order at which they appear in the essay. This can then form the base of a summary and also work as a guide for the essays progression.

In summary: there are several applications to assessing an essay. They are based on the same ideas but have some variations. It is important to notice that this thoroughfare is based on an article that, even if it is was written no more than four years ago, might be outdated in some areas. The underlying ideas are nevertheless the same.

2.2. Research Questions

After thorough consideration and several attempts I have, based on the former sections, defined three research questions in collaboration with my supervisor.

- How does EssayCritic afford and constrain collaboration in an essay writing context?
- How can EssayCritic improve essay writing?

- To what extent can EssayCritic motivate students to write good essays?

Through my analysis of the collected data from various sources I will elaborate, discuss, and answer these questions throughout the remainder of this thesis.

3. Research Design and Methods

This chapter will present the design of my study and the methods used for collecting data, and why I chose these methods. Explanations will be given for the data collection methods

3.1. Research Design

There are several definitions of research design, one could be *"A plan of what data to gather, from whom, how and when to collect the data, and how to analyze the data obtained"*(Unknown). Another definition is given by Frankfort-Nachmias (1996) *"the program that guides the investigator as he or she collects, analyses, and interprets observations"*. This program can consist of several steps as Yin(1994) explains:

> *[…] an action plan for getting from here to there, where here may be defined as the initial set of questions to be answered, and some set of conclusions (answers) about these questions. Between "here" and "there" may be found a number of major steps, including the collection and analysis of relevant data (Yin, 1994, p. 19)*

Yin (1994) also argues that all empirical research have an implicit, if not explicit, research design. Since my research has been part of a larger research project some of the premises have already been laid and my research has naturally been influenced by this. In Hong Kong there has been a study like mine, but with a quantitative approach to data collection and analysis. In Norway we wanted to do a qualitative research with main focus on the interaction between two students using the system together (collaborative writing). In addition to the four main data collection methods for qualitative research Silverman (2006, pg:18) we have used questionnaire to collect data both my study and for comparison between Norway and Hong Kong.

One early choice that had to be made was whether the study should start with an initial theory or conceptual ground or if it should start on a relatively free ground. McDonald (2006) state that there are basically two strategies for construction or developing theories, these are often called *Research-Then-Theory* and the opposite, *Theory-Then-Research*. A third form is a composite of these two. In the first, research is done to create a theory and to use theory to analyze data as patterns emerge, while in the

second one research is done to verify and test theories. These two main strategies are also closely respectively related to induction (or bottom-up) and deduction (or top-down) approach. Also these two strategies have a combination, and this is called abduction.

Research-Then-Theory also known as the "*Baconian approach"* is mainly an orientation where the argumentation is that to create a theory or analytic argument you can't start from scratch, you need some research prior to the theory. This orientation consist of essential four steps, McDonald (2006) group them as follow:

> *1. Select a phenomenon and list all the characteristics of it*
> *2. Measure all the characteristics of the phenomenon in a variety of situations (as many as possible)*
> *3. Analyze the resulting data to determine if there are any systematic patterns among the data worthy of further attention*
> *4. Formalize the significant patterns as theoretical statements constituting laws of nature (or axioms according to Bacon).*

This approach has some advantages and some disadvantages. The main disadvantage in my case is that in a social setting the first step could be impossible to achieve. And the reason for this is that it could be a considerable amount of characteristics of the chosen phenomenon.

Theory-Then-Research is evidently the opposite of the *Research-Then-Theory* approach and consists of five steps (McDonald and Schneberger 2006):

> *1. Develops an explicit theory in either axiomatic or process description form*
> *2. Selects a statement generated by the theory for comparison with the results of empirical research*
> *3. Designs a research project to test the chosen statement's correspondence with empirical research*

4. Makes appropriate changes in the theory or the research design if the statement and the empirical data do not correspond, then continues with empirical research (return to step 2)

5. Selects further statements for testing or attempts to determine the theory limitations when the statement does correspond with the empirical data.

In my case this was not a wanted approach. A composite of these two have three steps (McDonald and Schneberger 2006):

1. Exploratory. Research is designed to allow an investigator to just "look around" some phenomenon, looking for ideas. There should be some structure to the research in order to provide guidance to stage two.

2. Descriptive. The goal is to develop careful descriptions of patterns suspected from the exploratory research—developing empirical generalizations or intersubjective descriptions. A generalization that is considered worth explaining, is worth a theory.

3. Explanatory. This stage develops explicit theory to explain the generalizations formed in step two. It is actually a continuous cycle of theory construction, testing, and reformulation.

The latter approach is the one that fit my study best but step 3 is to go beyond the scope of my thesis and is therefore omitted. This approach has the advantages of the two former, but not the disadvantages.

3.2. Methodology

Silverman in (Silverman 2006) refers to methodology as "*the choices we make about cases to study, methods of data gathering, forms of data analysis etc. in planning and executing a research study"*. Again, since my study is a part of a bigger research, many premises are already laid so in my case there was a wish to do a predominantly qualitative case study with students working in pairs using the EssayCritic system. The aim was to study the interaction between the two students and the system and based on

this I have done an interaction analysis of the video we taped. The videotape has been my main data source, but as explained in section 3.3 I have also used other methods to collect data.

An interaction analysis is described as an "*interdisciplinary method for the empirical investigations of the interaction of human beings with each other and with objects in their environment.*" Jordan (1995) and its goal is to identify regularities of this interactions.

A case study like this is not suited to do generalization about other cases because of the limited number of situations studied and that each case is unique. It is on the other hand suited to explain **this** case, and that is exactly my target. I will use the term "experiment" for the actual data collection and the use of EssayCritic, note that this is not a strategy as Yin(1994) define it.

3.3. Data collection methods

There are several methods to collect data, and to choose which ones to use in different cases depend on the task. For my study, where I want to do a mainly qualitative research Silverman (2006) lists four major methods used:

- Audio and video recording
- Analyzing texts and documents
- Observation
- Interviews

Of these four methods the plan was to use all, certainly to a varying degree and the main method for my research is video recording. These methods can also be used in a qualitative research, but if so, in a different way than I use them in my study. In addition to these four I have also used another method, questionnaire, to compare the results, Hong Kong vs. Norway. Each of these methods have advantages and disadvantages and these are described further in the respectively sections later on. The reason for using all the methods are to get a richer data material and be able to do triangulation of the different data. The triangulation is done to avoid and minimize the limitations and benefit from the advantages of each method. Silverman (2006) warns

about using triangulation because of the complexity it adds to the research but even so I think it is a useful strategy in my case. Also in my case there are not a lot of data from the video recording, we only had one session with the students which resulted in about one and a half hour with video. So triangulation is done to increase the validity. The different data collected can also be used by other researchers/master students later on for further research with different focus (follow up studies) and research questions.

When collecting data, there will often be some grade of invasion of personal privacy. In this study the subjects was 16 to 17 year old students and it was important to assure that the data collection was done properly. The collection had of course also to be approved within Norwegian law and proper ethically. To manage such issues Norwegian Social Science Data Services (Norsk Samfunnsvitenskapelig Datatjeneste, NSD) provides support and service for researchers and students regarding proper collecting and access to data. The collection of data was only done after the project received a positive permission from the Norwegian Social Science Data Services. All of the students involved were informed about the study, as well as their parents and everyone was informed that they could refuse all participation without any consequences, but none did so. As already mentioned, the students and the teacher were eager about the study. All the data collected in this project will be made anonymous after the project is done and this will be done by deleting videotapes and deleting any connections between written data and names.

3.3.1. Video recording and analysis

In my study video recording and analysis was the main method for data collection. There are several advantages and disadvantages to do video recording and later analysis, but in my case the advantages clearly exceeds the disadvantages.

Silverman (2006) states that by using tapes there are three clear advantages compared with other kinds of qualitative data:

1. Tapes are a public record.
2. Tapes can be replayed and transcripts improved.
3. Tapes preserve sequences of talk.

In my case the tapes is to be deleted after a limited period of time so the first advantage listed by Silverman is not the case for my study. The second and third advantages are on the other hand valid for my study. Unlimited number of viewings, both of the researcher himself or other researchers, give the opportunity to expose richer and deeper details of the case than an observation can possible give. Jordan (1995) state that "*Video recordings replace the bias of the researcher with the bias of the machine"* and this is another important advantage as well. It is impossible for an observer to write down or remember all facial expression, non-verbal communication, verbal communication and so on, and this means the observer has to choose an extract of the case. After the initial extraction, all other data is for the purpose of analysis lost.

Disadvantages of video recording is mainly the time and cost associated with this method. Researchers need equipment for recording and this used to be expensive, but is now at a level where it can almost be neglected. The time needed to review tapes is on the other hand an important factor and to do a proper transcription/analysis it is necessary to replay the tapes over and over again, maybe just to find interesting sequences for further analysis. Another disadvantage is that using a camera we only get an extract of the real world, we have to choose the angle, audio, zoom, and so on. This will cut of the "wholeness" of the situation. Indeed this can be helped by using several cameras and audio equipment, but nevertheless, field notes and observation is an important support for the later analysis. As stated by Jordan (1995) "*More subtly, what for a human observer may be at the periphery of attention but still appreciable, may be altogether off screen in a video recording"*. When using a video camera and microphones in the open we will affect the object of interest and this is a concern that is important to be aware of, but *Jordan (1995)* states that *"Experience shows that people habituate to the camera surprisingly quickly,* ***especially if there is no operator behind it****."* (my italics) and *"As a practical matter we have found it most useful <u>not</u> to position ourselves behind the camera whenever possible. Then the camera, rather than being interactionally alive, quickly becomes the proverbial "piece of furniture" that nobody pays much attention to"*. This showed to be the case for my study as well, the students seems to be aware of the camera at the beginning, but after a short period of time they shift slightly in behavior. When I checked on the camera, to ensure the tape was still recording, they were reminded of the camera for a short while again. Also the fact that the camera was placed behind them helped to make them forget about it, out

of sight, out of mind. In the case there is a monitor/TV in the setting and it is important to see exactly what's on the screen it is important to consider how this is to be done. There are often flickering on the screen and this can be devastating for the quality and usefulness of the recordings.

Taken both advantages and disadvantages into consideration video recording and analysis is a powerful method that well suit my purpose.

3.3.2. Analyzing text and documents

Analyzing text and document can give a researcher valuable information (Hammersley and Atkinson 1995) and in my case the different stages an essay goes trough was important. Earlier versions of EssayCritic did not save each upload of essays to the system, but after our request the system was adjusted to save a copy of each uploaded essay, both the essay itself and the feedback provided. We then have a complete "history" of the different uploads/stages the essay goes trough.

Myself I did not analyze the essays but the teacher did go through both the first and second version of the essay. Afterwards we did an interview with her to get her point of view.

3.3.3. Observation

Observation is an important method in ethnography and qualitative research and there are several types of observations. We as researchers can choose to not be a part of what we want to observe, or we can choose to be a part, also known as *participant observation* (Silverman 2006). Even if researchers in social practices will always to some degree be participant observers (Hammersley and Atkinson 1995) it is common to distinguish between participant and non-participant observation. There is no clear boundary between the two and for my study it was not wanted to be a part of the classroom setting except guiding students if there were any questions about the system and its use. To help students writing their essays, in such as grammar, structure, and content we were not implicated, the teacher was responsible of this, like normal. As with video recording, observation will also affect the situation.

Besides being in the classroom to ensure the students were able to use the system I wanted to observe the students in the classroom. This was as a complement to the

video recording to understand the complex situation that the video camera could not capture. Unfortunately there was not time to make any notes because of the problems students experienced. Nevertheless, I was present, and could observe and even without taking notes I got a much richer understanding of the wholeness of the situation than any video recording could give me.

3.3.4. Interview

Using interviews is the most commonly used method to gain insight in participants' interpretation (Guribye 2005), it is relatively economical and "*qualitative interviewing is particularly useful as a research method for accessing individuals' attitudes and values – things that cannot necessarily be observed or accommodated in a formal questionnaire. Open-ended and flexible questions are likely to get a more considered response than closed questions and therefore provide better access to interviewees' view, interpretation of events, understandings, experiences and opinions"* (Byrne 2004). Interviews are also important to clear up possible misunderstandings and can be done in several ways going from the strict *structured interview*, via *semi-structured interview* to *open-ended interview*. I choose to do an open-ended interview with both the teacher and the class, this was done because I had some questions I wanted answer on, but I did not want to limit the interviews to only these questions if something interesting shows up while we were in the middle of the interview. The interview with the teacher was a telephone interview and where taped for later thoroughfare and transcription, while the interview with the class was done as a group interview and also videotaped for later reviewing and transcription.

3.3.5. Questionnaire

A questionnaire was also handed out to the students when we finished the group interview and this was done for several reasons. One was because of the study in Hong Kong who had also been using questionnaire in their study and to make it possible to compare the results of the two studies I used their questionnaire as a template for my questionnaire. I removed some questions that were not appropriate in my case, and added some new ones regarding the pair writing setting. Another reason was to get as rich data material as possible and giving the students the possibility to write down their thoughts anonymously. The questionnaire was paper-based and handled out at

the end of the study and contained both open and structured questions. In Appendix B both the questionnaire and the answers are shown.

3.4. The Case

As mentioned in the previous sections this study was a part of a bigger study and naturally some of the premises were already laid and my task has been to do one experiment with students in Norway using the EssayCritic in a paired setting. EssayCritic is a system using Latent Semantic Analysis to give automatic feedback to an essay submitted via a World Wide Web interface. The feedback consists of both praise and critique and is easy to use. The system is described in detail in chapter 5 and will not be described any further here.

Through help from other staff at InterMedia, UIO, we got in contact with an English teacher at a high school in Skien, Norway. She was teaching a class of 16-17 year old students and agreed to let us do a study in her classroom. After some planning about when to do the case, we had to apply for permission from the Norwegian Social Science Data Services, NSD (Norsk Samfunnsvitenskapelig Datatjeneste). According to their webpage NSD is *"a resource centre, which assists researchers with regard to data gathering, data analysis, and issues of methodology, privacy and research ethics*." We then informed both the learners and their parents about the study and also emphasized that everyone could refuse to be in the study, but no one did. The information submitted to students and their parents are attached in 0. In fact the learners were very enthusiastic about being part of the study. At the information session in the classroom prior to the test, we give the information and showed how EssayCritic worked and gave an assigned task to the students; each group should write an essay in English about the topic "Mobile phone impact" and hand the essay in to the teacher the day before the actual experiment. The topic was already prepared and EssayCritic was set up to give feedback on this. How to prepare a topic to be used is explained in chapter 5. The reason for the hand in in advance was to give us a chance to run through the essays and choose one of the average groups for videotaping. There were totally 28 students in the class but two of them were sick during the test, so a total of 26 students paired up in 13 groups were present at the experiment. The students choose themselves who their partner should be prior to the test. A timeline of the study is shown in Figure 3-1 below.

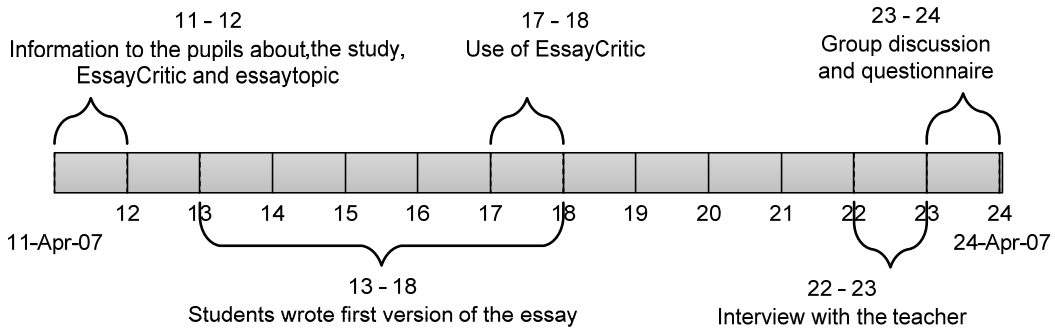

Figure 3-1 Timeline for the experiment

About one week after the initial information session the actual experiment took place. This was done in a computer lab the students normally used, so the environment was well known and in that sense we did not add any extra except for the cameras and 2 people. The room setup is shown in Figure 3-2. Since the main data collection method was video recording in order to capture one group for later interaction analysis, most of the students used one part of the lab while the group of interest was placed in the other part. This was done primarily to ensure quality audio recording, and to minimize the disturbance from other groups. Each chair in the drawing represents one pupil, and camera 1 was placed behind and to the side of the group of interest, while camera 2 was placed to get the best possible overview of the computer lab. Both cameras was placed on a tripod and left "alone" to minimize the disturbance and to help the students forget them. In fact when going through the recordings of camera 1 at least one of the students had forgotten about the camera and was talking when the other student had to remind her about the camera and microphone. Then they both started laughing.

There was some discussion among myself and my supervisor about using hardware or software to record exactly what happened on the screen, but it was decided to skip this. The hardware available from InterMedia was very noisy and would have been very distracting to the students. Also there were some considerations about how to use and to trust the equipment. Software for recording the monitor was also turned down, mainly because we were unsure if the computers to be used would manage this. The computers were old, and maybe not capable of managing the extra load without disturbing the performance. It was neither desirable to install software on the school's computer without access/time for testing to ensure that it actually worked. Also the fact that the angle of the camera captured the monitor and that we could use

screenshots to illustrate what happened influenced our choice. In fact it showed that the shot from camera 1 gave enough information about what happened on the monitor.

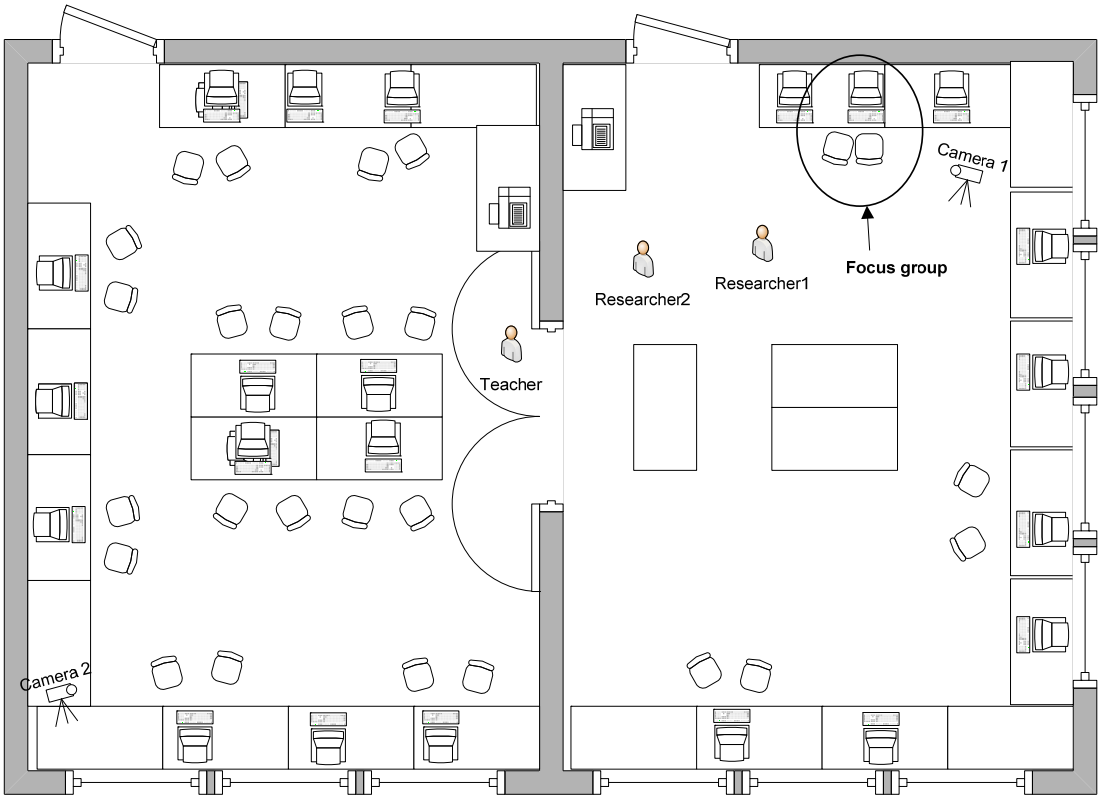

Figure 3-2 Overview of the computer lab

In addition to the students there were three other people in the room, the teacher, and two researchers. The teacher was walking around in the lab, helping students to write, remember grammar, and so on. The two researchers were myself and my supervisor.

In addition to the information and demonstration on our first meeting with the students they got an easy “How-To” guide to the system (Appendix C). It showed them how to use the EssayCritic and how the feedback would look like. Most of the groups logged on without any problems, but some initially typed the wrong internet address, wrong username/password and so on. These issues were quickly resolved and the groups were able to log in and upload their essay from a Microsoft Word file. One of the groups had forgotten to bring the file containing their essay and therefore they did not upload anything. Another group did not write their essay in Microsoft Word format and had to convert their file prior to uploading.

The group that was recorded did get their feedback and continued writing and evolving their essay based on this. After a while there were some problem with the server in Hong Kong and much of this time I tried to help groups that experienced problems. Because of these matters, the time I originally wanted to use for observation of both the recorded group and the other groups were very limited. Luckily the recorded group was able to upload a second version of their essay and they got additional feedback from the system. Many of the other groups did not manage to upload version 2 of the essay because of the server problem in Hong Kong.

Four days after the session using EssayCritic we made a telephone interview with the teacher to get her view of the session, how it affected the students and how the final essays were compared both with the first version and the other essays the students had written before. This interview was recorded for later transcription and analysis. See chapter 6

Five days after the session we organized a group interview with all the students present, which was video recorded, and finally we asked the students to fill in a questionnaire. The questionnaire is added as Appendix B together with the answers.

To find and get access to classrooms and willing personnel for research like this are not always an easy and straightforward task. As an incentive for their help and to show our appreciation we served pizza and mineral water the last day. Hopefully this experiment was a positive experience both for the students and the teacher.

4. Theory

In this chapter I will describe the theory of Latent Semantic Analysis, LSA which is a critical component of EssayCritic and then show some examples of applications of LSA. I will also describe theory about the two terms *Common ground* and *Intersubjectivity* that is used in my analysis, chapter 6.

4.1. Latent Semantic Analysis

In this section I will try to give an explanation of what Latent Semantic Analysis (LSA) is and how it works. I will also give some examples of applications that use LSA. Hopefully I will be able to give a first glimpse for a reader that is not familiar with LSA.

Landauer (1998) give a definition of LSA: "*Latent Semantic Analysis is a theory and method for extracting and representing the contextual-usage meaning of words by statistical computations applied to a large corpus of text*". Wiemer-Hastings (2004) have a slightly more demotic approach; "*Latent Semantic Analysis (LSA) is a technique for comparing texts using a vector-based representation that is learned from a corpus*.".

I will not go in depth explaining the statistical and mathematical computations used in LSA, but briefly go through it.

According to Wiemer-Hastings (2004) and others, LSA was originally developed for retrieval of textual information from large information spaces and was first known as Latent Semantic Indexing (LSI)(Wiemer-Hastings 2004). Accordingly, it was used for selecting relevant documents from a large database. Earlier techniques for this have been word by word matching, weighted keyword, and vector based representations (Wiemer-Hastings 2004). LSA brings in a new factor to the vector based representation scheme, the Single Value Decomposition (SVD) (Golub and Van Loan 1996). I will explain SVD further down, as I present the main parts of LSA. It is important to notice that this is a very brief presentation of a complex algorithm, for further reading I will suggest Landauer, Foltz et al. (1998)

In various articles and reports the authors present several critical steps for LSA. For example in Landauer, Foltz et al(1998) two and in Wiemer-Hastings (2004) four. I will use three here because I think it is easier to see how LSA work this way. The three steps I have chosen are called 1) Build corpus, 2) Create matrix, and 3) Perform Singular Value Decomposition.

Build corpus

Collect a large set of text (also called the corpus). To reduce the amount of text actually needed, take out all non domain-specific terms (there is little use to collect text about *knitting* if we want to deal with *football*). This compressed text is then separated into "documents". This could for instance be paragraphs or sentences. According to Wiemer-Hastings (2004): *"For most applications, each paragraph is treated as a separate document based on the intuition that the information within a paragraph tends to be coherent and related."* Words, like for instance and/or, that can be considered as "empty", are also removed in order to condense the content.

There are some disagreements about how large the corpus should be. To answer this Wiemer-Hastings(2004) gives two examples, one with "*a couple hundred kilobytes with 2000 word types, 30,000 word tokens, and 325 documents*" and one "*containing 750,000 word types, 550 million word tokens, and 3.6 million documents*". There is no repeated evidence of the "perfect size", but it seems like there are no reduced performances if one is using more text, so as a rule of thumb we could say that the bigger corpus we've got, the better it is. The limitations are rather on the practical side.

Create matrix

The system makes a matrix of the compressed text, where each row stands for a unique word and each column for the "document" or part of text where the word occurs. Each cell of the matrix will hold the frequency of the word in the different "documents" of text. To illustrate this I have made two sentences and transformed it into the following matrix as example:

S1: Norway has a lot of great mountains

S2: Hiking in the mountains is great

Matrix:	S1	S2
Norway	1	0
has	1	0
lot	1	0
of	1	0
mountains	1	1
hiking	0	1
in	0	1
the	0	1
is	0	1
great	1	1

Notice that the word "mountains" occur in both sentences, but occupies only one row in the matrix. This is one of the steps to reduce complexity.

Perform Singular Value Decomposition

At the third step, the mathematical computation in LSA makes use of Singular Value Decomposition (SVD). Using SVD we decompose the matrix into three smaller matrices that allow easy matrix manipulation. Haley et al (2004) referring Deerwester et al (1990) explain it as follows:

Let t = the number of terms, or rows

d = the number of documents, or columns

X = a t by d matrix

Then, after applying SVD, X = TSD, where

m = the number of dimensions, m <= min(t,d)

T = a t by m matrix

S = an m by m diagonal matrix, i.e., only diagonal entries have non-zero values

D = an m by d matrix

After this step there are the three matrices, T, S and D where matrix S is the important one for further work. Matrix S is a diagonal matrix containing scaling values ordered from most to least significant and if the three matrices are matrix-multiplied the result will be the original matrix. Such matrixes are then easy to do mathematical computation on which can enable us to make powerful and fast computer programs.

LSA reduces the diagonal matrix S to reduce the number of dimensions, deleting the least significant values, meaning that the connection between terms with the weakest correlation to documents is kind of "zeroed out". This will then give the remaining dimensions stronger correlation between texts that are similar to each other and weaker correlation between texts that are not similar to each other. It is clear that when reducing the number of dimensions we have to choose how much we want to reduce. We have to choose somewhere between the two extremities not reducing it at all, and removing it completely. To find the appropriate number of dimensions is also called to "tune" LSA for best results and is not an exact science. The size of the matrix S is not a straight forward choice, and Landauer, Foltz et al (1998) estimates that because of computational reasons not more than a few thousand can be constructed. If the number should be higher today, nearly ten years later than they wrote their paper, is not easy to say, but the computational opportunity have at least greatly increased. On the other hand, Wiemer-Hastings (2004) state; "*In LSA, the typical assumption is that only the top 300 or so dimensions (out of tens or even hundreds of thousands) are useful for capturing the meaning of texts.*" This is also supported by Stahl (2006). For EssayCritic the average is in fact approximately 300 after tuning the system. The result of this is the product of the three matrices, which are the least-squares best fit to the original matrix X.

To exemplify this matrix Landauer et al (1997) explains LSA conceptually as follows; "*the LSA model can be viewed as a simple but rather large three layer neural net. It has a layer-one node for every word-type (event-type) and a layer-three node for every text window (episode) ever encountered, several hundred layer-two nodes-the choice of number is presumed to be important-and complete connectivity between layers one and two and between layers two and three.*" The choice of numbers in layer two in this conceptual view is equivalent to the size of the reduced matrix S in step 3 above.

Figure 4-1 below is a visualization of the neural net explained.

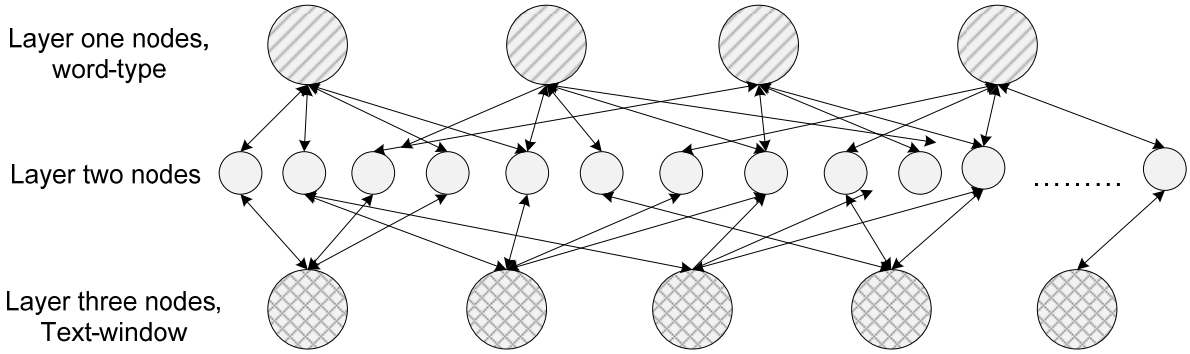

Figure 4-1 Three layered neural net

To exemplify how LSA work Landauer, Foltz et al (1998) give an explanation of how children have an unaccountable rapid growth of their vocabulary, even if there are no explicit connection between them. In the article there are one sentence "*John is Bob's father and Mary is Ann's mother*"

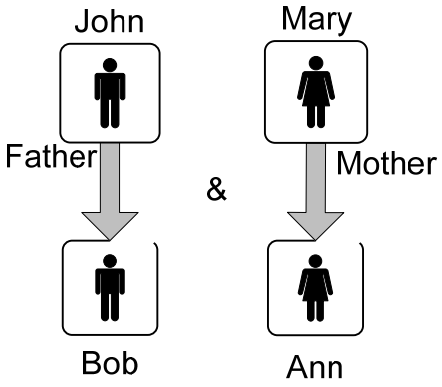

Figure 4-2 John is Bob's father & Mary is Ann's mother

and a second sentence "*Mary is Bob's mother*"

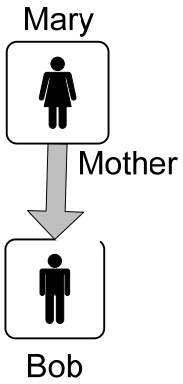

Figure 4-3 Mary is Bob's mother

Reading both of these sentences will for us intuitively give Figure 4-4 as a result.

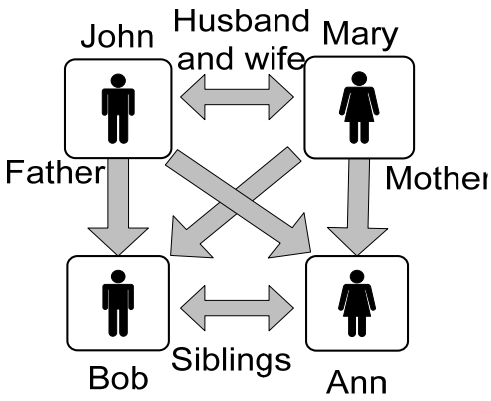

Figure 4-4 One happy family

Let us take a look at how this could be the case for LSA. We know that John is Bob's father and that Mary is Bob's mother. This can be called strong connections/ correlation since they are explicitly added. But there is also a connection/correlation between John and Mary trough Bob which I will call week since this is not explicitly told, it could be wrong. All the connections that are not explicitly told are week, but the more strong connections we add, the stronger is the possibility that these week connections are correct, the correlation increase.

I have now explained and given examples of how LSA work, but Latent Semantic Analysis is not a magical solution and it has some shortcomings. These are important to know about end there will be errors. In the last example which ended with "one happy family" we can see that even if LSA report a connection it does not have to be the case, and there are no logical or semantic proofs of this. For families of today there might be weaker ties than earlier as well, since the family relationships have changed a lot during the last decades. LSA cannot understand such a situation. If systems using LSA is reporting similarities and a match, it might be wrong. Wiemer-Hastings (2004) mentioned "*One critical objection that is raised against the LSA approach is that not only does it ignore the syntactic structure of sentences, it even ignores word order. In other words, LSA treats a text as a bag of words"* so LSA is not the solution if we want to correct bad structures, and he follows with "*Another notable gap in LSA's competence is negations. Things that LSA "ignores" is negations, either because they are omitted from the LSA training via a "stop words" list, or simply because their widespread use throughout a corpus renders them representationally depleted"*. This also shows that totally different meanings in two texts could be judged as closely related. Also, if a word is spelled wrong, LSA will neglect the word and find no similarity.

LSA also has some limitation when it comes to the length of the texts to be compared. If it contains more than 200 words (Rehder, Schreiner *et al.* 1998), LSA will perform well, but with single sentences it does not (Wiemer-Hastings, Wiemer-Hastings *et al.* 1999). I have now briefly explained what LSA is and how it works. I will now mention one of several possibilities of LSA that is unexplored. (Landauer, Foltz *et al.* 1998)

4.1.1. Scaffolding

A particularly interesting concept for educational purposes is scaffolding. The possibility to use LSA to "*match students with text at the optimal level of conceptual complexity for learning.*" (Landauer, Foltz *et al.* 1998) can be seen as a form of scaffolding. By this is meant that a learner will learn more if the text is adapted to the learners' level of expertise, and is related to their "zone of proximal development" (ZPD). ZPD is a theory proposed by Lev Vygotsky in the context of adult-child development. Vygotsky's frequently cited definition is as follows: "*the distance*

between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers." (Vygotsky 1978)

If a text is too hard or too easy for a learner, they will not learn the same as if the text is just right. This phenomenon is something I have definitely noticed myself during my reading for this thesis. If LSA could measure the level of expertise for a course it can help a student to find a text that is the "best match" for him. Wolfe (1998) did a related study to examine the hypothesis that learners will benefit more from a text that is neither too difficult nor to easy compared with the skill of the learner. LSA was used to predict the learning outcome and it showed that a text that was close to the learners skill resulted in greatest learning, and they found that "*LSA proved as effective at predicting learning from these texts as traditional knowledge assessment measures*" (Wolfe, Schreiner *et al.* 1998).

Several authors (Hobsbaum, Peters *et al.* 1996, ; McLouhglin 2004, ; Reid-Griffin and Carter 2004) refer to Wood (1976) as the first to have coined the term "scaffolding" in the context of contemporary education and who made a connection to Vygotsky and his theory of ZPD (Hobsbaum, Peters *et al.* 1996). "Scaffolding" is described as the tutorial interaction between an adult and a child where the adult helps children learning to manage a task that is normally too hard for the child to do by itself. This help can take form in several ways. For instance an adult can guide and give clues about what might be the next step, giving examples, narrowing the possible choices if the design space is too large for the child to handle alone, and so on (Wood, Bruner *et al.* 1976). Scaffolding has stimulated research and design of computational scaffolds for instructional design of educational technology like intelligent tutoring systems. Critiquing systems can be seen as another application. EssayCritic is a critiquing system that uses LSA to provide computational scaffolding for English composition.

4.2. Common Ground and Intersubjectivity

In this section I will describe the two concepts based on key text, using Clark (1996) and Clark (1991) as my starting point for *Common Ground*. For *Intersubjectivity* I will use Rommetveit (1979, 1972) and Mortimer (2003) as starting points. It is difficult to see what separates the two terms and first I will write about each concept separately

and finally I will try to compare them and find what common denominators there are and what separate them.

4.2.1. Common Ground

At the beginning, let me dwell just a little bit with the term *language use* and what is meant by this according to Clark (1996). It is important to recognize that language use is not only about conventional languages. It also includes such as gestures or other signals intended to give meaning for another person or persons. Some signals are performed through speech, like Norwegian, English or even sign language, while other signals can be flashing the headlights to a facing car in the dusk to let the driver know he drives with no lights on, knocking on someone's door to let them know you are there, or as Clark say *"Juliet signaled Romeo it was safe to visit by hanging a rope ladder from her window"*(Clark 1996, pg:13)

Clark also present six working propositions that is important to see the context of common ground.

1. *Language fundamentally is used for social purposes*
2. *Language use is a species of joint action*
3. *Language use always involves speaker's meaning and addressee's understanding*
4. *The basic setting for language use is face-to-face conversation*
5. *Language use often has more than one layer of activity*
6. *The study of language use is both a cognitive and a social science*

(Clark 1996)pg 23

It is important to view the concept of Common Ground against this background. Clark (1996) reference to earlier research (Stalnaker (1978) cited from Karttunen (1975)) where the technical notion of common ground was introduced. Clark(1996) then define Common Ground as *"Two people's common ground is, in effect, the sum of their mutual, common, or joint knowledge, beliefs, and suppositions"* McCarthy

(1991) have a very similar description of common ground: "*the mutual knowledge, beliefs, and assumptions of the participants in a conversation*" (p.209).

Clark(1996) suggest two types of shared bases people find or create for common ground and this is the *Communal common ground* and the *Personal common ground.*

Communal common ground is deducted from the cultural communities a person belongs to, or more precisely the shared expertise of people. This can be for instance nationality, profession, hobbies, religion, and so on. Two persons belonging to the same religion have a shared basis, based on this we could say they are both insiders of that community. They have inside information of that particular religion. But, they are normally outsiders to another religion, they have only outside information to the other religion. Clark (1996) contrasts the two types of information:

> ***"Inside information** of a community is particular information that members of the community mutually assume is possessed by members of the community*
>
> ***Outside information** of a community is types of information that outsiders assume is inside information for that community"*
>
> (pg 101)

So, if a Norwegian meets a Japanese for the first time, the Norwegian will have inside information about the Norwegian culture, language, geography, population and so on, but outside information about the Japanese language, geography, population and so on. A Norwegian will assume that the Japanese will have inside information about Japanese language and so on, but only limited knowledge about information about Norway. And of course vice versa. The two then have a common ground. But the common ground consists only of the outside information. If in addition, they both are brain surgeons and realize this, then they both can assume that the other have inside information about the brain surgeon field of expertise, and stronger and broader communal common ground. These communities also have sub levels, different communities are nested in a kind of tree structures. A Norwegian can be both from the northern part with a different culture than someone from the southern part, and so on. Each of us belongs to a huge number (endless?) of different (sub)communities, I myself have of course a nationality, occupation, hobby, gender and so on.

What then, if I meet someone I have never met before? It is totally dark, so I don't even see anything, nor have it been any talk yet. There are no clues about this other person and I don't know anything about this person, except that I know it is a human being. Can I still assume that we have some common ground? Yes, Clark (1996) classifies this as a "human nature" common ground, I can assume that the other person and myself think more or less in the same ways. I can assume that they have the same senses of smell, noise, rhythm and much more. As Clark (1996) say, this can be right or wrong, but it still is a starting point. Regarding right or wrong, if I belong to the Norwegian community and therefore have inside information about Norway in general, such as what is the name of the king, what is the capital and so on. I can also assume that this information is shared with other members of the Norwegian community, but I can't know this for sure. Even more uncertain is it if the question is who the prime minister was in 1998, it should be still in the Norwegian community range of information, but this shows that there are also "*grading of information*" (Clark 1996, pg 110) . In all probability, those of us that have participated in question games and watch a competitor get a question like "What is the capitol of Norway" have some time or another uttered "that is too easy…give him another one" (if the competitor is a Norwegian of course). We often have a intuitive feeling of what other members of the community know based on our own knowing (if I know it, so should he) and this often show to be true.

Personal common ground is according to Clark (1996) based on mostly joint personal experiences and divided in two sub categories. These two categories are *joint perceptual experiences* and *joint actions*. Everyone has some kind of sense impression of what goes on around themselves and if this is a shared event between two persons and the two persons are aware that they share the same event this will add to the common ground. Clark (1996) calls this a jointly salient event and they are mainly established in three ways:

1. *Gestural indications*
2. *Partner's activities*
3. *Salient perceptual event*

Jointly salient events are always interpreted by the persons experiencing them and the communal common ground already established is a prerequisite to interpret the event as common ground. Just as with joint perceptual experiences, *joint action* rest on some communal common ground, but for this action talk is the normal way of communicating. As with communal common ground that is defined by cultural communities we also define personal common ground but in this case there are the two "communities" *friends* versus *strangers* (Clark 1996). Even if two persons shares several cultural communities they are not necessarily friends, if they have never met, they are still strangers two each other and so, they do not have any personal common ground. People do not necessarily become friends at the moment they meet either, Clark (1996, pg 115) illustrates this with four degrees:

1. *Strangers: no personal common ground*
2. *Acquaintances: limited personal common ground*
3. *Friends: extensive personal common round*
4. *Intimates: extensive personal common ground, including private information*

I have now said something about what common ground is, but how do we build up common ground? Common ground can be seen as several layers of mutual information and the fact that we are aware that the information is mutual. If I wear a t-shirt with the logo of Brann football club and at the same time are singing "Byen e Bergen, laget e Brann" I send a pretty strong signal that I am a supporter of the Norwegian football club Brann. And thereby I am a member of a certain communal community. If I meet someone I have never seen before I can also assume that this person (especially if it is a Norwegian) recognizes I am a supporter of Brann. On the other hand, it is not necessary to deliberately send signals of what communities' one are a member of, just by looking at other people we can state that a person is for instance a middle aged male and in such a case it is obvious that it is mutually shared information. Again, let me stress the fact that it is only mutually shared information that is recognized as such for all the participants that can be seen as contributing to common ground. As we can understand of the following from Clark (1996):

"Sherlock Holmes may identify a man as shoemaker from the calluses on his thumb, but unless the shoemaker realized this, neither of them would take his occupation to be common ground" Clark (1996, pg 117).

In Clark (1991) he suggests that building common ground have two phases:

> *Presentation phase: A presents utterance u for B to consider. He does so on the assumption that, if B gives evidence e or stronger, he can believe that she understands what he means by u.*
>
> *Acceptance phase: B accepts utterance u by giving evidence e that she believes she understands what A means by u. She does so on the assumption that, once A registers that evidence, he will also believe that she understands.*
>
> (Pg. 130)

After this B can be in one of four states:

> *State 0: B didn't notice that A uttered any u.*
>
> *State 1: B noticed that A uttered some u (but wasn't in state 2).*
>
> *State 2: B correctly heard u (but wasn't in state 3).*
>
> *State 3: B understood what A meant by u.*
>
> (p. 130)

It is only when B is in state 3 that A can consider the utterance *u* to be common ground.

I finish this part with the following quote from Koschmann (2003) "*Common ground cannot and should not be treated as an empirical fact. It is not a thing that can be measured, either directly or indirectly.*" We cannot measure common ground on a scale, for instance a value between one and ten. But we can say something about more or less common ground, if not it would be impossible to do any research regarding building common ground. I will now continue with the closely related concept *Intersubjectivity.*

4.2.2. Intersubjectivity

In his article "On the Architecture of Intersubjectivity" Rommetveit (1979) see the conceptual framework he present as *"based upon the assumption that language is a thoroughly and genuinely social phenomenon"*. In Rommetveit (1972) also that he

understand all language communication as part of a historical, social and psychological frame. Theoretical his perspective can be placed in the socio cultural theory.

Rommetveit write that "*Communication aims at transcendence of the "private" worlds of the participants. It sets up what we might call "states of intersubjectivity""* (Rommetveit 1979) and to explore these states he draw a set of co-ordinates as viewed in Figure 4-5. He defines the three dimensions as "*the time at which the act of communication takes place, its location, and (in the case of spoken language) the identification of listener by speaker and vice versa*"(Rommetveit 1979). In the dimension I-You there are the two poles of "*potential states of intersubjectivity*" (Rommetveit 1979) and this is directional from the I, speaker toward You, listener. Rommetveit later describe the time and location to be dependent of the topic of discourse. Time could for example refer to "the last century", "this day", or "this minute". The same is the case with location, it is also dependent of the topic of discourse. It could be "Norway", "Oslo" or for instance "this cafeteria". This is up to the "I" in the communication act. In Rommetveit's (1979) own words:

> *"The speaking "I" has the privilege of pointing out the objects, events and stats of affairs to enter the field of shared attention. Which of all possible entities of an experientially shared situation will be introduced and enter the slots of THIS, HERE, and THAT, THERE of the formal skeleton of intersubjectivity is thus in principle determined by the speaker."*

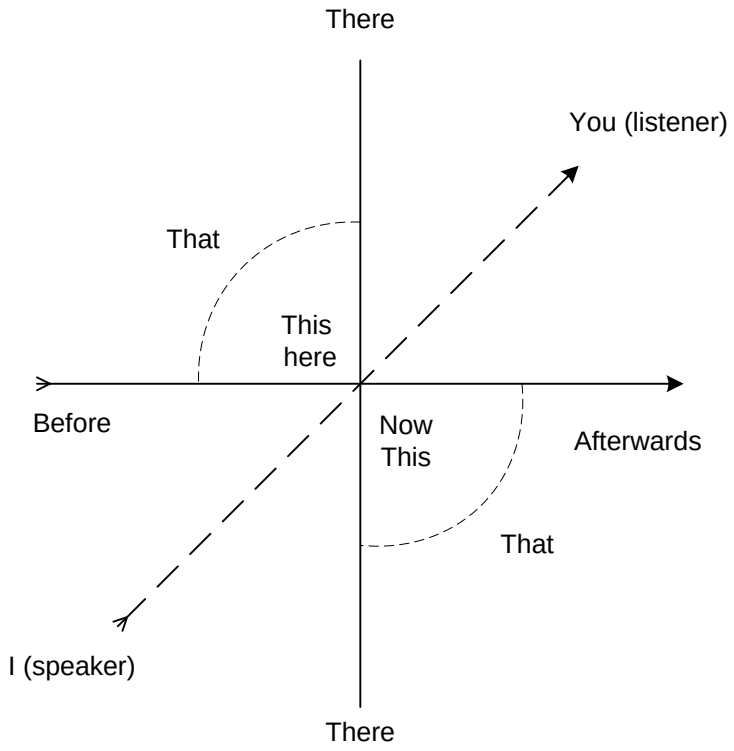

Figure 4-5 The spatial-temporal-interpersonal co-ordinates of the act of speech. (Rommetveit 1979)

There are a spontaneously contract between the "I" and "You", so that the speaker does speak in regard to the listener and the listener listens with the regard to the speaker. When I speak myself, I often catch myself thinking "*hmm does he (the listener) understand this word, should I use another one, or maybe explain the case in a totally different way*". I try to adjust my way of saying things to what I expect the listener to understand. The same is the case for a listener, who tries to decode my message with regard to what I try to communicate. "*Intersubjectivity has thus in some sense to be taken for granted in order to be achieved*" (Rommetveit 1979).

This intersubjectivity can also be seen as the speaker and the listener need to be on the same frequency to have any kind of intersubjectivity. So, how do they find the right frequency? They need some kind of "*initially shared, unquestioned or free information onto which your very first question is nested or bound.*" (Rommetveit 1979). The concept about intersubjectivity is then about that the participants need to take the other participants perspective into consideration and can be described "*as the ability participants have to take part in a dialog with another participant and at the same time overcome the differences in their worlds*" (Sjo 2005).

Using the sentence "*My spinster aunt is an infant*" (Rommetveit, 1979, pg 100) he gives examples of how to understand the sentence by which place and time you are in the coordinate system in Figure 4-5. When reading it in a literal sense it seems like a semantic anomaly, but Rommetveit shows how this sentence can be understood in different situations, it have potential meanings, based upon the spontaneously contract established and "*what is jointly and tacitly presupposed at the moment of speech*" Rommetveit (1979).

4.2.3. Common Ground vs Intersubjectivity

To compare the two concepts common ground and intersubjectivity there is a need to also mention Clark's concept of *grounding* (Clark 1996). Explaining grounding thorough would need another chapter but it can be seen as *the process that leads to common ground* and can include several ways of doing so.
Both common ground and intersubjectivity have as its basis that it is some kind of *contract between speaker and listener*. Both also say some about nesting of information, what we know now is based on earlier stages of interaction with each other and the social world. I will say these are the two most important shared features for both concepts.

Trying to find other research that compare them I have found only one, Matusov (1996) who state that "*An intersubjective epistemology is distinguished from common ground by assuming a participatory process within which beliefs are enacted (and in this sense are shared from the outset) without necessarily being mutually accepted.*"

Furthermore, not a difference between them, rather a connection, Baker states that "*grounding or 'intersubjectivity' must be situated within the ZPD if it is to lead to learning*" (Baker, Hansen *et al.* 1999) This ZPD is Vygotsky's Zone of Proximal Development (Vygotsky 1978) which was mentioned in section 2.1.2.
To the best of my knowledge and for the scope of this thesis I would say that intersubjectivity contains both common ground and grounding and for that reason treat them as one.

5. EssayCritic; System Architecture and User Interface

In this chapter I will go through the system architecture of EssayCritic, how to add a new topic to the system and what happens when a student upload an essay for feedback. Then I will explain how the students and teachers are supposed to use the system through the user interfaces.

5.1. System Architecture

Since this experiment was a co-operation between UiO, Norway and Hong Kong Baptist University, the system was installed on servers in Hong Kong and personnel from Hong Kong Baptist University handled most of the preparations prior to the experiment. The only requisite needed in Norway has been an internet browser, like Internet Explorer, Firefox or its equal. And of course access to World Wide Web. We were given the possibility to administer our own teacher and user accounts in Norway.

The architecture of the system is shown in Figure 5-1 which depicts the internal system with databases, processing units and users. Below I will explain how the system works.

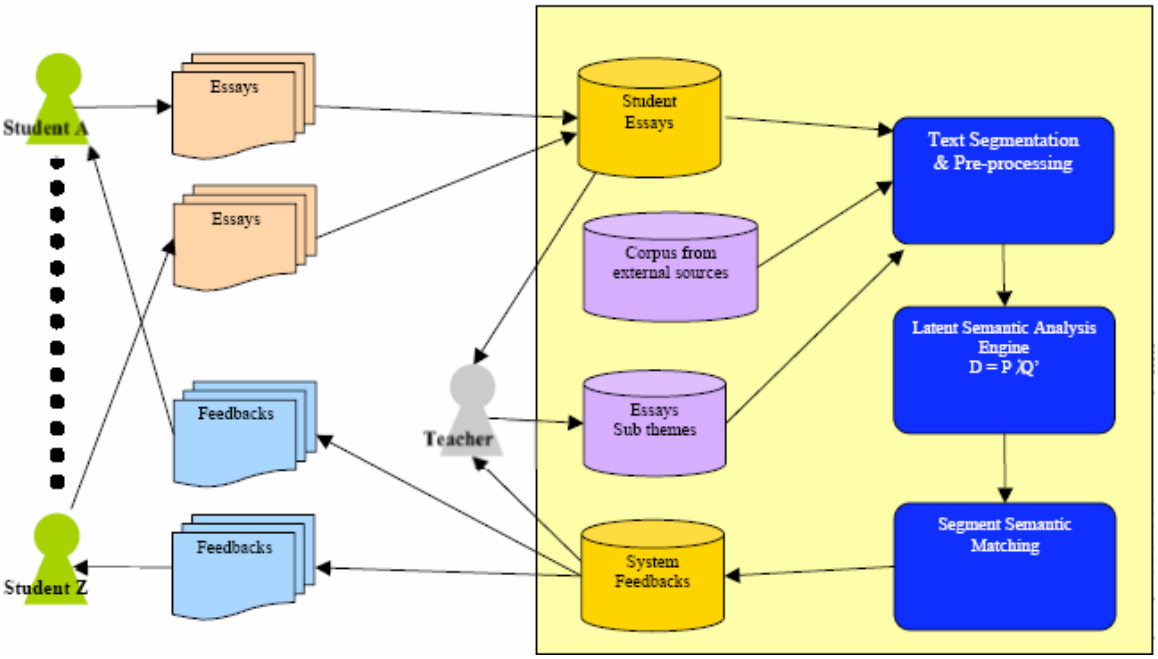

Figure 5-1 System architecture for EssayCritic (Wong, Lee et al. 2007)

As mentioned in section *4.1 Latent Semantic Analysis*, EssayCritic uses Latent Semantic Analysis (LSA) as its core element to analyze and give feedback to the students. To give LSA some data to work on we need to feed the system with input, prepare the system, prior to letting the users upload their essays. These data must be divided in topics and each topic needs to be input EssayCritic manually. This is both time and work demanding and has been done exclusively in Hong Kong. For instance our topic for the experiment in Norway was "Mobile phone impact".

To prepare a topic there are several steps needed to be done prior to giving learners access and uploading their own essays (Cheung, Mørch *et al.* 2007, ; Wong, Lee *et al.* 2007). Unfortunately I have no firsthand knowledge about how this is done, but our colleagues in Hong Kong have been kind enough to give some information.

First, a number of essays about the topic are collected from students. Note that this is not the same students as the ones doing the actually experiment and could be anyone writing an essay about the specific topic. After manual revision of the essays a number of subthemes (marked 1,2,..,n) are summarized and the sentences or key words(marked A, B, C, . . ., n) of these subthemes we collected to form a list. A very short example is shown below for the topic *School discipline*.

1. *School discipline. [1subthemes (school discipline)_16102007.doc]*
   - *A. maintain a good image for the school and the students. [s12.doc]*
   - *B. order could be kept without rules. [s17.doc]*
   - *C. maintaining the order. [s17.doc]*
   - *D. their school must be a good school. [s9.doc]*
   - .
   - .
   - .
   - *n. punishment to try to raise the school discipline. [s9.doc]*

2. *Freedom of expression. [1subthemes(schooldiscipline)_16102007.doc]*
   - *A. gives students a lot of freedom. [s10.doc]*
   - *B. encouraging them to be independent of teachers. [s10.doc]*
   - *C. hesitate to speak in public or to express their opinion. [s13.doc]*
   - .

.

.

n. Allowing free discussion in class can make both teaching and learning beneficial. [s19.doc]

.

.

.

n. Students' learning in the classroom. [1subthemes (school discipline)_16102007.doc]

A. makes the students not use their brains to think. [s1.doc]

B. not initiative and active enough. [s12.doc]

.

.

.

n. Creativity is also shown in class when the students are having activities like role play and story telling. [s13.doc]

Second, a number of words, for EssayCritic it is in the order of about 40.000, are collected to form a corpus, from internet for the LSA. Then this corpus and the list of subthemes are loaded into the databases named *Corpus from external sources* and *Essays Sub themes*. These databases are also shown in Figure 5-1.

Third, after input of some parameters (e.g. dimensions, see chapter *4.1 Latent Semantic Analysis*) the system is now ready to do pre-processing with the LSA engine. According to Wiemer-Hastings (2004) a typically number of dimensions is 300 and this is in practice also the same average as the dimensions found to give the best results for EssayCritic. When the pre-processing is done the LSA engine which is able to receive Word documents is started. It is then necessary to retune the feedback EssayCritic give to the students, this is done by uploading test cases to the system.

Fourth, it is not given that the parameters given above are the one giving the best precision and recall results. It is therefore necessary to run some test cases through the system, upload essays, and manually go through the results and maybe vary the

parameters to find the values that give the best result.

Finally the accounts for the students can be set up in the front end server and the users may start using the system.
Naturally this process is quite time consuming and work demanding, especially the first and fourth item, as mentioned, and each topic to be used need to be handled the same way. Fortunately the system is now ready for an endless number of students/classes on these topics.

The system is now ready for students to upload essays and when uploading according to Figure 5-1 the essay is first uploaded and saved at the server, then the essay is segmented into small text segments and it is run through the LSA engine. (Cheung, Mørch *et al.* 2007, ; Wong, Lee *et al.* 2007)The engine compares the segments with the corpus and gives a match if the correlations with the predetermined sub-themes are high enough. This comparison is accomplished by a mathematical algorithm that computes the cosine value of the two vectors corresponding to each other. The closer the cosine value is to 1, the closer the match is and if the match is above a certain level, they are classified in one of three categories and presented to the student as *highly related, related* or *slightly related*. Highly related is then the highest match level of the three. Since EssayCritic is set up with several sub-themes that is supposed to be in the essay it is easy to know which sub-themes are missing. Finally EssayCritic set up the feedback, saves it in a database and present it to the student. From the essay is submitted to the result is ready it takes only seconds, so it is approximately instant feedback to the students.

Since both the essay and feedback are stored in a database it is easy to make them available for further inspection and revision, one example of such use is the possibility for the teacher to see each student in his/her class, their essays and feedback. If desirable it is possible to see each submission and hopefully progression of the essay. The next section shows both the student and teacher possibilities in the user interface.

5.2. User Interfaces

EssayCritic is not equipped with a fancy, exaggerated user interface. Nevertheless, the system is easy to use and only what is needed to carry out the task is take into

consideration. I will show some of the user roles of the system and how the interface is built to support this, namely the student interface and teacher interface. A teacher can also do some administrative tasks.

EssayCritic is used technically in the exact same way both in Hong Kong and Norway, but in Norway the students worked in pairs, while in Hong Kong they were working one by one. The reason for why this was done is explained in section 3.1. This means of course that the user interfaces are the same as well. It is important to be aware of the fact EssayCritic has been developed in Hong Kong without the intention to use the system in a pair setting. The term "Student" has therefore been used in the interface to describe only one person and one type of user account. In Norway on the other hand, our experiment use the term "Student" in the system meaning one group consisting of two students. When looking at the interface it is easy to misunderstand this difference so have this in mind when looking at the figures.

5.2.1. Student Interface

The student interface is as the other interfaces built to be easy to use, there is not much a student can do, and this suite us well from a usability point of view. We did not want to spend a lot of time and effort explaining and training the students to use the system. I have removed the part of the screenshots that are unnecessary for the explanation and will try to show the interface in the same order as a student normally will experience them. First there are a standard login with username and password, and Figure 5-2, shows the first screen with a short menu on the left of the page and a status field to the middle/right. None of the users in our case study had any problems using the interface.

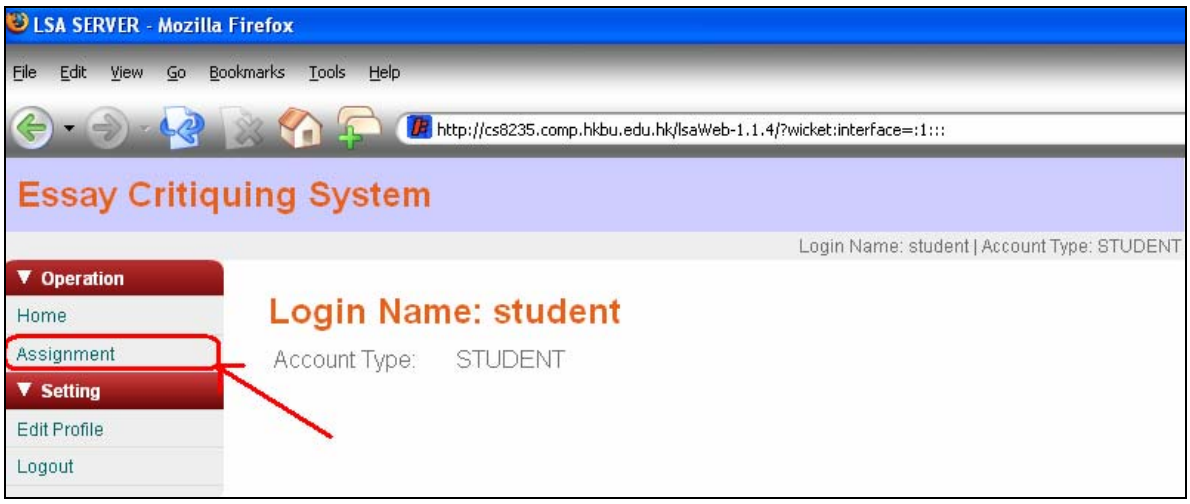

Figure 5-2 First page for the student interface

To upload an essay the students has to choose the menu item “Assignment” marked at Figure 5-2. Each assignment the student is registered for will show up in the next page, Figure 5-3, and he/she has to choose which assignment to submit to by clicking on the “Select” item marked in the figure. In this page we can also see the deadline for the assignment, and this has been set by the teacher when setting up the assignment.

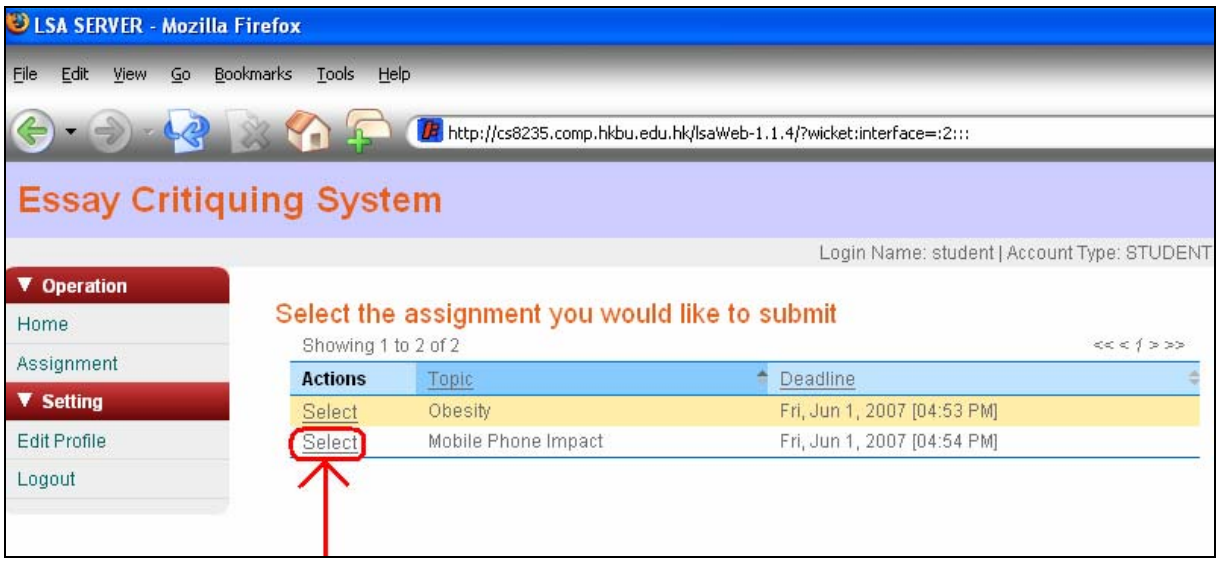

Figure 5-3 Student choose assignment

After selecting which assignment to submit the student has to browse his/her computer to find the essay, (see 1), and then click the "Get Feedback" button, (see 2), at Figure 5-4

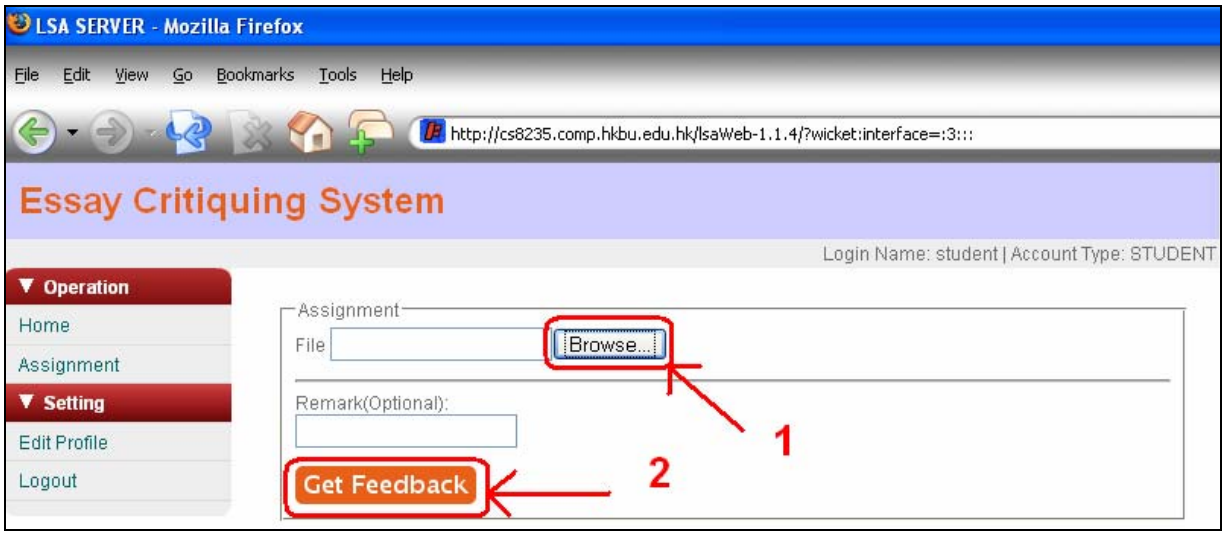

Figure 5-4 Student Get Feedback

After a few seconds showing a progress bar the first feedback page will be displayed. One example is shown in *Figure 5-5* (note that this is not an essay about Mobile Phone Impact) and it shows the essay to the right, an overview of which sub-themes

EssayCritic find to be missing for the essay (marked 1) This page is the critiquing part of EssayCritic and has been designed to give suggestions about which sub-themes the student **can** include in a revision of the essay. Students can then choose to include them, or not.

On the page there is also a button (marked 2) the user can click on to see which sub-themes EssayCritic find in the essay. This button is used to toggle between Covered sub-themes (praise) and Suggested sub-themes (critique).

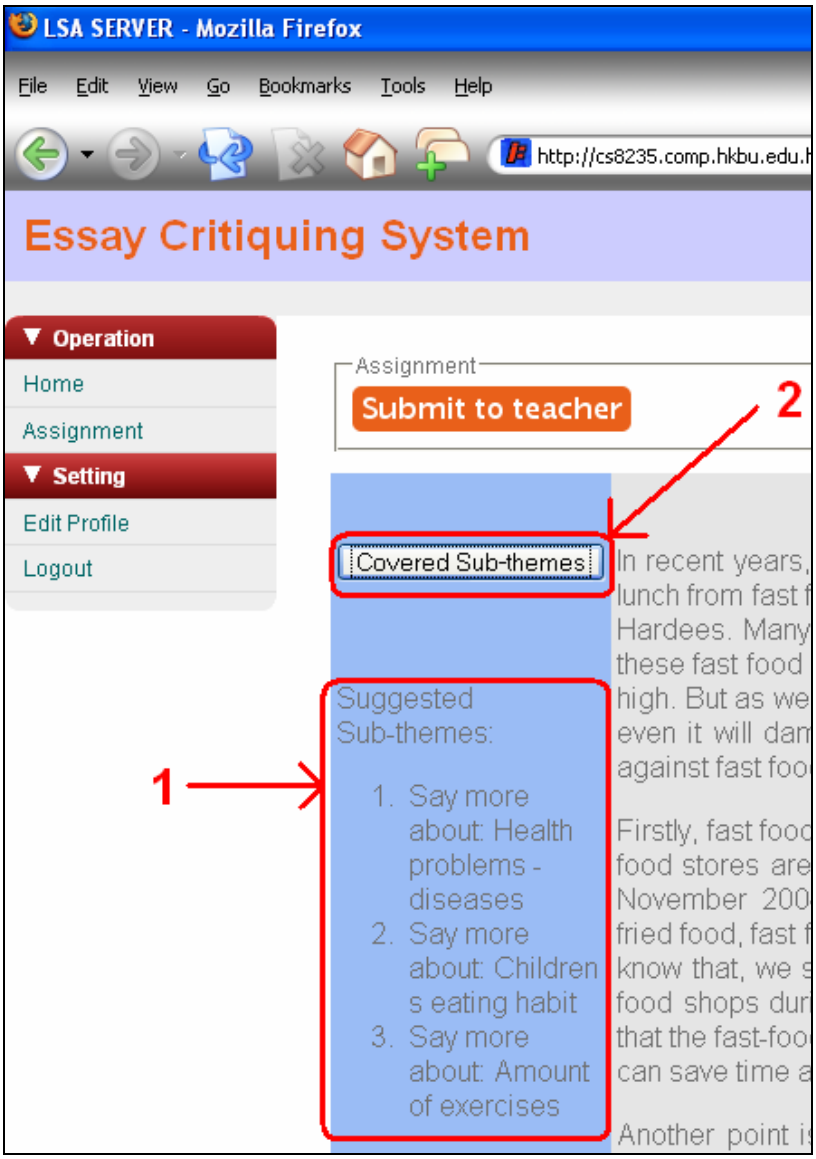

Figure 5-5 Suggested Sub-themes

If the student wants to see which sub-themes EssayCritic has marked as covered, he/she has to click on the *Covered Sub-themes* button, marked 2 in Figure 5-5. A new page shows up, still with the essay at the right and sub-themes at the left side.

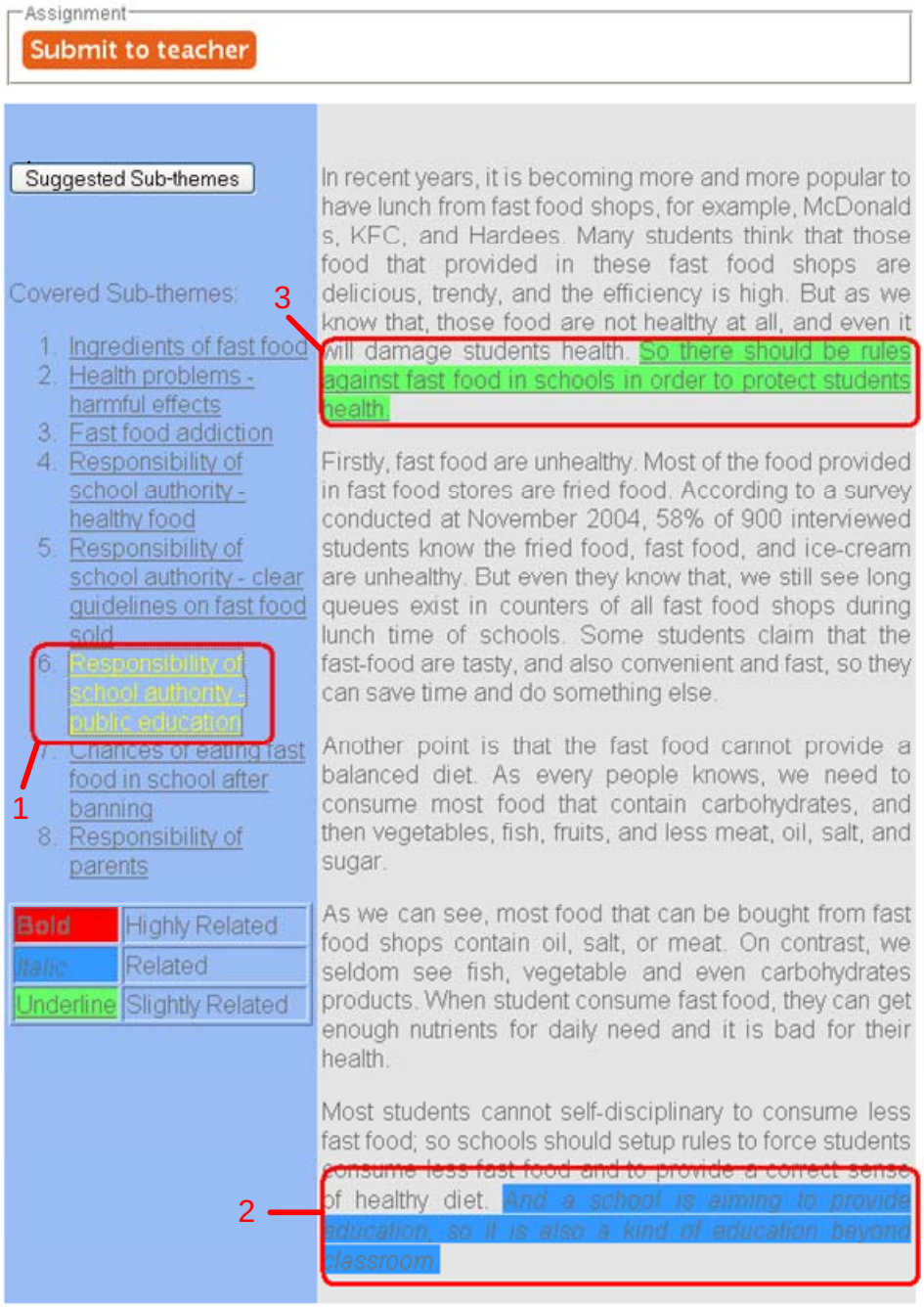

Figure 5-6 Covered Sub-themes

The difference is that at this page it is the covered sub-themes showing and the students have the possibility to check where in the text EssayCritic has marked each sub-theme covered. To see this the student has to click on the desirable sub-theme and

EssayCritic will mark the segments in one of the three categories, *highly related*, *related* or *slightly related*. See *Figure 5-6* for an example, where the sub-theme is chosen (marked 1) and we can see text marked as related (2) and slightly related (3).

This page is the praise part of EssayCritic and will for each sub-theme listed show what EssayCritic find related. It is important to know that this is not a bullet-proof result and it will not be 100% accurate all the time so the student must think independently about the feedback.

After carefully looking through the feedback, students need to revise their essays and may write a second and third version. To upload and get a new set of feedback, students need to follow the same procedure and when the essay is finished they have to press the button *Submit to teacher* for delivering the essay to the teacher. It is possible to set a max number of feedbacks and for our experiment in Norway the students was told to use the system to get feedback not more than twice.

5.2.2. Teacher and Admin Interface

Compared to the student interface that is relative simple with just a few alternatives to choose between the teacher interface offers more possibilities. Among this is administration of student accounts, including creating new accounts, view and update existing accounts and assigning students to classes and assignments. Maybe the most important use of that facility for this experiment was to view the submitted essays and the connected feedback. This is the same feedback as the student (in our case a group) got. Some of these possibilities were included in the interface as we were preparing for the experiment, because the interface was updated to meet our requests. This collaboration was irreproachable and our colleagues in Hong Kong were very helpful. In the following I will show a typically workflow for a teacher to view feedback for a student/group. Note again that the interface consistent use the term “Student”, where we at our experiment in Norway did not create student accounts, but rather group accounts. Technically it is exactly the same, but the interface has been created in Hong Kong where they created individual student accounts.

After logging on the teachers need to select which class he/she wants to take a look at. In our case there were only one class, but a teacher will often be responsible for more than one class so the interface takes this possibility into account, see *Figure 5-7*.

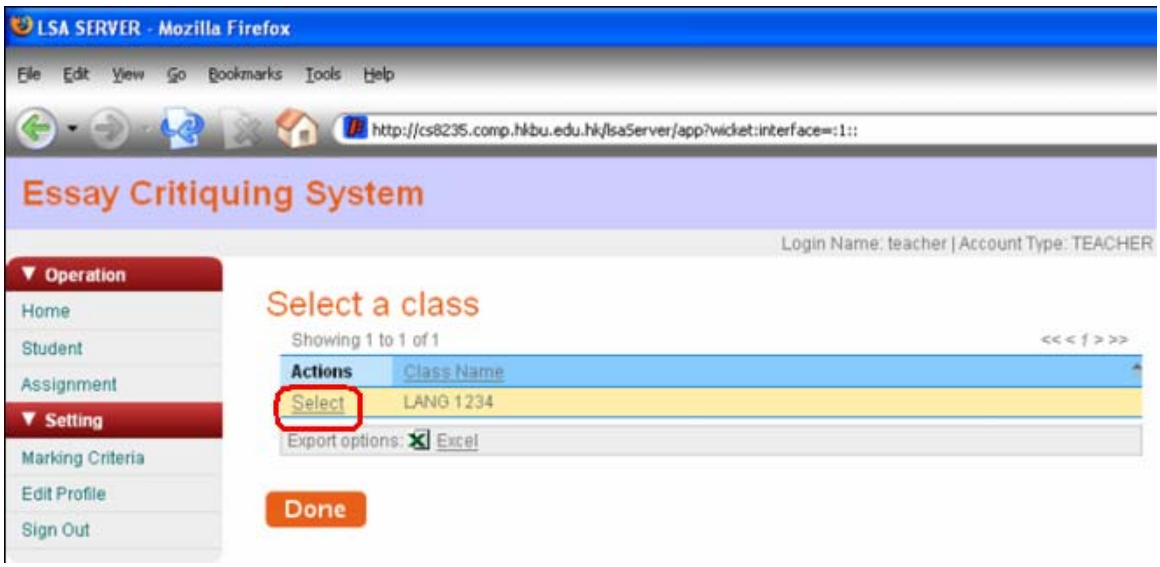

Figure 5-7 Select a class

After selecting the class of interest the next page, *Figure 5-8*, shows all the students/groups, represented by accounts, in that particular class. These screen dumps are from a test case so there is not more than one student account to choose from. In a real setting each student account in the class will be listed.

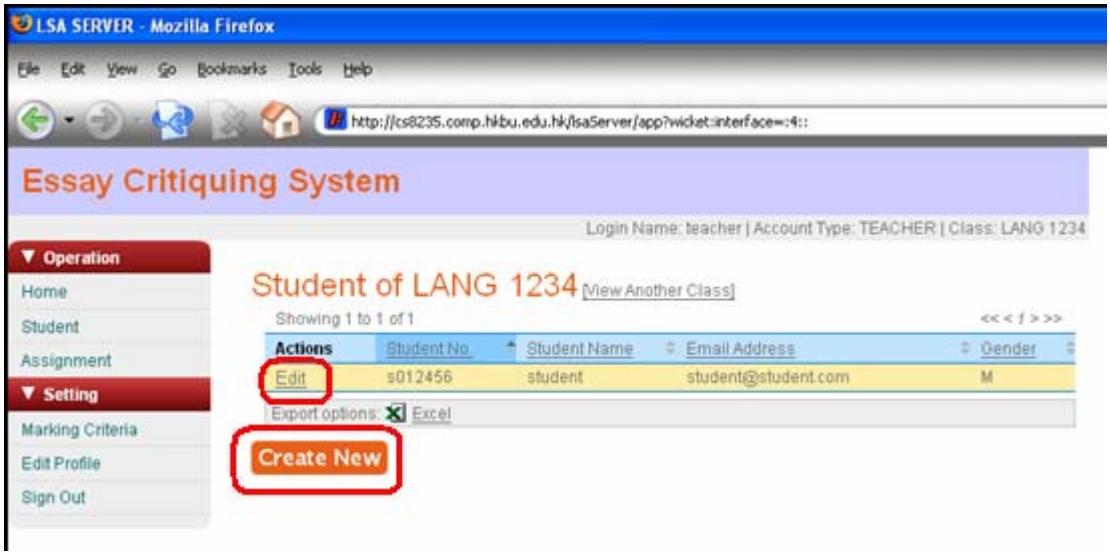

Figure 5-8 List of students

If required the teacher can now create new student accounts or just choose to edit information about the student such as email address, password and so on. To see the essay and feedback for a student the teacher first need to click on the “Edit” link marked in the figure to choose a student. Information about the student account then opens, *Figure 5-9*,

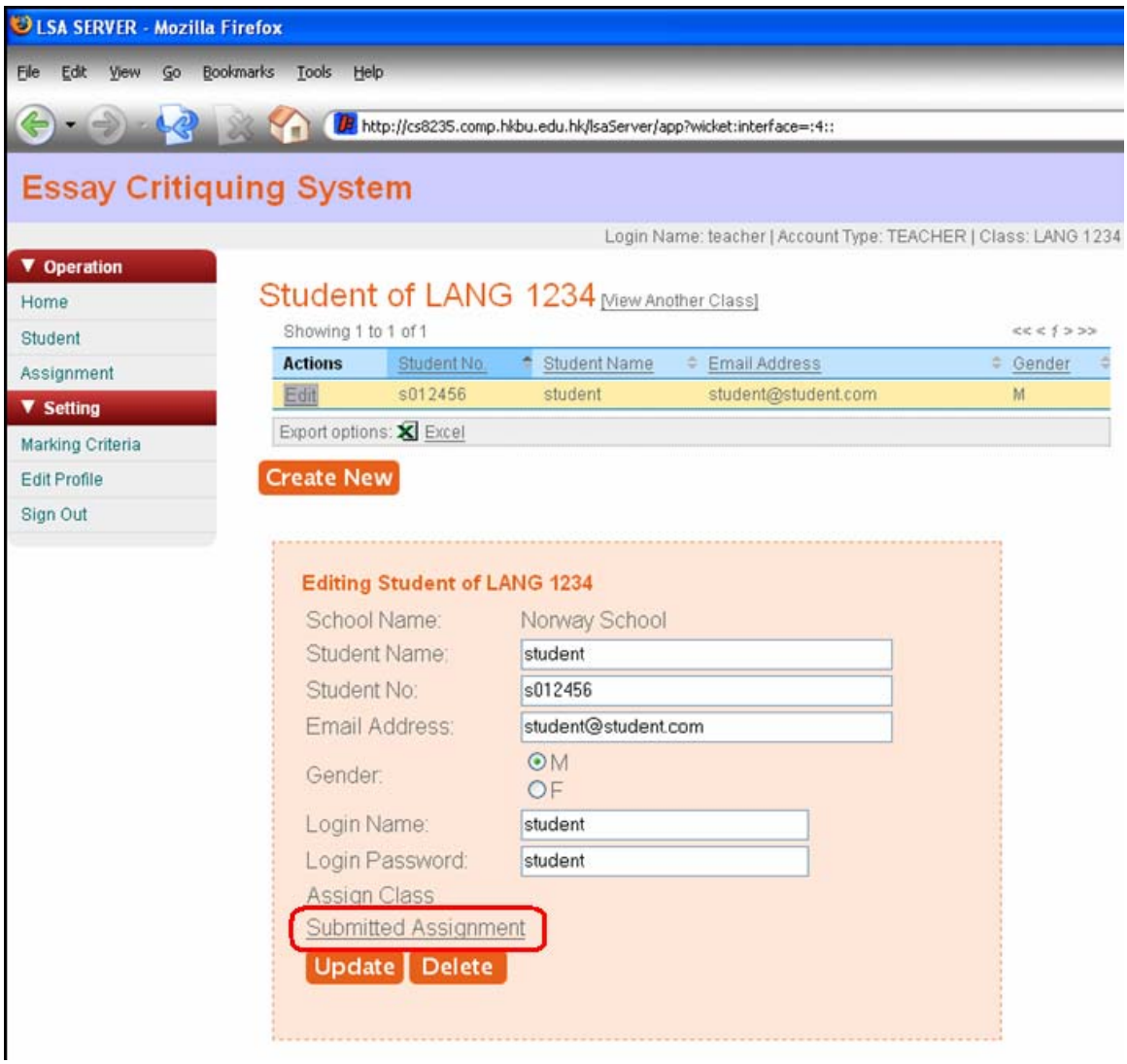

Figure 5-9 Information student account

and the teacher need to choose the link "Submitted Assignment" to open the next page, *Figure 5-10*, where all the submitted essays for the student are listed.

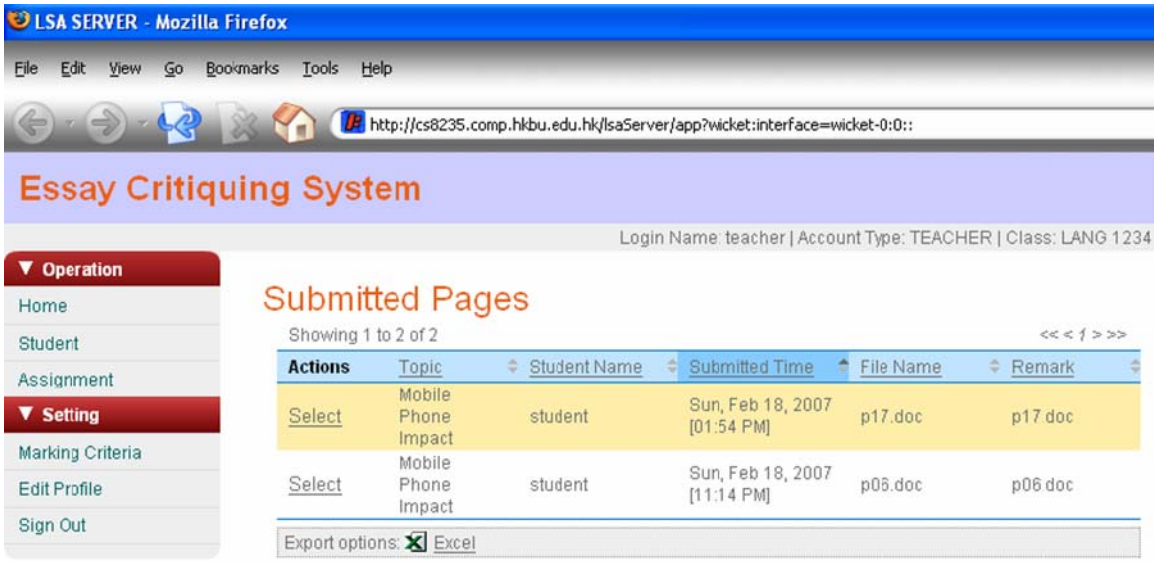

Figure 5-10 Submitted essays

When selecting one of the submissions, the essay and the same feedback as the student got is shown, one example is shown in *Figure 5-11*. If the teacher wants to look at which sub-themes EssayCritic has marked as covered he/she has to click on the "Covered Sub-themes" button. Again the same information as viewed in the student interface is shown. If a teacher want to compare different versions of an essay it is needed to compare this manually. Either by downloading the submissed files and run some kind of comparison (could be done by software) or simply by choosing the different submissions in EssayCritic and compare manually.

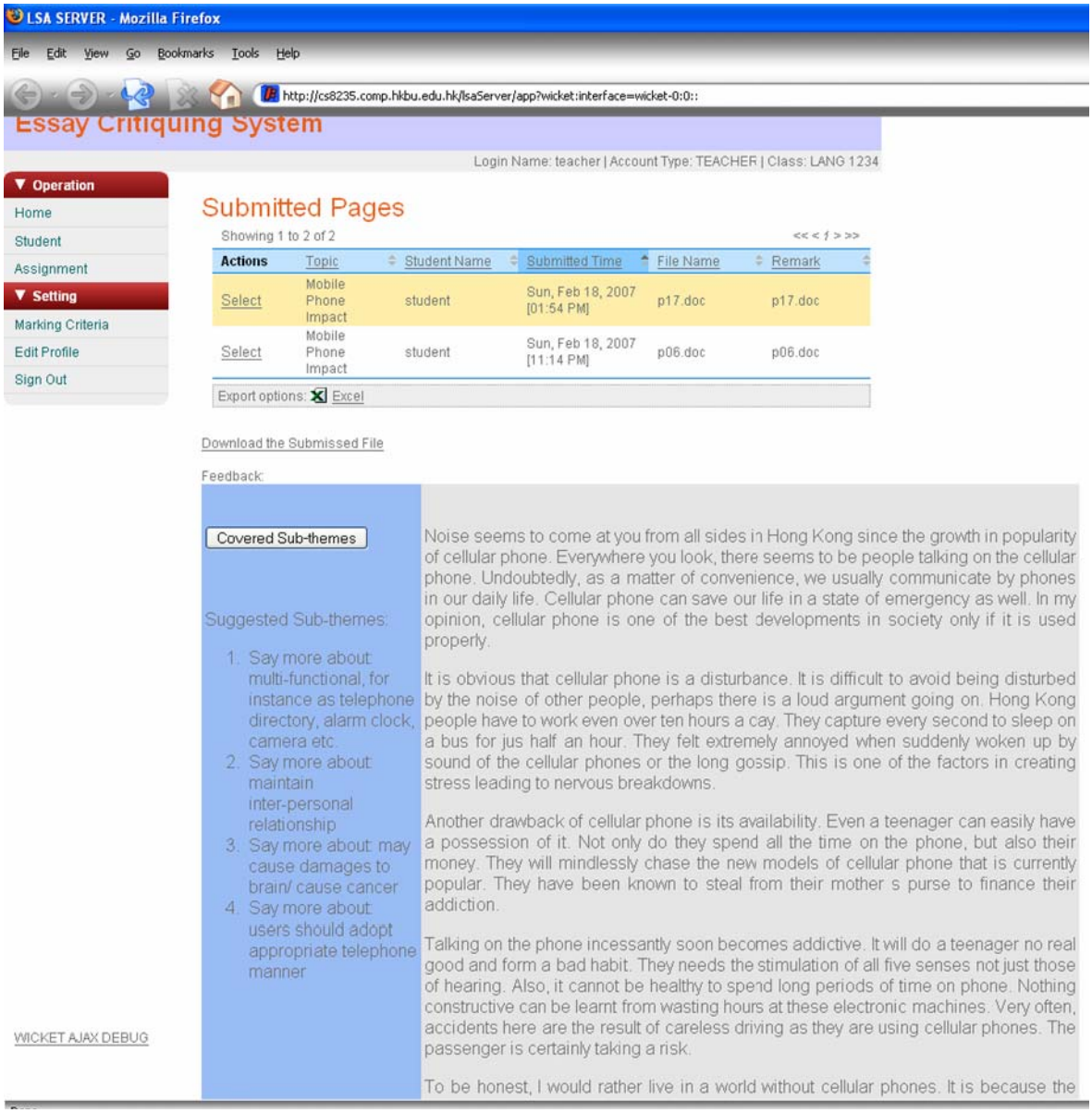

Figure 5-11 Essay and feedback for teacher revision

I have now shown the most important screen images and steps to use EssayCritic. The interfaces are definitively not final and are subject to constant revision and improvements, many of them as a result of our study in Norway during spring 2007. Even before this master thesis is finished, the interfaces might have changed further, based on user testing and feedback from case studies like ours. But the basics will most likely be the same in any case.

6. Analysis

In this chapter I will analyze the data and discuss my findings related to the theory of Common Ground and Intersubjectivity. For this I will make use of interaction analysis of the recorded video with the focus group supplemented with other data material collected using the methods observation, interviews, text analysis and questionnaire. These methods are all explained in chapter 3.

When analyzing the data my research questions have been important guidelines for me to know what to look for in the ”sea of data”. Otherwise I wouldn’t know what to focus on. As stated in chapter 2 my research questions are:

- How does EssayCritic afford and constrain collaboration in an essay writing context?
- How can EssayCritic improve essay writing?
- To what extent can EssayCritic motivate students to write good essays?

6.1. Analyzing data

I will now present excerpts from the videotape and other data collected. The full transcriptions are reproduced as Appendix D. Since this experiment has been performed in Norway, the students are talking in Norwegian, but the essay and feedback is written in English. The excerpts are translated into English which is signified by presenting the translated text in italic to show what was originally uttered in Norwegian. For any step or process the data go through there are the chance of losing information. Therefore, in Appendix D the text is not translated to preserve as much of the details in the case as possible.

Further, the two students in the focus group are not only two students who just happen to be paired up for this experiment. The students chose themselves who they wanted to work with, and the two girls in our focus group were old friends, living in the same little municipality outside the town the school is located within. This means that they share a vast communal common ground and personal common ground as defined by Clark (1996). All the students who took part in the experiment are roughly living in the same geographical area, but we cannot assume they are all close friends or next-

door neighbors. Therefore communal common ground and personal common ground are not as dominant in the other groups, but still considerable.

Excerpt 1

At this point the students have just got their first feedback from EssayCritic. They are looking at the monitor and both are reading the feedback. Figure 6-1 shows a section of the screen dump from EssayCritic. In both excerpt 1 and excerpt 2 the students are referring to this feedback. In excerpt 1 the students discuss issues related to the upper of the two markers and in excerpt 2 the lower.

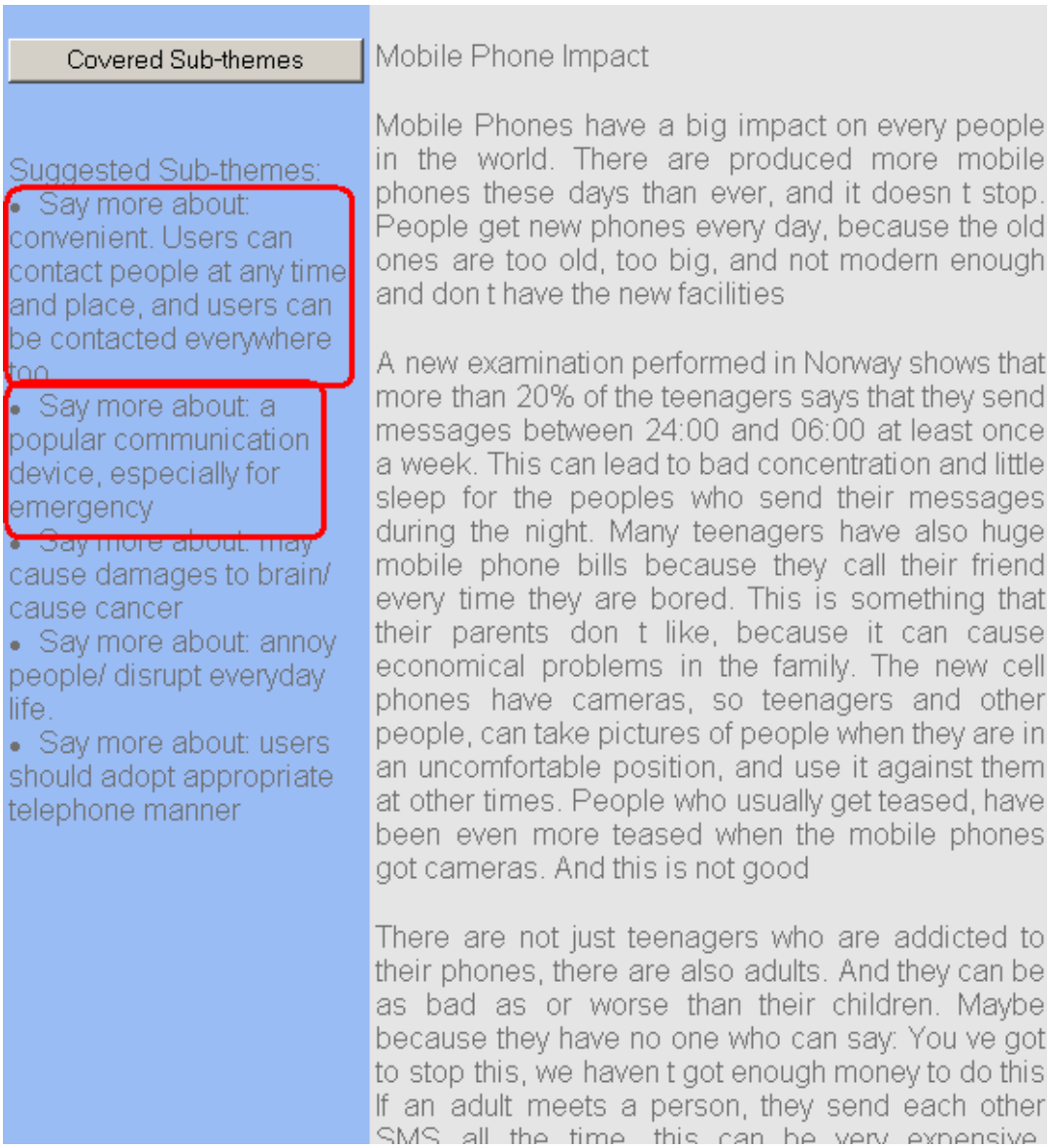

Figure 6-1 Feedback, suggested sub-themes

For the excerpt, text in italic is originally in Norwegian, but has been translated by me.

Time Code	**Who**	**Speech**	**Body language**	**Comments**
5:05	Betty	ok..... Say more about .. convention..... people at any time and place and user can be contacted		Shifts to EssayCritic, read feedback
5:15	Betty	*Umhm, didn't we say something about that already?*		Shifts to Word/essay
5:16	Mary	*Yes, we did ...*		
5:18	Betty	*..Ok, we might write some more about it'...*		
5:18	Mary	*...sure we wrote about it, just didn't used the right words... yes?...*		
5:21	Betty	*Hmmmm, where did we write about it....?....*		
5:28	Betty	*Here!* (mumbling/reading from the essay)		
5:31	Betty	For example the world gets smaller…		Reads from the essay
5:33	Mary	*Yes,.... ehhmm.... we could write something like ... wherever people are .. they can be reached*		
5:43	Betty	*Mhhmm...*	Typing	

In this excerpt Betty starts by reading the feedback from EssayCritic and realized that they had already written about one of the sub-themes EssayCritic suggests to say more about. At 5:15 she asks the question "*Didn't we say something about that already*" and by this she take on the role "I, the speaker" according to Rommetveit(1979), (see also Figure 4-5). The word "that" refers back to her last utterance "*convention…. people at any time and place and user can be contacted*". Betty assumes that Mary intuitively understands what she means by "that". Mary has the role of "You, the listener"

(Rommetveit 1979), she decodes "that" to find its meaning and answers back with "*Yes, we did*" signaling that she indeed understands what Betty means. They are then in a "state of intersubjectivity," and the place and time as described in the system of co-ordinates by Rommetveit (1979) (also shown in Figure 4-5) is mutually set by both participants. In the following utterances the students build upon this shared state of intersubjectivity and base what they say on what has already been established.

In sum, excerpt 1 shows the two students have read the feedback from EssayCritic and as a result of this discuss and improve upon one of the sub-themes in their essay by adding new information. The two versions of their essay uploaded to EssayCritic shows an incremental improvement.

Excerpt 2

Another example when the students use the critiquing part of EssayCritic.

Time code	**Who**	**Speech**	**Body language**	**Comments**
6:36	Betty	Say more about up ....communication device especially for emergency …		
6:47	Mary	*There we go..*	Leans a bit closer to the monitor	
6:47	Betty	*ok… . that you can call a such 113 thing*	Betty waves "explanatory" or "inviting" with her arm	
6:51	Mary	*Or 911 or 113*	Glimpse toward Betty	
6:53	Betty	*Yes*		
6:54	Mary	*Or 102 or ....*	Mary drinks from a bottle	
6:55	Betty	*with no money...*		
6:55	Mary	Mhm	Smiling/ laughing	
6:56	Betty	*And reception..*		
6:57	Mary	Mhm		

In this excerpt we can see signs of both already established communal common ground (Clark 1996) and the making of new communal common ground regarding this task. First, when Betty at 6:47 says "*call such a 113 thing*" she understood the feedback given and make use of what she assume is common ground, the Norwegian

emergency number for ambulance, 113. It seems she is searching for an explanation, maybe just the words “emergency number”. At the same time she invites Mary to give feedback if common ground is reached, this is what Clark (1991) refers to as the *presentation phase*. At the presentation phase of building common ground Betty present an utterance *u* and expect an evidence *e* from Mary to assume common ground is reached (Clark and Brennan 1991). Mary responds not only with a “yes” or “mhm.” which could be a signal of understanding, but is a poor evidence *e* in the acceptance phase (Clark and Brennan 1991). Instead she continues using another emergency number, 911, which can be considered a strong evidence of common ground. “911” is probably the most frequently used emergency number in the world (and often used in American movies and TV productions). At 6:51 Mary is clearly in state 3 of grounding (Clark and Brennan 1991, pg:130). Mary also initiates a new presentation phase by this utterance, and Betty confirm, acceptance, but now with just a “*Yes*” to let Mary know she has understood. We can conclude from this they have reached a common ground about the “thing” emergency number, even if neither of them has uttered those words. Nevertheless they understand each other and can assume the other shares this as well. Mary follows with another number, 102, which is not an emergency number (at least not in Norway). Even if the number is wrong Betty does not correct her. Why this is the case is difficult to speculate about, but it could be because the actual number is not important — it is how it is used that is the topic of conversation. Betty adds more information to the common ground by the two expressions “*with no money...*” and “*And reception*..” while Mary acknowledges with the non-verbal utterance “*Mhm*”. This is another ”round” of building the common ground.

In sum, excerpt 2 shows that the two students have read the feedback from EssayCritic and got ideas about what they can write about. They discuss what the feedback means, and by building common ground around this they have a shared understanding of what is meant by the feedback and what they can write about on this basis.

Altogether, the first two excerpts show that the students have read and discussed two of the subthemes suggested by EssayCritic. This can be further supported by questionnaire data. In the questionnaire the students were asked how many of the subthemes suggested by EssayCritic they actually used. Overall, they used between one and four subthemes. Only one of the students did not use any of the suggested subthemes, whereas three students used more than four (see Figure 6-2). It should be

noted that the questionnaire was not answered by all 26 students, and some didn't answer all the questions. This could be the reason there is not an even number, which it should have been considered they worked in pairs.

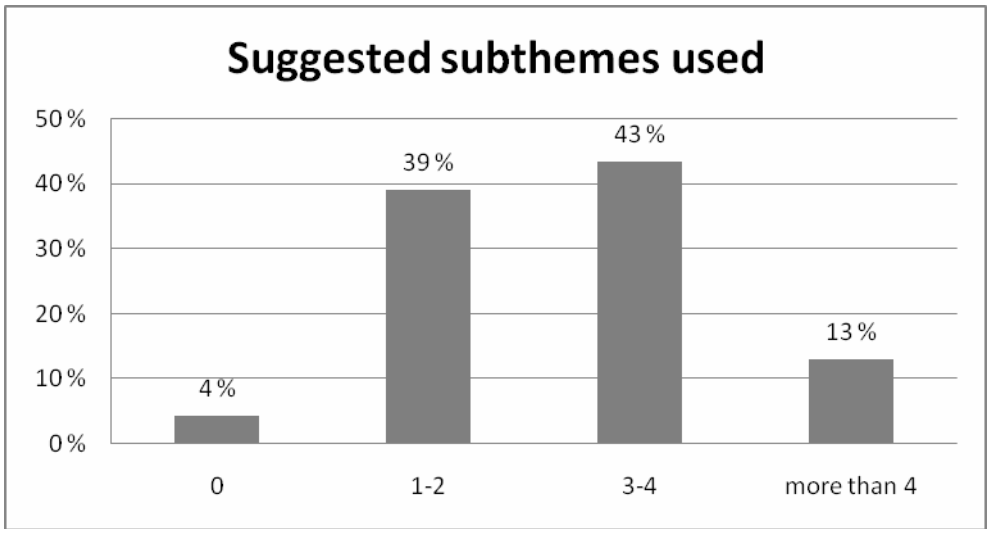

Figure 6-2 Suggested subthemes used (N=23)

Both at the first information meeting and at the group discussion at the end of the experiment 2-3 (high achieving) students out of 26 believed the essays would be very similar if everyone got the same advice about which sub-themes to write about. And that this would prevent creativity. The same pattern also showed in the experiment conducted in Hong Kong. This was one of my questions to the teacher during the interview with her. According to her the essays were indeed not similar. Although the students shared many of the same sub themes, they differed in how they went about integrating them into their essays.

"The essays are altogether not similar, so that has not been a problem."

Quote from interview with the teacher (22. April 2007).

In the questionnaire the students were also asked if they thought the suggested subthemes were useful, and to this question six students answered "very useful" and seventeen answered "useful". No one answered "unuseful" or "very unuseful", not even the ones that didn't use any of the suggested subthemes See Figure 6-3.

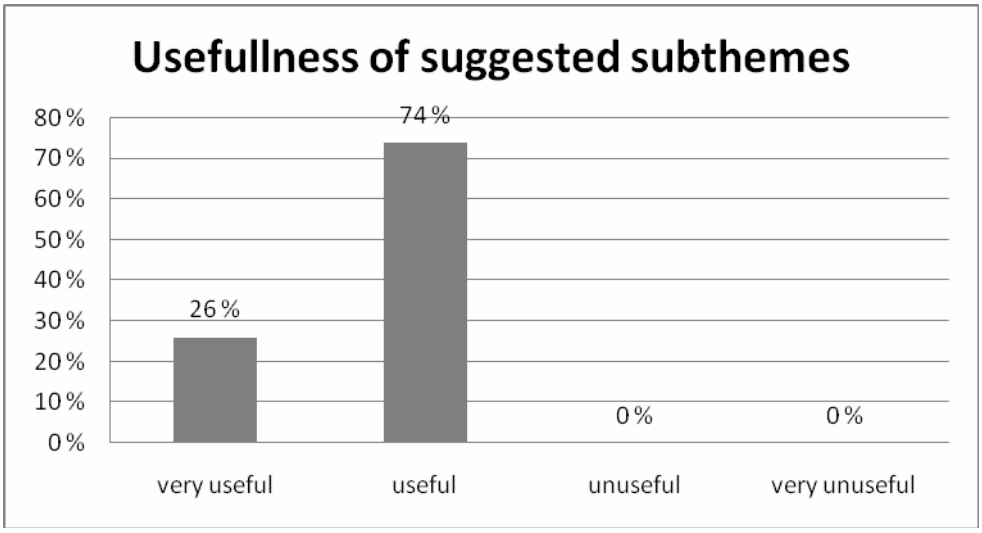

Figure 6-3 Usefullness of suggested subthemes (N=23)

In the interview with the teacher she also mentioned that EssayCritic was especially helpful for the low achieving students because they that often got writing block. They didn't manage to find anything to write about after the initial trial and any keywords to stimulate them are helpful. In her own words:

> "*Especially the low achieving students find that it helped a lot in case of writing block. [……] It helped a lot in the process of writing"*
>
> Quote from interview with the teacher (22. April 2007)

To the question if the teacher should continue to adopt EssayCritic for teaching essay writing in the future all but one student answered confirmatively yes. One of these students' put it in the following way:

> "*Because it is nice if you get a writing block, and it is nice to get a feedback prior to delivery to the teacher"*
>
> Quote from the questionnaire (Student No.6)

This finding corresponds to findings reported by Stepp-Greany (2002), who also reported beneficial effect especially for low achieving students. The teacher in our experiment estimated that the students in average raised their essay scores by one

grade from version one (prior to using EssayCritic) to version two after getting feedback from EssayCritic.

Excerpt 3

At this point the students look at the monitor and have for the first time switched to the screen where EssayCritic presents the covered sub-themes of their essay, which is the praising part of EssayCritic. They are both looking at the monitor and read the feedback out loud. Figure 6-4 shows a section of the screen dump. To get the whole feedback displayed in one page, I have cut the middle section of the essay (marked with "******"). All feedback from EssayCritic at this stage is presented. The figure shows that the students have clicked on the second link at the left side, "*maintain inter-personal relationship*". EssayCritic then highlight two sentences in their essay, which shows the sentences relating to the chosen covered sub-theme. The first one is marked Slightly Related and the next one is marked Related. I have highlighted this with red rectangles for easy comparison in the discussion below.

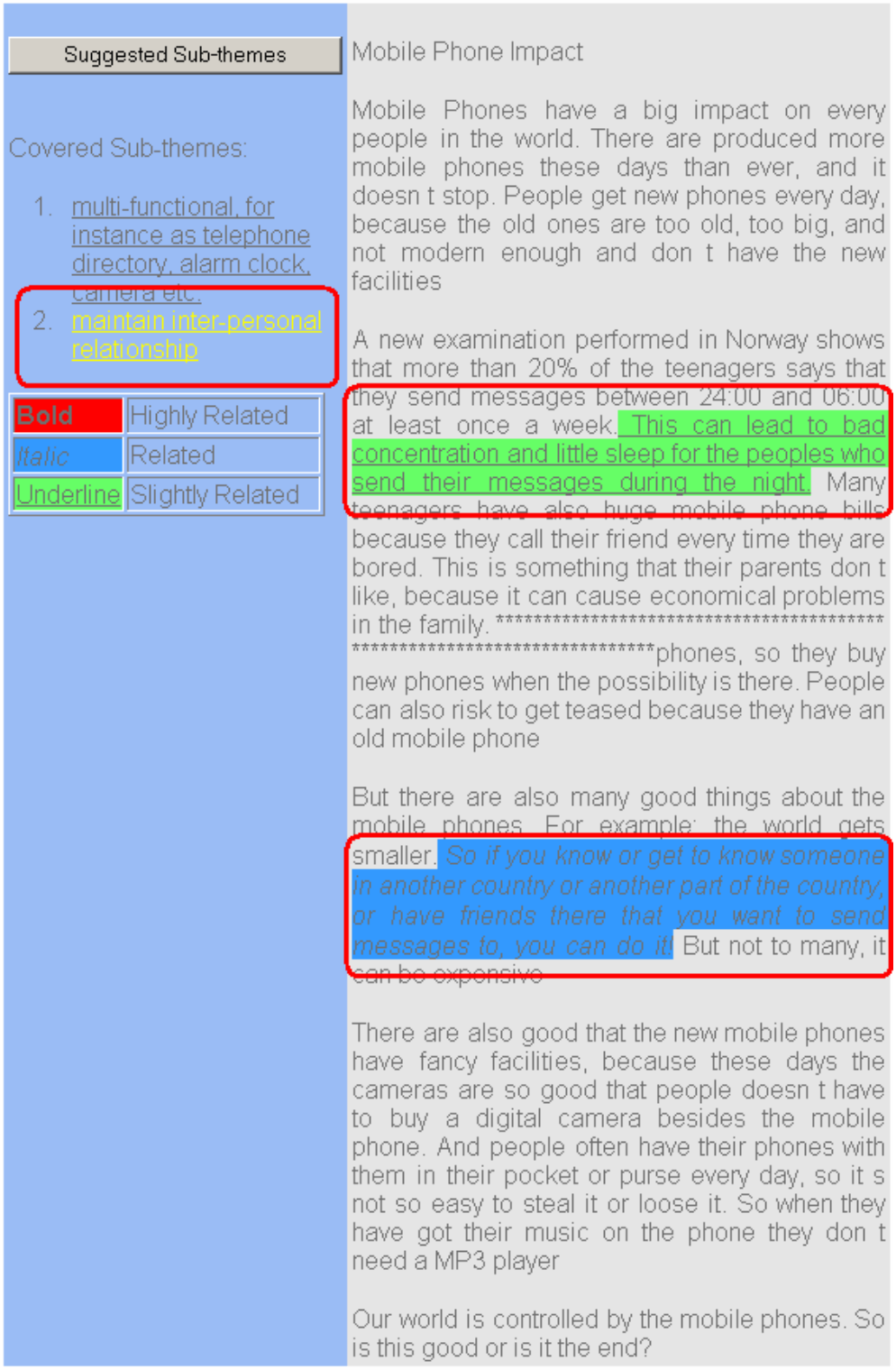

Figure 6-4 Feedback, covered sub-themes

Time Code	**Who**	**Speech**	**Body language**	**Comments**
7:50	Betty	Maintain inter personal relationship... *”mumbling”... but they haven’t said anything about bullying , we have ...*	Scrolling down the list of feedback	Finds the marked text
8:00	Mary	*Yes, and...* mhm		
8:02	Betty	*But.... that is just the way we look at it*	Looks at each other	
8:03	Mary	*Yes, that’s true.... Maybe we could just try to improve the whole thing at a general level, because...*		
8:07	Betty	*Yes.*		
8:08	Mary	*Should we just write down.. okay, eehhm*		

In this excerpt Betty reads the praise while she scrolls down the list to get a glimpse of all the feedback. She then makes a comment to Mary saying that EssayCritic does not give feedback about the subtheme bullying, which their essay contains. This is the presentation phase for building common ground where Betty present an utterance *u* and expect an evidence *e* from Mary to reach common ground. Mary then gives the evidence *e* with her answer “yes, and…mhm”. She is then in state 3, she understood what Betty meant by her utterance, (Clark and Brennan 1991, pg:130) and both Betty and Mary can assume that this is common ground. After Betty receives the evidence and common ground is acknowledged she continues expanding common ground with the following utterance at 8:02, *“but… that is just the way we look at it”* which is a new presentation phase with a new acceptance phase at 8:03 by Mary’s “*Yes that’s true*”.

In sum, this excerpt shows the use of the covered subthemes part of EssayCritic. When comparing this to the questionnaire the students were asked to answer how useful they thought the praising part of EssayCritic was. The results are shown in Figure 6-5. It shows predominance of “useful”. In addition one respondent answered “very useful”, another “unuseful”, and two answered “very unuseful”.

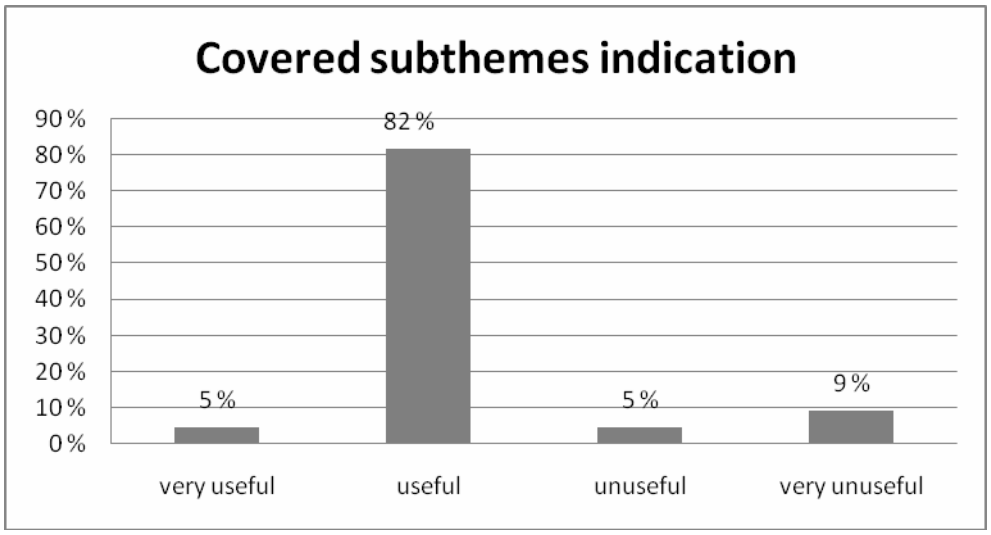

Figure 6-5 Covered subthemes indication (N=22)

With a small number of respondents there is not enough data to make general conclusions, but the tendency seems to be that the students considered the suggested subthemes part of EssayCritic to be slightly more useful than the covered subthemes part.

A reason for this can be explained as follows. At the interview with the teacher she said the system missed some of the subthemes the students did include in their essays. There were especially two subthemes mentioned in the interview, and can be categorized as “bullying” and “economy”. In line 7:50 in excerpt 3 bullying was indeed the subject of discussion:

”mumbling”... but they haven’t said anything about bullying, we have ...

Whether this is based on cultural differences between Hong Kong and Norway (regarding choice of subthemes to include) or the corpus collected in Hong Kong does not contain this subthemes just accidentally is not clear. It is beyond the scope of this thesis to speculate further on this, but it is an interesting topic for further research.

In sum, the praising part of EssayCritic was little emphasized both during the group interview and during the interview with the teacher. Finally, none of the open ended questions at the questionnaire addressed it.

Overall, we see a pattern in the collaboration of the two students grouping that they organized themselves so that one of them (Betty) was the “driver” This is supported by the fact she was the only one using the keyboard and mouse during the whole session. She alternates between different programs, such as Microsoft Word for writing, EssayCritic for feedback, and Internet resources like Google and online dictionaries for anchoring discussions. Mary acted like a wing man, i.e. she was the “navigator” and suggested what to write about and comment on duting Betty’s writing, spelling and punctuation. The two students have only occasional eye contact during the session. Instead they used the monitor as indexial referent, pointing at the monitor either with a hand/finger movement, nodding with their heads, or just looking at it. Because of the video equipment used, it was not possible to get a clear view of the movement of the mouse on the monitor during analysis, but the information we captured is still significant for understanding and supporting the role of intersubjective and grounding actions that occurred during the session. Of course it was impossible for us to see the cursor on the video but in all likelihood both of the students could see it and could have used it as a marker for “point of interest”. Only rarely they actually looked at each other, and this was normally just a glimpse for brief acknowledgement or surprise. Speech was characterized by incomplete sentences supplemented with body language like described above. This has also been found in another study (DoCTA NSS) that also analyzed aspects of grounding (Wasson and Mørch 2000, ; Fugelli 2004). In that study “incomplete language” was identified as a “collaboration pattern” (Wasson and Mørch 2000). From our study we can say that “driver/navigator” is a candidate for another collaboration pattern, based on data from the focus group we followed.

In this study the students worked in pairs and besides the videotaping and interaction analysis the other methods for data collection was important to get the students own view of this way of working. A majority of the respondents were positive towards working in pairs as shown in Figure 6-6. This figure is based on the analyze of one open ended question at the questionnaire. It shows that 75% think working in pair was helpful and only 4% (one student) answered negative.

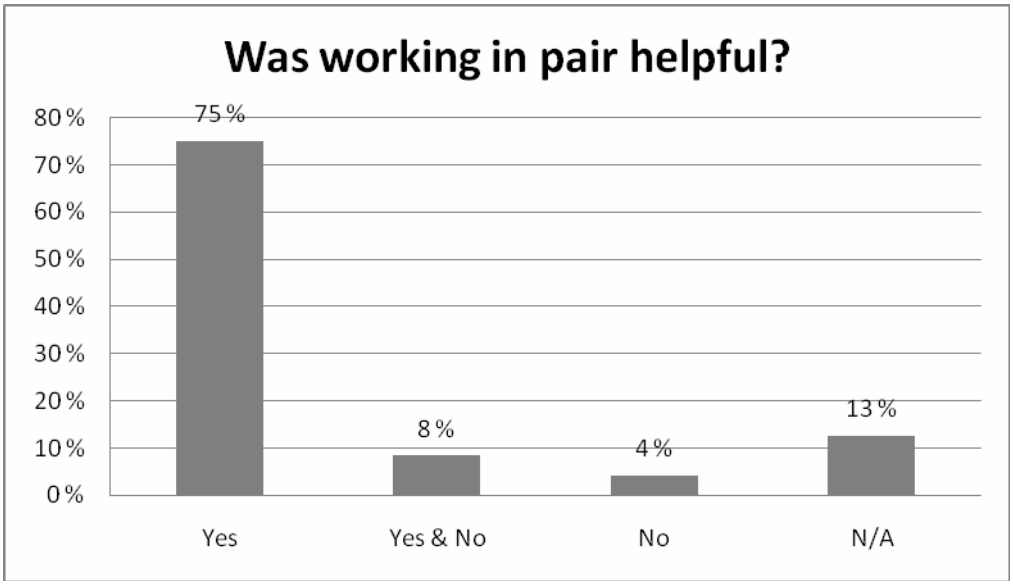

Figure 6-6 Working in pair helpful? (N=24)

One of the students commented that working in pairs has some possible drawback as well, but in this experiment he was happy about it:

> *"It depends on who you are working with, of course. I was lucky to be working with a skilled classmate this time, so yes; it helped me a lot. For example, we had different ideas we suggested, and noticed things about the system that I probably couldn't have found myself."*
>
> Quote from the questionnaire (Student No. 19)

The question of how to best organize students in groups for maximum benefit is an important but challenging question (multiple answers). Should low achieving students be grouped with high achieving students, or should a group consist of participants with approximately the same level of proficiency? Is personality more important than skill? Even if these are important questions they are unfortunately to broad, and therefore considered outside the scope of this thesis. I will therefore leave it at that and suggest this as an area for further work of other master students.

As mentioned above, most of the students were positive about working in pairs. Based on the answers from the students about this at least two common denominators emerged. These two can be categorized as "*different ideas*" and "*discussion,*" and can

be considered important for every group setting. Students have normally different ideas about a topic, and to elaborate this with multiple points of view (different ideas), and to follow this up with identifying the pros and cons of the various ideas (discussion). This gives a broader basis for making a decision about what to do next, or in this case, what to write about in the essay.

Motivation is one key word for my experiment, how can EssayCritic motivate students to write good essays? One of the students gave some clue about this in her answer regarding if working in pairs was helpful:

> *"It was nice to work together. You get more ideas and different views to work with. We helped each other to understand things and improve our sentence structure. We can discuss and choose the most important themes. Besides it is more fun to do it this way, and you get more motivated."*
>
> Quote from the questionnaire (Student No. 3)

She states that working in pairs "it is more fun and you get more motivated". Clearly, compared to the previous quote, it depends who your opponent is, but if your opponent is a "good choice" it will at least motivate this student.

Thus far I have emphasized the positive results of using EssayCritic, but at the interview with the teacher she mentioned one significant negative result, compared to earlier essays the students had written. At the first information meeting with the students the organization (structure) of an essay was stressed, including telling the students that a well written essay consists of head, body, and tail. Very few of the groups wrote an ending (tail) to their essays, they just stopped when they had reached a limit. It seems like many of the students were too absorbed in the task of "satisfying" EssayCritic and to obtain as much praise as possible, and when this was done, they considered it finished. This finding was also reported in another study, State the Essence, as described in section 2.1.2. As with State the Essence this negative result might fade away if EssayCritic was used more often or repeatedly in a class.

6.2. Limitations of the study

In experiments like mine there will always be some limitations and biases that influence the results in one way or the other. I will briefly address some of them here.

One factor that might influence the result in a negative way is the fact that the students were told prior to the writing assignment given by the teacher that there would be no grading of their essays. In other words neither the first version nor the second/final version of their essays had any impact on their grade in the course. This can have influenced the results in that the students didn't bother to do a thorough enough effort, especially on the first version. Prior to delivering the second version they were supposed to work between one and one and a half hour in the classroom improving their essays, and some might have taken this as a time to improve their essay (you mean another essay?) which they knew was not good in the first place.

Another factor that could have influenced the result in a positive way is that the students were enthusiastic about the project. This was a chance for them to do something other than the ordinary "boring" school work. This might have biased the results in our favor and can have triggered a higher motivation for using EssayCritic than if the students had used the system for some time already. Also the fact they were part of a research project, i.e. their contribution was appreciated by us could lead to the so called Hawthorne effect (Parsons 1974). This could mean that they answered more positive than they would have done otherwise.

7. Summary of Findings and Discussion

In this chapter I will give a summary of the findings from the analysis in chapter 6. I will also compare my study with a similar study performed in Hong Kong.

7.1. Summary of Findings

In this section I will give a short summary of the analysis chapter and mention the most important findings.

Some of the high-achieving students worried that essays would become more or less identical, and as a result individual creativity would suffer. According to the teacher this was not the case at all. Furthermore and more importantly, EssayCritic had a positive effect on the low-achieving students. It helped them considerable by suggesting subthemes they could write about. Many of them struggled before they used the Critic. They would run out of ideas and get "writing block." But the essays where still very different even if many of the subthemes they contained were identical. According to the teacher the students would in average have achieved one grade higher score when using EssayCritic compared to not using EssayCritic, if their essays were evaluated in the normal way. Other research also supports this finding, which provides evidence of techniques to motivate students to achieve better as a result of using technology in education (Stepp-Greany 2002).

All the students thought the critiquing part (suggested subthemes) of EssayCritic was useful or very useful. Except one respondent, all of the students reported that they used one or more of the subthemes suggested by EssayCritic. Most of the students used between one and four subthemes. The praising part (covered subthemes) was also appreciated, but judged to be slightly less relevant. Still the majority thought it was useful. There could be several reasons for this minor difference. One is of course that the overview of the covered subthemes does not give any concrete help for how to incorporate it. It is descriptive, rather than prescriptive, and provides information about your status, based on the current state of your essay. Another reason could be related to the fact that several of the groups had subthemes in their essays that were not detected by EssayCritic (e.g. bullying and economy).This could have led to

disappointment and with the possible consequence they did not trust the remaining feedback.

Even if organization (structure) of the essay was stressed prior to the writing, there was a structural deterioration when the students used EssayCritic compared to earlier essays without using EssayCritic. Few, if any of the groups had an ending part in their essays, they just stopped writing. This phenomenon was also found in another study of an application of Latent Semantic Analysis, State the Essence (Miller 2003).

In the collaborative setting of this experiment (pair writing) there were also considerations about how collaboration takes place during the writing and revision based on feedback from EssayCritic. What became apparent in the focus group was that the students organized their work in two different roles. A “driver” who typed the text and operated the keyboard, and a “navigator” who helped the driver by proposing what to write about and correcting the driver in case of spelling mistakes etc. They both used incomplete sentences and supplement their conversation with body language like pointing, nodding and also by using the monitor as an anchor point.

As with their opinion of the use of EssayCritic, interviews and questionnaire were used to capture the students’ own perception on how it was to collaborate in pairs while writing essays. Two types of comments repeated in the data of the 25 students, and I have categorized these as “different ideas” and “discussions”. Many of the answers from the students mentioned one or both of these, and also use words like “cozy”, “fun” and “motivating”. There was also one that mentioned that it depends who your partner is, and that it is particularly important with regards to skills and personality matching. There were some minor negative comments as well, but only one responded solely negatively. Some students answered “both yes and no”, a few didn’t answer at all, but eighteen of a total of twenty-six answered positively.

7.2. Comparing to result from a similar study done in Hong Kong

Since my study has been part of an international collaboration project, the data reported here can, to some extent, be compared with a study conducted in Hong Kong. I have used some of the same questions in the questionnaire as they have done. This means I can compare some of the answers, and this data is shown in its entirety in Appendix E. The main difference in the two studies is that in Hong Kong the students

worked one and one by themselves, while in Norway the students worked two and two in pairs. This reflects local teaching practices.

The two studies did not have the same research design, so they were not made to be easily compared. .This comparison should therefore be thought of as an indication that can stimulate further research and new research design that allows more easily comparison. Little difference was found except for one part and this was very distinctive. The students in Hong Kong reported an average of about 38 hours of weekly use of computer while students in Norway reported an average of about 12 hours. The reason for this difference is unknown, but one reason could be that the Norwegian students did not count the use of computers in school, whereas the Hong Kong students included it. Another reason could be that it is just a cultural and/or technology gap between Hong Kong and Norway. The age of the students also differs, in Norway the students was 16-17 years old while in Hong Kong they was 18-19 years old.

Regarding other questions like system easiness and usefulness of the suggested subthemes, both cultures answered exclusively positive, with the Norwegian students slightly more positive than Hong Kong students. The other small difference can be seen in questions like how many suggested subthemes they used, how useful they found the covered subthemes to be, and whether they would like to continue to use the system. In the Norway study the students used from zero to more than four of the suggested subthemes while students in Hong Kong used from one to four subthemes. Also, some of the students in the Norway study answered on a few occasions *unuseful* and *very unsuseful* regarding the relevance of the covered subthemes, whereas students in Hong Kong answered exclusively positive. Finally, twenty-three out of the twenty-four students in Norway answered yes regarding continuing to use the system or not, while nine out of twelve students answered yes in Hong Kong.

As already mentioned, this comparison should be considered merely indicative for the purpose of setting up a new experiment with a common research design. In sum, both studies showed that the participants had an overall positive attitude toward EssayCritic and that they made use of the suggested subthemes. A new research design might benefit integrating a qualitative approach with a quantitative approach to data collection, which was the design chosen for this thesis.

8. Conclusions and direction for further work

In this chapter I will summarize the thesis by addressing the research questions raised in the beginning. Finally, I suggest some directions for further work.

8.1. Conclusions

This thesis has been concerned with exploring the use of EssayCritic as part of a pilot study. EssayCritic, as the name implies, is a critiquing system. The critique presented by the system is computed based on Latent Semantic Analysis. I have focused my work on how the system affects students in a collaborative setting. I employed a predominately qualitative approach in a case study set up with a detailed focus on the interaction of one pair of students over a period of 3 weeks (three 2-hour meetings). We did not use any control group, since the scope of the work was judged to be more than measuring the effects of EssayCritic.

Initially I identified three research questions that have guided me trough the different steps in this case study and I will present them here and answer them topically. The next three subsections are named after the questions.

How does EssayCritic afford and constrain collaboration in an essay writing context?

EssayCritic did afford collaboration by helping the students to build common ground and achieve intersubjectivity as shown in my analysis chapter. This is a necessity to be able to collaborate about creating a common artifact like an essay. EssayCritic functions like an anchor point that students can reference and use. It gives them feedback about their essay, which has the effect of stimulating them with new ideas about what to write about in the essays. This became a topic of discussion in the groups, the topics were elaborated and often incorporated as new content items in their essays. One remark was mentioned that is not related to EssayCritic as such, but rather to collaboration in general. Collaboration is dependent upon your partner as well. For instance, a high-achieving student might not want to be paired with a low-achieving student.

How can EssayCritic improve essay writing?

Writing an essay can be a stressful task if students do not have enough ideas for what to write about. Some students might experience writing block before they are able to complete their essays. This can especially be the case for low-achieving students as we found indicators for in our study. EssayCritic can improve essay writing by giving students suggestions for further writing. For instance what new subthemes to write about. In this case study the average score would have been on average one grade higher if the different versions of the students' essays would have been graded, according to the teacher. To some extent EssayCritic can also help the students to structure their essays, but to a lesser extent than helping with content. By viewing the praise given from EssayCritic students can see where in the essay their different subthemes appear. If EssayCritic shows that the same subtheme appears on several different places in the essay the student would be advised to group these sentences into one paragraph. However, a shortcoming regarding EssayCritic for helping with essay structure is that few of the students remembered to put an ending paragraph in their essays, even though they were told so explicitly by the teacher in the first hour of the experiment. EssayCritic provides instant feedback, and its services can be requested several times until the students are satisfied with the results. Also, by simply motivating students with new topics to write about the essays will most likely be improved with more content (length). Some high-achieving students were concerned about limiting creativity as a result of everyone getting similar feedback, but according to the teacher this was not a problem at all. The Critic does not provide any hint regarding the step from feedback to incorporation in the essay. The feedback is descriptive rather than suggestive.

To what extent can EssayCritic motivate students to write good essays?

The feeling of not mastering what you are supposed to do is demotivating for any kind of complex task. If students know that they can get help in a way that is just an arm's reach away they might get a positive attitude that may eventually lead to higher expectation for what they achieve on their own. Other data also show that the use of computers can be motivating to students (Stepp-Greany 2002). For this study it seems like the students were motivated by the program, but there could be several reasons for that, as described in section 6.2. Finally, the use of EssayCritic in a collaborating

setting clearly was an additional motivation for the students because it allowed them to discuss and elaborate the critique provided by the system. Thus leading to higher motivation about the process of writing.

In sum, EssayCritic allowed the students to reflect upon their essays and gave them suggestions for further writing. The system affords collaboration and this was a positive element for the students when they wrote their essays. It seems like EssayCritic is especially useful for low-achieving students, but also high-achieving students seems to appreciate the use of EssayCritic even though they had some reservations regarding its potential "streamlining" effect on students' creative writing.

8.2. Direction for further work

My study has been one piece of a bigger puzzle about the design, evaluation and use of the EssayCritic, and there are already suggestions for further work in previous writing. In Cheung, Mørch *et al.* (2007) a knowledge building forum is suggested as a integrated part of EssayCritic, I think this is a good idea, but it can also constrain collaboration as this has been found by Fugelli (2004) in another study of collaboration in knowledge building. Further research on knowledge building from the point of view of common ground and intersubjectivity seems to be an interesting route to explore to see how this affects collaboration during knowledge building. Also, I would suggest continuing to do research considering pair writing. In addition the continuing effort to tune the LSA-engine and building corpuses are needed to get the best result possible for the users of the system.

Hopefully my master thesis can be a valued contribution to further research about critiquing systems in a collaborative setting, since this is a new area of research. This could take place in the context of further research on EssayCritic or by developing and/or using other collaborative critiquing systems.

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Appendix A

Information letters to the learners and their parents

Information about collection of data regarding the project *EssayCritic: A pilot study of a computer supported essay writing critic*

InterMedia UIO, in cooperation with Hong Kong Baptist University will conduct a pilot study of the computer system "EssayCritic". EssayCritic is a system that enables a computerized feedback of a students essay about a specific topic. The topic for the essay that will be the object of the experiment is "Mobil phone impact". The students grouped in pairs write an essay, upload it to the system using internet and receive a feedback which they then choose to rewrite their essay based on, or not. After doing this twice they deliver the final result to their teacher as normal.

The study will focus on the cooperation between students using the system as they read the critique and review their essays, and if the system gives reasonable and applicable feedback to the students.

To go through with the study there is a need of students to test the system and monitoring their activities. Because of this we need students writing an essay and then react to the feedback provided by the system.

Associate professor Anders Mørch is responsible for the study and additionally Jan Are Otnes, a master student in informatics will participate. The responsible for the class and students is Eli Huseby, teacher at Skien VGS. To gather data in the project there will be used several techniques; observation, video of discussions and group work, group discussion, questionnaire and the different stages of the written essay. The data will constitute a part of the master thesis written by Jan Are Otnes and it will not be possible to identify individuals in the thesis or any other reports.

Even if it might feel strange to be observed by researchers, there are no risks participating, all written information collected will be unidentified during the study and deleted afterwards.

All data will be made anonymous and videotapes will be deleted after the study. The study will end 01.11.2007.

Participation is totally voluntary and it is also possible to drop out at any time, with no influence, during the study and without any particular reason! All of the staff involved also has professional secrecy and all data will be handled confidential!

The project is reported to *NSD, Personvernombudet for forskning (http://www.nsd.uib.no/personvern/index.cfm)* which is securing that the project is within the law about protection of personal privacy. At page 3 of this information note you will find a agreement for participation which we ask you to fill in and return to the teacher, Eli Huseby. If you have any further questions or comments, do not hesitate to contact us!

- Anders Mørch, anders.morch@intermedia.uio.no or phone 22 84 07 13
- Eli Huseby, emhuseby@gmail.com, or phone 97 59 57 19
- Jan Are Otnes, janot@ifi.uio.no or phone 481 31 375

Regards

Anders Mørch, Eli Huseby and Jan Are Otnes

Agreement for participation in EssayCritic Pilot Study

I have read the information enclosed and I am willing to be observed during my work.

I am aware that my contribution will be used in the pilot study only.

Information from/about me is kept in locked cabinets/rooms and only the project staff has access to it.

I know that my participation is voluntary and that I, at any time, can choose to retract from the study.

Guardians are entitled to see questionnaires prior to the study.

This approval has to be signed both by student and guardian.

_____

Place and date

_____

Signature student

_____

Signature guardian

Appendix B

Evaluation questionnaire for the students, and their answers

EssayCritic – A Computer-Supported Essay Writing Critiquing System Evaluation Questionnaire

We should be grateful if you could let us know your opinions on EssayCritic by filling in the questionnaire below. Your support will help us further improve the system. Your comments can be written in either English or Chinese.

Thank you.

==========

1. Your gender is: ☐ Male ☐ Female

2. Your English background:

_____

_____

_____

3. The average number of hours you use computers per week is _____.

4. Which of the following(s) is/are your major use of computers?

☐ communications (e.g. e-mails, ICQ, MSN, ….)

☐ searching information

☐ entertainment (e.g. games, ……)
☐ conduct on-line transactions (e.g. purchasing, bill payments, e-banking, ….)
☐ other: please specify: _____

5. This EssayCritic is:

☐ very easy to use.

☐ easy to use.

☐ difficult to use.

☐ very difficult to use.

6. The suggestions on the missing ideas (sub-themes) in your essay provided by this system are

☐ very useful.

☐ useful.

☐ unuseful.

☐ very unuseful.

7. How many sub-themes suggested by this system did you use in your essay?

☐ 0

☐ 1-2

☐ 3-4

☐ more than 4

8. The covered sub-themes in your essay indicated by the system are

☐ very useful.

☐ useful.

☐ unuseful.

☐ very unuseful.

9. Do you think the teacher should continue to adopt this system for your essay writing in the future?

☐ No.

☐ Yes.

Why/Why not?

_____

_____

_____

_____

_____

10. Do you think working in pairs was helpful regarding understanding and using the critique from the system? Please elaborate.

_____

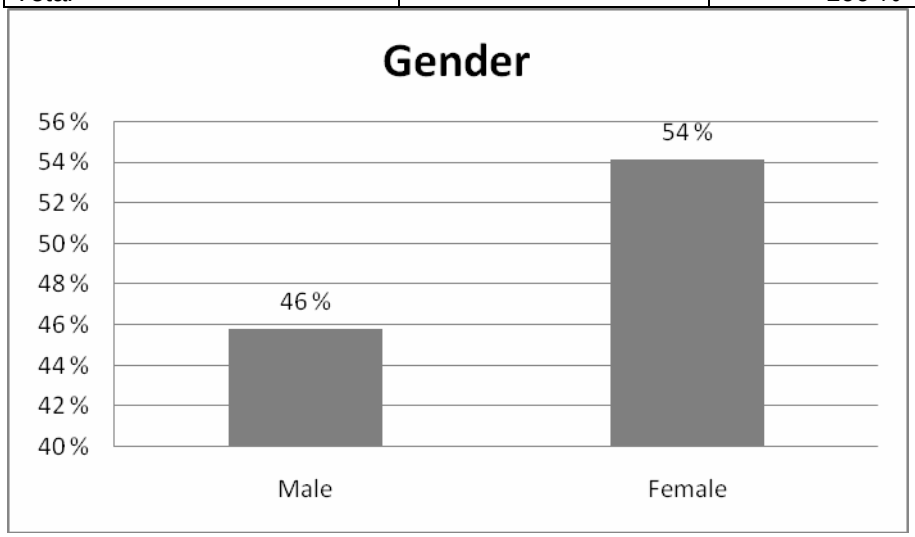
_____

_____

~ Thank you ~

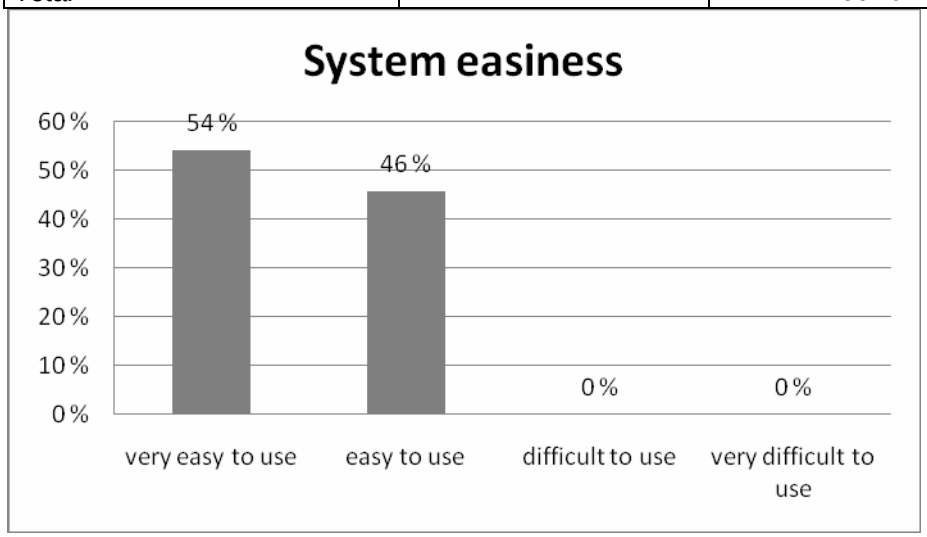
1: Gender

Gender	Number	%
Male	11	46 %
Female	13	54 %
Total	24	100 %



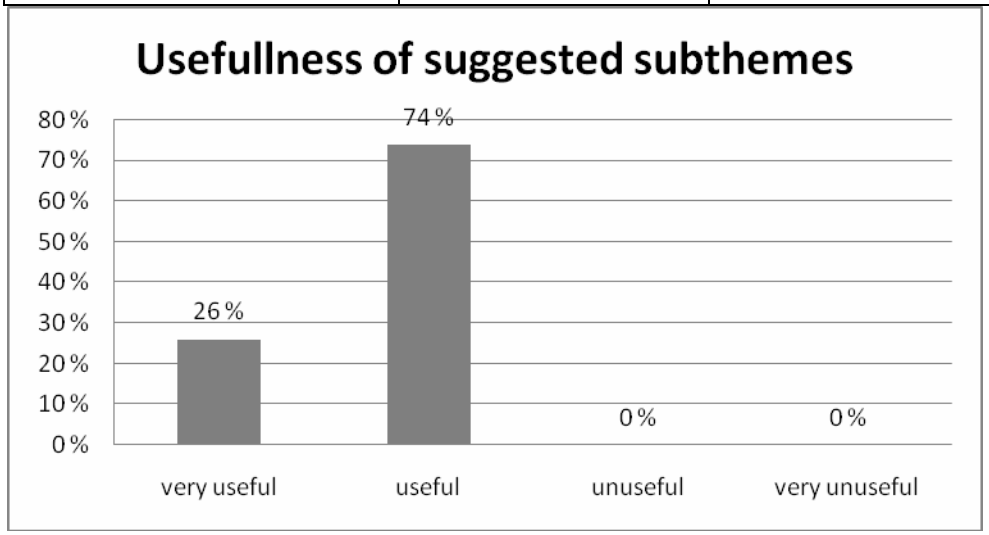
5: This EssayCritic is

System easiness	Number	%
very easy to use	13	54 %
easy to use	11	46 %
difficult to use	0	0 %
very difficult to use	0	0 %
Total	24	100 %



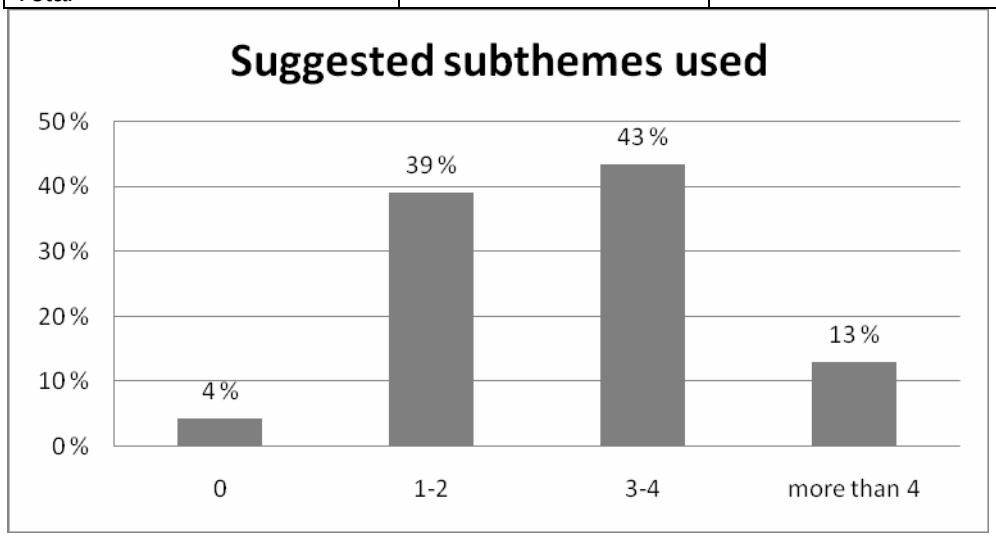
6: The suggestions on the missing ideas (sub-themes) in your essay provided by this system are

Usefullness of suggested subthemes	Number	%
very useful	6	26 %
Useful	17	74 %
Unuseful	0	0 %
very unuseful	0	0 %
Total	23	100 %



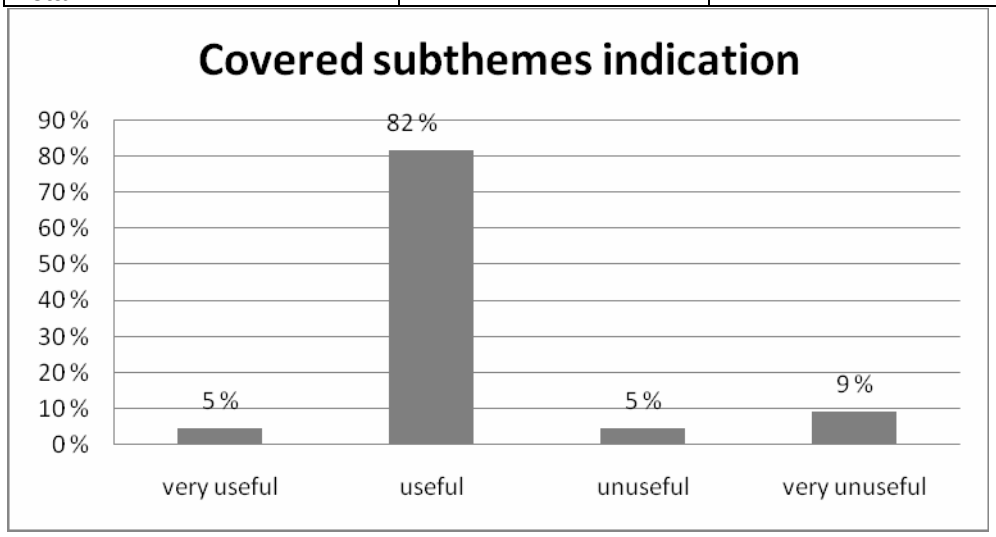
7: How many sub-themes suggested by this system did you use in your essay?

Suggested subthemes used	Number	%
0	1	4 %
1-2	9	39 %
3-4	10	43 %
more than 4	3	13 %
Total	23	100 %



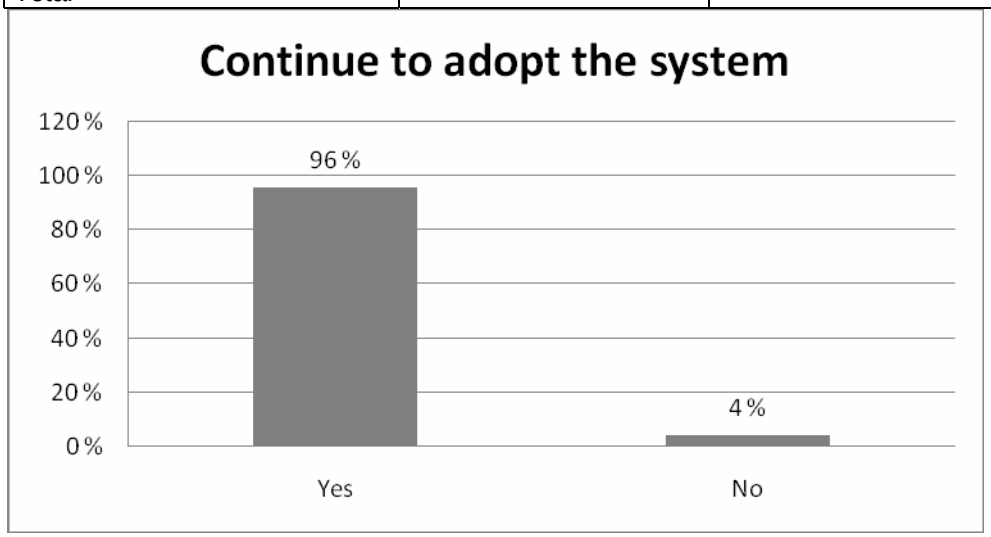
8: The covered sub-themes in your essay indicated by the system are

Covered subthemes indication	Number	%
very useful	1	5 %
Useful	18	82 %
Unuseful	1	5 %
very unuseful	2	9 %
Total	22	100 %



9: Do you think the teacher should continue to adopt this system for your essay writing in the future?

Continue to adopt the system	Number	%
Yes	23	96 %
No	1	4 %
Total	24	100 %



Open questions

2: Your English background

- We have had English at school since about 2. grade, primary school
- We have had English at school for some years, about 9
- We have had English at school for some years, (about 9)
- I've had English in school some years, about 9
- 11 years at school and some vacations abroad
- Learned English at school since primary school
- Soon 11 years
- Primary school + junior high school. Almost 11 years
- Started to learn English at primary school, don't remember exact age
- Been thought it at school since the 3rd grade
- 10 years learning english
- I worked with English through school
- I have learned it at school
- Since 2.clas at primary school, 7 years
- Ca 10 years at school
- I have had English in almost eleven years
- English at school started in 2.class primary school, been to England three times
- Since I was 5-6 years old. I could already understand the English language. It is harder now :-(
- 7 years with English at school (I think)), and some use at spare time. Started learning english at 2.grade, primary school (7-8 years)
- Englsih from school
- I've been learning English in school for about 10 years.(Since 2nd grade, I'm in "11th grade" now
- I've been learning English at school since I was 7 years old(second grade)
- I have studied English in school since I was 7 years old
- Started learning English in 3.grade primary school

3: The average number of hours you use computers per week	4: Which of the following(s) is/are your major use of computers				
	communication (e.g. e-mails, ICQ, MSN…)	**Searching information**	**Entertain-ment(e.g. games,..)**	**Conduct on-line transactions(e.g. purchasing, bill payment, e-banking**	**Other: Please specify**
10	x		x		Projects and so on
10	x		x		Projects
10	x		x		Projects
10	x		x		Projects
1-2	x	x	x		
20-30			x		
once a week	x	x			nettby, deiligst, facebook
4	x	x	x		
7	x				
5	x	x			Forums
7	x	x			
15-20	x		x		
10	x		x		
10			x		
18	x	x			Nettseries
once a week	x	x	x		
8	x		x		Music
4-5?	x	x	x		
ca 20	x		x		Graphic programs(Photoshop, Corel Painter etc) Internet communities
15-20	x		x		
50-60	x	x	x		Linux
10	x	x	x		
20	x	x	x		
8	x	x	x		

9: Do you think the teacher should continue to adopt this system for your essay writing in the future?

Yes	It is a very instructive program and it saves the teacher for unbelievable amount of work. It was also a fun way to learn!
Yes	It saves the teacher of some revision and the student get tip even if they don't come from the teacher. It is also a good and different way to learn!
Yes	It is a very useful program, with good tip for writing a better essay. You can use it more often than the teacher has time to revision your essays.
Yes	It is a good program that helps us to write and it is easier for the teacher as well. It does not take long time to revision.
Yes	Yes, because it is an easier way to find errors/things missing in the essay
Yes	Because it is nice if you get a writing block and it is nice to get a feedback prior to delivery to the teacher
Yes	Because it's good!
Yes	It's easy response. Nice and so on
No	It is better that a living human with a brain consider based on skill and experience, than a programmed computer.
Yes	It's a good way to check what sub-themes you've covered and how well you've stuck to the subject, even though it has no clue about structure or quality.
Yes	Because it can help people write better essays
Yes	Because it gives good advice. And it gives good training to improve our own skills
Yes	It is useful
Yes	Yes it is of great help if you don't find any themes
Yes	It is interesting and it get easier to correct
Yes	Because we got to know more about what we missed and so on for the essay
Yes	I've been sick so I haven't tried the program
Yes	Because I think it is useful and I learn much more.
Yes	Yes, maybe. I don't think it should be used every time (my opinion is that it hand over too much of the work process to the computer), but maybe some times as training. (It should be adjusted to recognizing more synonyms)
Yes	Because it gives good advices and it is good writing practice to improve.
Yes	The system will surely be helpful for the teacher correcting assignments, so further use by the teacher will be positive. The case is different for the students, as I can't imagine the system (as it is now) useful for them. It's having too many errors for that.
Yes	Because it makes it much easier to write a good essay, and to cover the most important subject.
Yes	Because it makes it much easier to write a good essay, and it tells you about

which subjects are important

Yes It can be useful if you lack something to write about/ideas

10: Do you think working in pairs was helpful regarding understanding and using the critique from the system? Please elaborate.

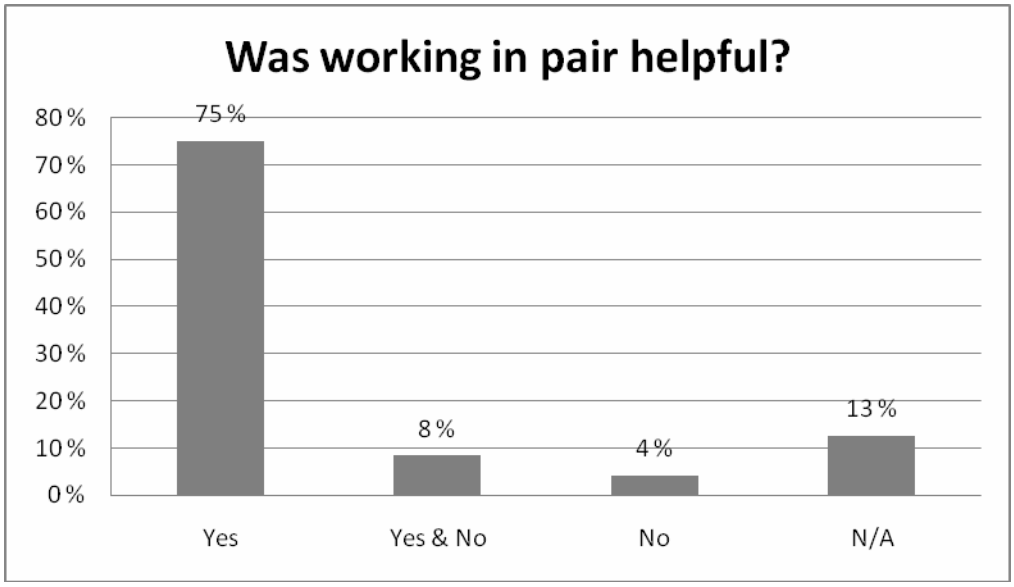
- Yes, definitely, especially since this is a new concept. There will also be more tip and ideas if you are two.
- Yes, it was nice to work in pairs because two brains think better than one. We can give each other tip and discuss to get the best essay. It is also more cozy to work together than alone.
- It was nice to work together. You get more ideas and different views to work with. We helped each other to understand things and improve our sentence structure. We can discuss and choose the most important themes. Besides it is more fun to do it this way, and you get more motivated.
- I think it was good to work in pairs. We have different ideas about what is supposed to be in the essay and then it is easier to write it. What one do not understand, the other might understand.
- Yes it is easier to work in pairs.
- Yes it was. I like to work in pairs.
- It was not easier nor hard to work in pairs. Individual would have been better.
- Yes, then we can share meanings and give each other ideas to improve the essay.
- When there's something you don't get that well, you can't get any better help than a partner. In addition, we could focus on different aspects of the essay and so each part was made better.
- I think it helped some but it has to be developed further before it functions as supposed.
- Yes, because you can exchange meanings and help each other. All in all it worked well.
- Yes and no
- Yes, it was useful to work in pairs. Then we could discuss if we agree with the program. It is useful to get someone elses views.
- Yes and no, for some it is good to work in pairs, but for other it is not good.
- Working in pairs were helpful since we could help and ask each other
- Working in pairs is always helpful. In that way we can discuss the feedback and agree if we think the tip are relevant to include or not
- Yes, you can share views and help each other. All in all it works good.
- It depends on who you are working with, of course. I was lucky to be working

with a skilled classmate this time, so yes; it helped me a lot. For example, we had different ideas we suggested, and noticed things about the system that I probably couldn't have found myself.

- Yes, two brains work better than one
- Two brains work better than one
- Yes, you then got other views about how the system works.

Summary: Do you think working in pairs was helpful regarding understanding and using the critique from the system?

Yes	Yes & No	No	N/A
18	2	1	3
75 %	8 %	4 %	13 %



Appendix C

“How to” guide for the student use of EssayCritic

Pilot study - the EssayCritic system

This pilot study is built around the EssayCritic system and how this system can help achieving a higher level of understanding around the area of interest. In this case *Mobile Phone Impact*. Another important issue for this study is how the system influence on the ways students work together when writing an essay and interpreting the suggestions and other feedback from the system.

So, what is this system? The EssayCritic system is grounded on a theory called *Latent Semantic Analysis (LSA)*. To say it short, it is a computerized system that compares some text with other preloaded text about a theme. It then comes out with suggestions about similarities and dissimilarities.

We will now first say some about opportunities and limitations of the EssayCritic system, and then show you how to use the system to submit an essay and get immediate feedback.

Opportunities and limitations of the EssayCritic system

The EssayCritic system is computerized and online 24-7, meaning the system and its use is independent of time and place. This gives several advantages;

- It can give you immediate feedback and tip about sub themes to include in your essay, this means that you do not have to wait for a teacher to respond or a specific schedule to deliver.
- You can work wherever you want and you are independent of place when you submit your essay
- The system will save each submitted version for later revision
- Your teacher get more time and can help you in other ways than before

Unfortunately there are some limitations as well, it's not a miracle system;

- For the time being, only word format is accepted.
- Submitting only twice
- This is not a miracle form that writes your essay for you
- The system is not perfect, you can not totally rely on the feedback, it could be wrong
- The social aspect between teacher and student can be less than without the system

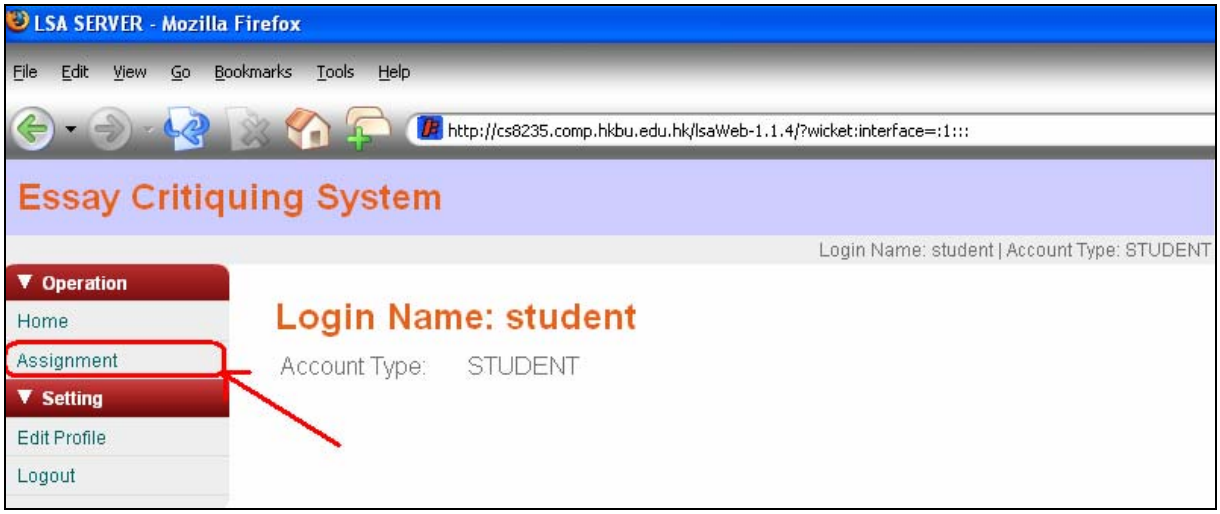
How to use the system to submit an essay and get immediate feedback

To log in and use the system you have to use a web browser, for instance Internet Explorer or Firefox, and you have to be online. Here we have used Firefox, but to our knowledge there are no differences if you use something else.

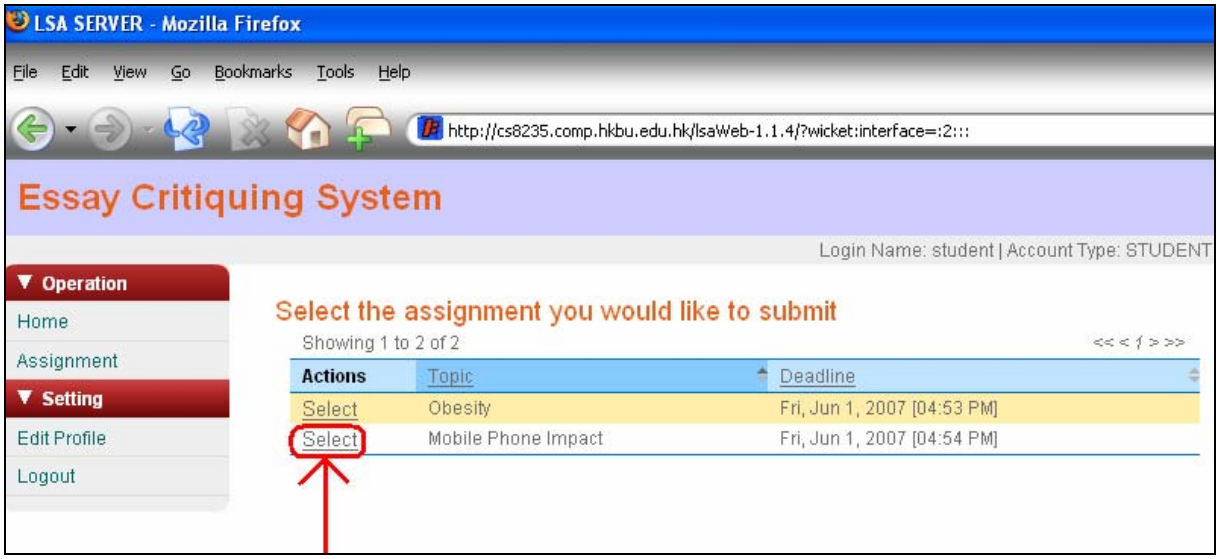
First, you have to go to the following address:

http://cs8235.comp.hkbu.edu.hk/lsaWeb-1.1.4

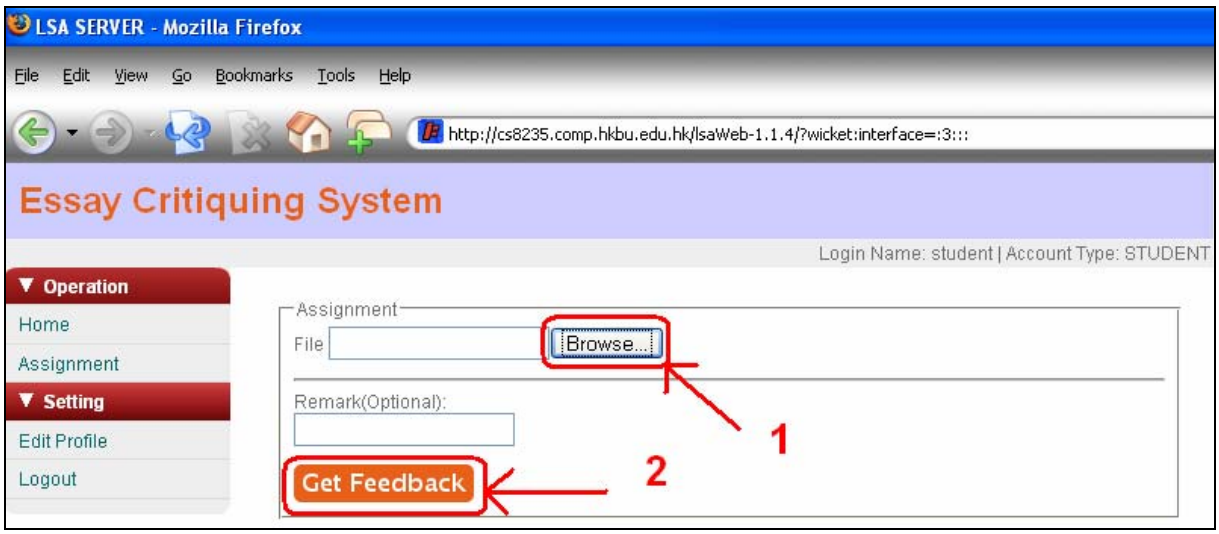
Then you log on using your username and password (provided) and the following page will appear.



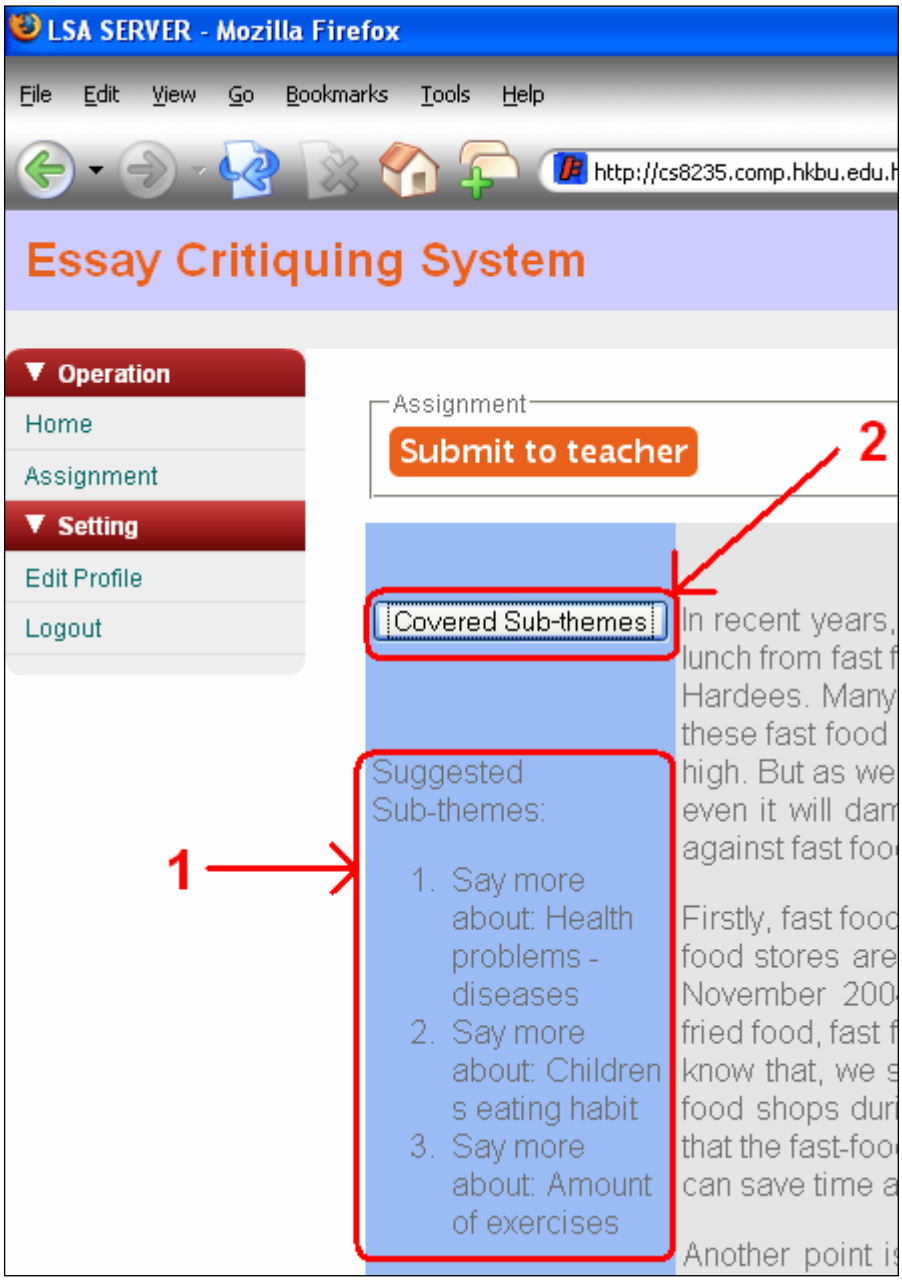
The only thing you need to do on this page is to choose "Assignment" and in the following page (below) choose "Select" on the "Mobile Phone Impact" line.



Now you have to click the "Browse" button, marked 1 in the figure below. Then you find the file as normal and press the "Get Feedback" button, marked 2 in the figure below.



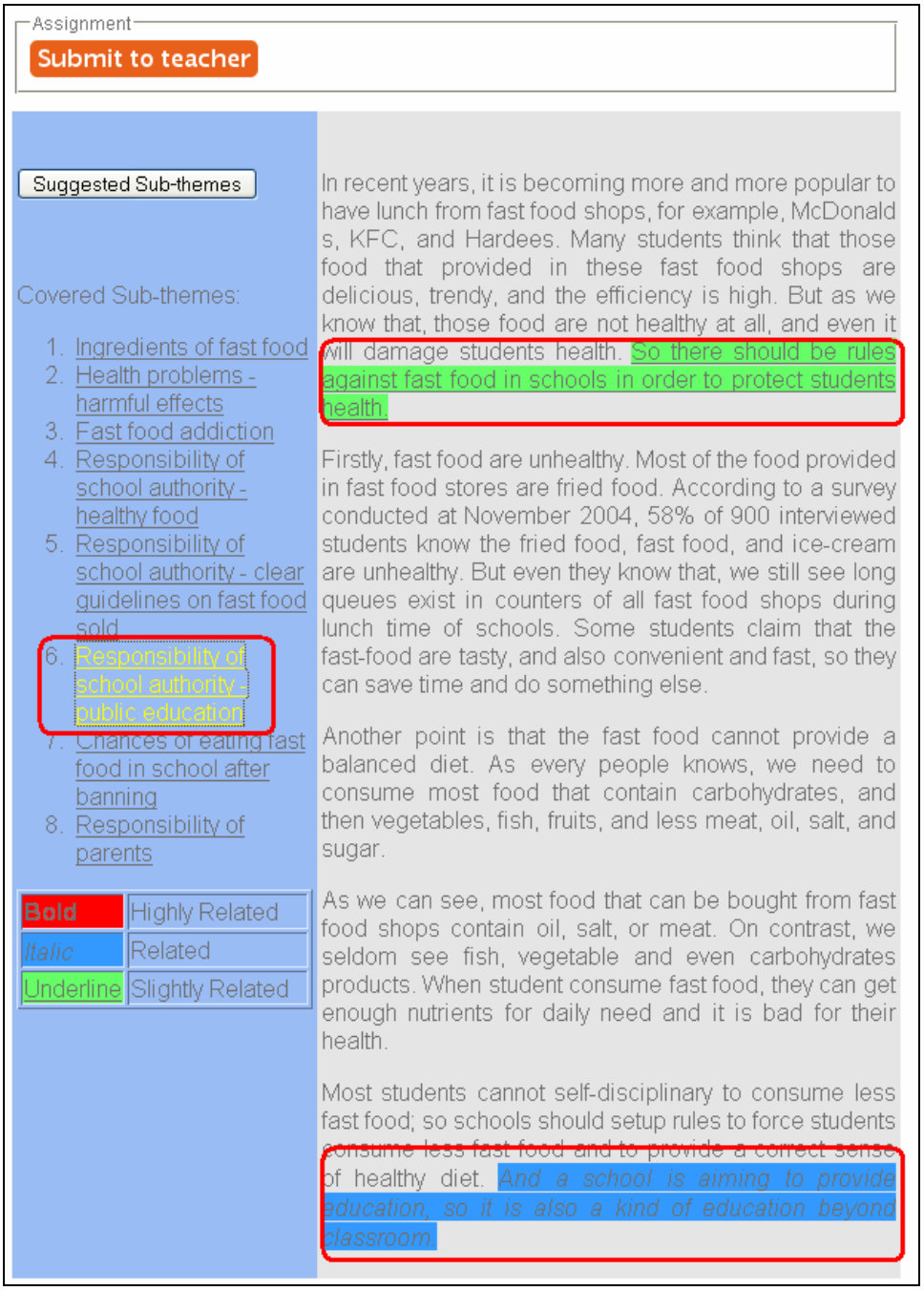
Now you will see a progress bar, usually a few seconds and then the system will show a page like the one to the right.



Here you can see which sub-themes the system suggest you should say more about (marked as 1)

If you want to see which sub-themes you have covered, press the button "Covered Sub-themes"(marked as 2) and you will get to the page shown below.

Here you can see the sub-themes you have covered, and you can click on each sub theme to see where in the text it appears. According to the system of course.



After looking at the feedback from the system you will now have to revise your essay and do the process once more. Finally you will have to deliver your essay to your teacher, using the “Submit to teacher button”.

Appendix D

Transcriptions of the video recorded with the focus group

In general both students are facing the monitor, either looking at the monitor or into the wall behind. In case they look at each other or for instance at the teacher this is commented. Also, the only one of the two students who operates the computer is Betty. Mary is sitting at the left side of the computer next to Betty. Eve is the teacher of the class (Betty, Mary and Eve are nicknames for the two students and the teacher)

Sequence 1

Theme: First feedback from EssayCritic. (Reviewing a list of 5 critiques)
Time (from:to): 4:36-7:30
Screen dump: Feedback1.htm(suggested subthemes) (attached at the end of this appendix)

Time Code	**Who**	**Speech**	**Body language**	**Comments**
4:37	Mary	Vi skriver ned i word?	Spør Betty	
4:40	Betty	Ja, vi skal laste ned i word etter.. eh åpne i Word og skrive der og laste ned etterpå	Spørsmål til Anders	
	Anders	Ja		
	Betty	Ok		
4:41	Mary	hehe Åhh Ufff..		Får første tilbakemelding
4:54	Betty	Er det den gamle?		Åpner essayet i Word
4:56	Mary	Ja tror det		
5:01	Betty	Der var den.....		Essayet åpnet og vises på skjermen. (Usikker på tale)
5:03	Mary	..Hehe..		
5:05	Betty	ok..... Say more about .. convention..... people at any time and place and user can be contacted		Skifter til Essaycritic, leser fra tilbakemelding

5:15	Betty	Eehh, har vi ikke sagt noe om det?		Skifter til word/essayet sitt
5:16	Mary	Jo, vi har ...		
5:18	Betty	..Ok, vi kan skrive litt mer om det...		
5:18	Mary	...sikkert skrevet om det, ikke brukt riktig ord bare... ja...		
5:21	Betty	Eehhmm, hvor har vi skrevet om det....?		
5:28	Betty	Her! ”mumler-leser fra essayet”		
5:31	Betty	For example the world gets smaller…		Leser fra essayet
5:33	Mary	Ja... eeehhhmm..... vi kan skrive lissom atte... uansett hvor folk går så kan vi få tak i de...		
5:43	Betty	Mhhmm...	Skriver på PC	
5:43	Mary	lissom folk har med mobilen		
5:45	Betty	No mer... No matter	Skriver/retter på PC	
5:48	Mary	Skal vi prøve å skrive litt bedre enn det vi gjorde i går?		
5:49	Betty	Ja….. Where you are.... .	Skriver på PC	
5:53	Mary	Mhm..		
5:54	Betty	.. people can always contact you	Betty gløtter bort på Mary som ser tilbake	Antar at det er blikkontakt
5:56	Mary	Ja, eller no.. ja mhm..	Ser på skjermen	
6:01	Betty	You.... at least if you have power and…. (uklart)	Betty ser på Mary	
6:05	Mary		Ler	
6:07	Mary	Aaanndd…	Betty skriver på PC	
6:10	Betty	If you have got power…… ….. … and ….. if … and … and….	Skriver på PC, vifter med hånden (hva videre?) Ser på	

			Mary, som ser inn i veggen	
6:25	Mary	Eehhhmmm,	Mary ser inn i veggen	
6:27	Mary	Kanskje vi bare ska	Ser tilbake på skjermen	
6:27	Betty		Betty skifter til EssayCritic for så å skifte tilbake til word etter et sekund	Mary skifter meining når essaycritic kommer på skjermen??
6:28	Mary	....skal vi se igjennom hva de har sagt først?		
6:29	Betty	ja		
6:33	Mary	At... Det er egentlig ganske bra tror jeg		
6:34	Betty	Mhmm	Skifter til EssayCritic	
6:35	Mary	Kjekt da		
6:36	Betty	Say more about up ....communication device espescially for emergency …		Mikrofonen flyttes
6:47	Mary	Sånn..	Lener seg ørlite grann mot skjermen	
6:47	Betty	ok… . at du kan ringe et sånn… 113 opplegg	Betty vifter ”forklarende” eller ”inviterende” med armen	
6:51	Mary	Eller 911 eller 113	Gløtter mot Betty	
6:53	Betty	Ja.		
6:54	Mary	eller 102 eller	Mary ”sutter” på drikkeflaske	
6:55	Betty	Uten penger...		
6:55	Mary	Mhm		Smiler/ler

6:56	Betty	og forhold..		
6:57	Mary	Mhm		
6:58	Betty	Damages.. åja, det sa vi ikke noe om....	Gløtter på Mary	
7:00	Mary	Nei det stemmer det....		
7:01	Betty	Ann .. Annoy .. ja..		
7:04	Mary	Også kan vi skrive om det der at de tar over så mye fordi du får jo mobilstoler... du får lissom mobilstoler..	Ser på Betty, som ser på skjermen	
7:09	Betty	Ja. Jaja	Nikker..	
7:09	Mary	.. mobilsokker du får all dill til mobilen din		
7:12	Betty	user should adopt appropriate telephone manner… ....ja.. er det at skal bruke….ssss.... bra ... manerer....	Vifter med hendene. Ser så vidt på hverandre	Leter etter riktig ord/forståelse?
7:24	Mary	Passende... telefon... mannerer..	Ler	
7:25	Betty	Jaa..	Ler	
7:28	Betty	Hva skal vi gjøre her da? Skal vi ta ros?		
7:30	Mary	Trykk på den	Gjør et nikk med hodet mot skjermen	
7:31	Betty		Trykker på knappen for ”Covered subthemes”	

Sequence 2

Theme: Covered subthemes
Time (from:to): 7:31-8:10
Screen dump: Feedback1.htm(Covered subthemes) (attached at the end of this appendix)

Time Code	Who	Speech	Body language	Comments
7:31	Betty		Trykker på knappen for ”Covered subthemes”	
7:32	Betty	Slight...		
7:33	Mary	bla... oj.. det var ikke mye	Leser på skjermen	
7:35	Betty	Nei, vent da, jeg må trykke...	Trykker på ett av ”covered subthemes”	
7:36	Mary	Åja		
7:38	Betty	Oj		”Overrasket” tonefall
7:39	Mary	He, OJ	Ler	Gjentar Betty sin ”overraskelse”?
7:41	Mary	.. åh, slightly....	Peker på skjermen	
7:43	Betty	Nei, fikk jo related.. related...	Scroller nedover i tilbakemeldingen	
7:48	Mary	Men det er slightly related	Peker på skjermen	
7:50	Betty	Maintain inter personal relationship... ”mumling”... men de har ikke satt opp om mobbing, det har vi gjort. ...	Scroller nedover tilbakemelding	Finner den markerte teksten
8:00	Mary	Ja, åssåå... mhm		
8:02	Betty	Men.. det er jo hva vi ser på det for	Ser på hverandre	

8:03	Mary	Ja, er sant det.. Vi kan jo prøve å kanskje generelt forbedre hele greia fordi...		
8:07	Betty	Ja.		
8:08	Mary	Skal vi bare skrive opp.. okay, eehhm		

Sequence 3

Theme: Improve the essay
Time (from:to): 8:11-10:00
Screen dump: -

Time code	**Who**	**Speech**	**Body language**	**Comments**
8:11	Betty	Men den innledningen er vel bra?		Leser i essayet sitt
8:13	Mary	Ja, jo		
8:14	Betty	There are produced more mobile ... (Mumler, leser stilt gjennom essay) A new eximination performed in... (mumler)……		Leser fra essayet vanskelig å få med seg hva som blir sagt, men sammenholdt med essayet er det mulig å forstå
8:29	Betty	Eehhh, vi har jo på en måte tatt med at de kontakter hverandre uansett da.	Gløtter mot Mary	
8:36	Mary	Ja... Åsså kan vi si det atte ..... mobiltelefonen blir også et problem fordi de ringer jo også i timen, folk er jo, det er vi		
8:47	Betty	Ja, det var det det sto her at vi kan ta opp..		Betty kutter midt i Mary sin setning
8:48	Mary	Åhh ja		
8:51	Betty	Atte det... interuption in daily life		
8:53	Mary	Sto det det?		Overrasket
8:56	Betty	Disrupt...		Går til EssayCritic

				og sjekker
8:58	Mary	Åh, jeg skjønner..		
9:00	Betty	Annoy people liksom.... det kan vi ta opp da.. skal vi ta det i et nytt avsnitt?		
9:06	Mary	Ja, vi gjør det ”mumler”		
9:07	Betty	Hvor skal vi gjør det, her?	Lager nytt linjeskift/avsnitt	
9:13	Betty	Eehhh	Vifter med handa, som for å komme igang igjen etter forstyrrelsen	Forstyrrelser
9:17	Mary	ok		
9:18	Betty	Mhhh, hva kan vi begynne med a?		
9:22	Mary	Vi kan si at det	Mary ser på Betty	
9:23	Betty	The fact that more and more...	Muligens øyekontakt	
9:25	Begge	”Ler”		
9:27	Betty	The fact that almost every people or…. person?	Mary ser på Betty, muligens øyekontakt	
9:32	Mary	Ja		
9:32	Betty	Have their own phone causes…		
9:36	Mary	Very much..		
9:37	Betty	Disruption?	Betty skriver	
9:38	Mary	Ja		
9:40	Betty	The fact that very.. eller almost?	Betty skriver	
9:46	Mary	Ja		
9:46	Betty	Every …	Betty skriver	
9:49	Mary	Person		
9:50	Betty	Per….. person... person have got	Betty skriver	Skriver feil, retter og

		their....		retter
9:55	Begge	”Ler”		

Sequence 4

Theme: Problem identification (”occur” , what does that mean?)
Time (from:to): 10:33-12:29
Screen dump: -

Time code	Who	Speech	Body language	Comments
10:33	Mary	Et kjent problem er... eller no sånt		
10:36	Betty	A well known problem... at least for the teachers?	Skriver	
10:45	Mary	That some that.. ...occurs almost every day eller ett eller annet sånt... som skjer nesten hver dag, er at telefoner som ringer i timen	Betty skriver	Litt uklart og vanskelig å få med seg de første ordene
10:54	Betty	That...ehhh		
10:56	Mary	Occure..		
10:57	Betty	Occure? Hva betyr det?	Betty skriver	
11:01	Mary	Neh, samma det, vi driter i å skrive det, så det er sikkert no		
11:04	Betty	Sånn?		Ser ut som om de bruker stavekontroll i word
11:04	Mary	det skrives.... annerledes		
11:07	Betty	ok, vent da.. var..	Betty skriver	
11:11	Mary	Vi kan bare skrive at .. happens , eller that.. ... jeg kan jo egentlig, nei...	Betty skriver	
11:16	Betty	Sånn..... happends ever.. every day is phones ...	Betty skriver	
11:26	Mary	Calling		
11:26	Betty	calling	Betty skriver	
11:28	Mary	During class, jeg veit ikke		

11:31	Betty	During class.... this interupts... teacher and students?	Betty skriver, ser på Mary på	
11:37	Mary	mhm	Nikker, ser på skjermen	
11:43	Betty	t e rupt ..... student ... teacher ... . teacher and... students	Betty skriver	Bruker stavekontroll ?
12:04	Mary	students		
12:04	Betty	..students..		
12:07	Mary	Og så kan vi si...		
12:10	Betty		Betty skifter til EssayCritic og ser på tilbakemeldinge n	
12:13	Mary		Lener seg mot skjermen og leser	
12:14	Betty	People... ehm.. get stressed	Betty skifter til word	
12:17	Mary	Ja, og så dør de av livsstylssykdommer, neida, hehe	Mary ser på Betty	
12:21	Betty	Ja, det kan vi skrive på det andre etterpå,		
12:23	Mary	Ja, ehh		
12:24	Betty	cancer å sånt		
12:25	Mary	Mhm		
12:27	Betty	People...	Betty skriver	
12:28	Mary	Eller skal vi si at mobile phones causes stress eller can cause.....		

Sequence 5

Theme: Need more information (done writing)
Time (from: to): 13:56-16:29
Screen dump: -

Time code	Who	Speech	Body language	Comments
13:56	Mary	Mmmmhhm..		Ser på tilbake-meldingen fra EssayCritic
13:59	Betty	Can contact people at any time and place.. users can be contacted everywhere too… det begynte vi på her nede…. Ja, her… every where you are people can contact you at least if you have got power… this is	Leser fra EssayCritic, og skifter til word	
14:18	Mary	Så lenge du ikke er i (??uklart) littegran, for der er det jo ikke akkurat dekning	Mary gløtter mot Betty	
14:21	Betty	Mhm, sant.. eehh, whether this is good or bad		
14:25	Mary	Ja, ikke sant…		
14:27	Betty	Hvordan skrives whether da?		
14:28	Mary	Wee.. ja..		
14:31	Betty	Blir ikke det weather whether ?	Gestikulerer med hendene og ser mot Mary	Samme uttale på to forskjellige ord.
14:32	Mary	Ja, det er det jeg å lurer på.... får vi lov å... Eve .... Nei, vi spør etterpå	Snur seg ut mot klasserommet og spør etter lærer, snur seg tilbake	
14:39	Betty	Ok, da skriver jeg bare whether da sånn .. if you.. if this is good or bad....	Skriver i word	Usikkert hvilket ord som skrives
14:53	Mary	Eli...	Snur seg mot Eve som kommer gående. Betty snur seg	Eve kommer gående i bakgrunnen

			også	
14:54	Eve	Ja..		
14:54	Mary	får vi lov å hente ordliste og bruke det?		
14:56	Eve	Hva sa du?		
14:57	Mary	Får vi lov å bruke ordbok		
14:58	Eve	Ja ja, ja dette er ikke et språkfag..	Kommer inn i bildet og ser på skjermen	
15:01	Mary	Nei jeg vet det... men vi...		
15:02	Eve	Men fikk dere mye tilbakemeldinger?	Blikk veksler mellom Mary/Betty og skjerm	
15:04	Betty	Ja		
15:04	Mary	Ja, vi gjorde egentlig det	Betty skifter til EssayCritic	
15:06	Eve	Så gøy da.. hehe		
15:07	Betty	Ja, det er bra da		
15:07	Eve	Det var det jeg håpa, kjempebra	Bøyer seg nærmere skjermen og ser på tilbakemeldingen	
15:10	Mary	Vi tenkte, hva hvis man skriver et perfekt essay lissom, da er det ikkeno		
15:13	Eve	Nei, da er det ikkeno gøy, fordi atte jeg tenkte vi må ha noe å gå i, på liksom		
15:18	Betty	Ja, men det var bra..		
15:19	Eve	Kjempebra	Eve går fra plassen	
15:19	Mary	Men kan vi ta å låne en på biblioteket, kan jeg bare gå på...	Mary snur seg etter Eve	
15:21	Eve	Men det er jo ordbok på	Kommer tilbake	

		merriamwebster... hvis dere kan, dere klarer engelsk ordbok dere?		
15:26	Betty	Ja	Skifter til nettleser	
15:27	Mary	Hehe		
15:28	Eve	Ja.. ww..... hva, men hva, er, skal dere ha fra norsk til engelsk	Eve står bak elevene og ser på skjermen og ned på Betty	
15:33	Betty	Nei, vi skal finne ut hvordan det skrives..		
15:34	Eve	Ja, men, åh, mm, merriamwebster		
15:37	Betty	Åssen skrives det?	Betty skriver	
15:38	Eve	M e rr iam eehh webster, w e b ster . com eller no sånn ja.. bare se hva du kommer ..		
15:50	Ukjent elev	Eeelliii		
15:51	Eve	er ikke helt sikker.. JA...		Svarer på tilrop med ”JA”
15:53	Betty	der		
15:53	Eve	der, åssåenter word or frame	Eve går..	
15:57	Mary	Eehmm..... nei, free trant… translation local	Mary gløtter på Betty og leser fra skjermen	det siste ordet er litt utydelig, det kan virke som om de hvisker til hverandre?
16:05	Betty	Shit		Mye latter
16:07	Mary	Hehe		-“-
16:09	Betty	(Utydelig) translatins	Skriver/“staver” seg gjennom ordet	-“-
16:12	Mary	Prøver å være lur du, hvisker å sånn, hehe		-”-

16:15	Betty	Free translations …		-"-
16:19	Betty	OK.. er det bra det her da?	Navigerer på web-siden	Henter seg inn igjen
16:21	Mary	Ja, jeg syns det, eller det er ikke, det bra lissom men...		
16:24	Betty	Norwegian		
16:26	Mary	English to Norwegian..		

Sequence 6

Theme: Knowledge collection
Time (from:to): 23:00?-33:50
Screen dump: -

Time code	**Who**	**Speech**	**Body language**	**Comments**
23:02	Mary	Eehh.. Gå på ...		
23:03	Betty	Her!		Finner noe, markerer i dokument
23:03	Mary	Viss vi går på Google og så ser vi på.... ehh kreft forårsaket av...		
23:09	Betty	Skal vi skrive ferdig den her først kanskje?		
23:10	Mary	Ja, det kan vi		
23:12	Betty	Get badly, kan vi skrive det?		
23:14	Mary	Mhm		
23:16	Betty	Dependent of/by your phone..?	Skriver	
23:19	Mary	Ja		
23:21	Betty	By your phone	Skriver	
23:29	Mary	Yess		
23:30	Betty	Ok, eehh, hva var det vi skulle gå på?	Skifter til internet explorer	
23:32	Mary	Eehh, Google..		
23:34	Betty	Google..	Skriver inn	

			adresse	
23:48	Mary	Skal vi søke på..... vi kan søke på norsk, eller... det er egentlig det samme		
23:54	Betty	Kreft mobiltelefonbruk	Skriver inn	Søkefelt i google
23:59	Mary	ja		
24:02	Betty	Trygg mobil	Klikker på en lenke	
24:04	Mary	Vi kan skrive noe om at det.. kan nedsette fruktbarheten å sånn og..		
24:09	Betty	Mhm..... eehm, hehe	Leser (stille) en internettside	Mary leser også siden
24:16	Mary	Jaaa..... vi kan skrive antall krefttilfeller.... eller krefttilfeller eller ett eller annet sånt....		
24:24	Betty	Søke på google mener du?	Ser på Mary	
24:25	Mary	Ja		
24:25	Betty	Ja	Skifter til google igjen og begynner å skrive	
24:27	Mary	Så vi får kanskje noe.. antall		
24:35	Betty	Ehm.... ..... nå søkte jeg på kreft.... det var kanskje ikke.....	Skriver inn søk på nytt	
24:54	Mary	Ta pluss på slutten		
24:57	Betty	Kanskje....	Skriver inn og leser (stille) søkeresultater	
25:10	Betty	Her, mobilstråling under lupen..... ehhmmm.....	Klikker på søkeresultat og leser(stille)	Mary leser også(stille)
25:31	Betty	Ja ok,..... en times daglig snakk i mobiltelefon eller trådløstelefon over en tiårsperiode dobler risikoen for hjernesvulst	Leser høyt fra internettside	
25:40	Mary	Det er DRØYT...		

25:42	Betty	Trådløs telefon.... det snakker jeg jo i.. stort sett hele tiden	Ser på hverandre	
25:44	Mary	Jeg og...det liksom ikke... (utydelig). mer.. jeg snakker i telefon i to timer å sånn		
25:49	Betty	Forekomst av hjernesvulst var betydelig større på den siden av hodet de hadde... holdt mobiltelefonen	Leser høyt fra internettside	Mary leser også(stille)
25:57	Mary	Skreiv du noe om stråling i den artikkelen din?		
26:01	Betty	Nei... åh, jo, beta og gamma	Ser på hverandre, øyekontakt	
26:04	Mary	Ja.		
26:04	Betty	og sånn? Ja.		
26:05	Mary	For det er litt kult..., for det er sånn at... de ionene slår løs ting å sånn.	Lener seg tilbake og ser bort fra skjermen	
26:10	Betty	Hjernen? Mhm	Scroller nedover på siden	Opptatt av internettsiden
26:10	Mary	Slår løs hjernedelene, sånn ja.. i cellene.		
26:20	Betty	De er ikke helt sikre da, er det det som er tingen?	Leser fra internett(stille)	
26:23	Mary	Vi kan skrive at det spekuleres i..		
26:26	Betty	Jaa..... S A R .. hva er det?..... ok..... ehm..... it.... forske.... å forske	Leser fra internett(stille) og skifter til essayet	
26:52	Mary	Emmmm, science?		
26:53	Betty	Ja.....	Skifter til dictionary	
26:57	Mary	Hehe, (uklart)	Virker litt uinteressert	(Untatt one)??
26:58	Betty	Ja.. (uklart)..... .... investigate....	Skifter til en internettside? Skriver inn og	Søker fortsatt etter ”å forske”

			får opp en ny side	/science?
27:24	Mary	Research	Leser fra skjermen	
27:24	Betty	Research... research made...	Leser fra skjermen, skifter til essayet og skriver inn	
27:28	Mary	Får vi lov å gå på do?	Vendt mot Eve som kommer bortom	
27:29	Eve	Jaja dere må... hehe	Ser på skjermen	
27:32	Betty	Sånn.. kanskje? ..... The last ten years... var det det?	Skriver på essayet, wer på hverandre	
27:39	Mary	Ja..... Viss vi skal .... ja... mhm.. skal vi gå på do etterpå?		
27:45	Betty	Ja...		
27:46	Mary	Ok		
27:47	Betty	the last ten years... ehh		
27:50	Mary	Eller, at det kom fram… i en	Ser på Betty	
27:54	Betty	Ok...	Ser på skjerm/tastatur	
27:54	Mary	.. studie som... Jeg kan si det på norsk da så...		
27:58	Betty	After.. ten years... of research		"Of research" sies i kor
28:02	Mary	Of research	Ser på Betty	
28:03	Betty	Ok… After ten years of … re.. research...	Skriver inn I essayet	
28:16	Mary	It…… ikke appeared, men ett eller annet		
28:20	Betty	Research… of mobile phone.. use..?	Ser på Mary og skriver	For å få bekreftelse?
28:24	Mary	Ja, mhm		
28:30	Betty	It showed.....	Skriver, men	

			stopper opp	
28:36	Mary	Det kom fram..... det ble oppdaget...	Ser på Betty/skjerm	
28:43	Betty	It got discovered.. det blir jo litt...	Ser på Mary/skjerm	
28:47	Mary	Gå på den derre... tritrans		
28:49	Betty	Tror ikke den oversetter setninger..	Skifter til www.tritrans.net	Usikker på hva som sies...
28:50	Mary	Ånei		
28:52	Betty	Komme fram, skal se om den tar det? Show..?	Skriver inn søketekst	”Show” sies før resultat av søk
29:00	Betty	komme inn, komme fram, lokke fram, komme... come, advent... komme ut	Går igjennom resultat, bruker tritrans.net... for å lete.	
29:16	Mary	Vi kan si....it		
29:22	Betty	Ok, res.. vi kan si...	Skifter til essayet	
29:24	Mary	It... it revieled holdt jeg på å si, det var avslørt..nei avslørt, ...nei det var jo ikke noen hemmelighet hehe		
29:30	Betty	Swedish .... ehh		
29:33	Mary	Ss, hva		
29:34	Betty	Forskere...		Snakker litt i munnen på hverandre
29:35	Mary	Hva? De..		
29:35	Betty	Hva du... sciences .... forsker..... scientist	Skifter til ordbok og skriver inn	
29:51	Mary	scientist		”scientist” sies i kor
29:55	Betty	Ok... swedish scientistssss did a research.. ?	Skifter til essay og skriver, snur seg mot Mary for bekrefting	

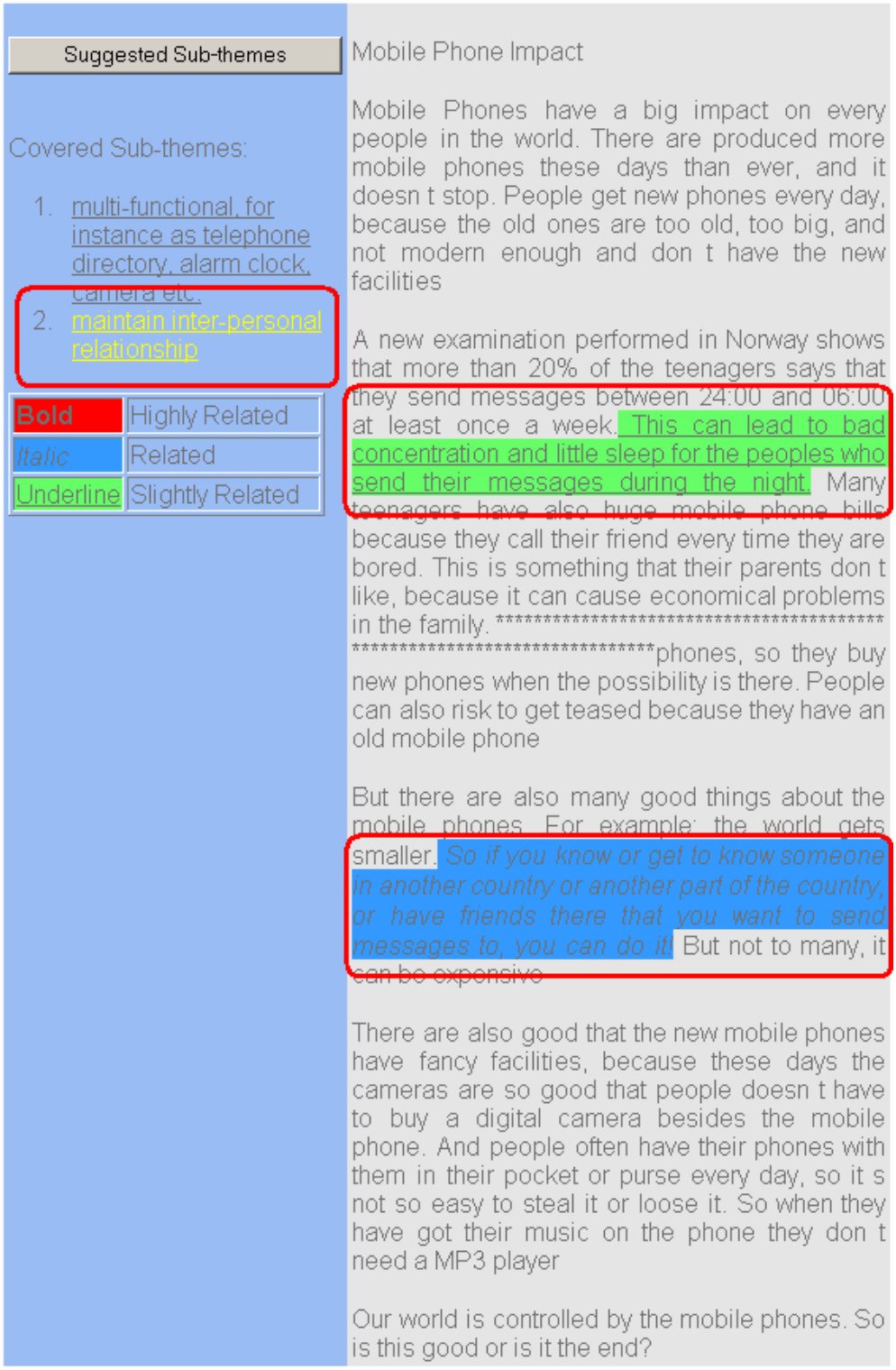
30:07	Mary	Ja. ... Search.. åh.. som gikk... over ti år liksom..	Nikker bekreftende	
30:14	Betty	Research in a period… of… of ten years?	Skriver	
30:22	Mary	Ja		
30:25	Betty	And it showed that…. Eller … and after… nei..	skriver	
30:32	Mary	Nei	Følger med på skjermen	
30:33	Betty	It showed that … ehh	Skriver	
30:36	Mary	one hour….		
30:37	Betty	People… people who talk… er det talks eller er det talk?	Skriver, ser på Mary	
30:46	Mary	Talk tror jeg… nei.. .. Nei, vi bare... det er…	Ser på skjermen	
30:50	Betty	Tror det er talks.. People who talks.. in their cell.. mobile… phones	Skriver	
31:02	Mary	One hour…		
31:07	Betty	Hour a day… øker? Øker…. Selvfølgelig……. Increases	Skriver og skifter til ordbok	
31:22	Mary	Increases kanskje		
31:24	Betty	Increases... det høres så proft ut	Skifter til essayet	
31:26	Mary	Hehe, ja det var det jeg å tenkte... det er sikkert et skikkelig (utydelig) ..ord		
31:28	Betty	Increases....	skriver	
31:34	Mary	Ses.....	Ser på skjermen	
31:36	Betty	....Increas	Skriver	
31:37	Mary	The risk… of getting...	Ser på skjermen	
31:43	Betty	Getting	skriver	
31:44	Mary	Hjer..		Begynner å sei hjerne(kreft?)

31:44	Betty	brain cancer	Skriver	
31:46	Mary	Ja… eller at tumor on… brain tumor… fordi vet ikke om det kalles hjernekreft		
31:53	Betty	Tumor… sånn?	Skriver	
31:54	Mary	Ja		
31:57	Betty	Tumor…… Kreft……	Skriver, skifter til ordbok	
32:06	Mary	Svulst..		
32:12	Betty	Tumour, ok…..eehh. … it showed that..	Skifter til essay, fortsetter å skrive	
32:20	Mary	They doubled the risk, eller et eller annet sånn		
32:23	Betty	They…. Doubled ….. doubled… the risk… and…		
32:36	Mary	The tumor was located in…		
32:38	Betty	Ja…		
32:41	Mary	Eller situ.. nei.. ja..		
32:42	Betty	The tumor..... was.. in the... brain… part …	Skriver	
32:50	Mary	That was … mostly in contact with the…. Hehehe, mobile…	Ser på Betty	
32:57	Betty	In the…. Side kanskje..? Side .. of …the… brain…. where you	Skriver	
33:09	Mary	Where…Eller the....		
33:10	Betty	Where they had their cellphone during a conversation?		
33:16	Mary	Ja!		
33:22	Betty	Conver.. sation	Skriver	
33:25	Mary	When they… Where they have	Peiker på skjermen, retter skrivefeil	
33:31	Betty	Where they have.... their .... ?		

33:34	Mary	Ja		
33:37	Betty	mobile phone during…. Ehh, kan gjenta… It showed that they doubled the risk of tumor on the side of the brain where they had their mobile phone….	Leser fra skjermen	
33:48	Mary	Ok, skal vi gå på do?		
33:49	Betty	Ok..		

Covered Sub-themes	Mobile Phone Impact
Suggested Sub-themes: • Say more about: convenient. Users can contact people at any time and place, and users can be contacted everywhere too • Say more about: a popular communication device, especially for emergency • Say more about: may cause damages to brain/ cause cancer • Say more about: annoy people/ disrupt everyday life. • Say more about: users should adopt appropriate telephone manner	Mobile Phones have a big impact on every people in the world. There are produced more mobile phones these days than ever, and it doesn t stop. People get new phones every day, because the old ones are too old, too big, and not modern enough and don t have the new facilities A new examination performed in Norway shows that more than 20% of the teenagers says that they send messages between 24:00 and 06:00 at least once a week. This can lead to bad concentration and little sleep for the peoples who send their messages during the night. Many teenagers have also huge mobile phone bills because they call their friend every time they are bored. This is something that their parents don t like, because it can cause economical problems in the family. The new cell phones have cameras, so teenagers and other people, can take pictures of people when they are in an uncomfortable position, and use it against them at other times. People who usually get teased, have been even more teased when the mobile phones got cameras. And this is not good There are not just teenagers who are addicted to their phones, there are also adults. And they can be as bad as or worse than their children. Maybe because they have no one who can say: You ve got to stop this, we haven t got enough money to do this If an adult meets a person, they send each other SMS all the time, this can be very expensive, especially if the person you are sending SMS with are from or in another country People with low social status can stop talking with others and hide them self behind the phone, these people are often the people who don t have any friends, maybe they are uncomfortable with them self, the mobile phone doesn t help at all in these cases Mobile phones are also very expensive, people wants to own the hottest and newest phones, so they buy new phones when the possibility is there.

Feedback1.htm(suggested subthemes)



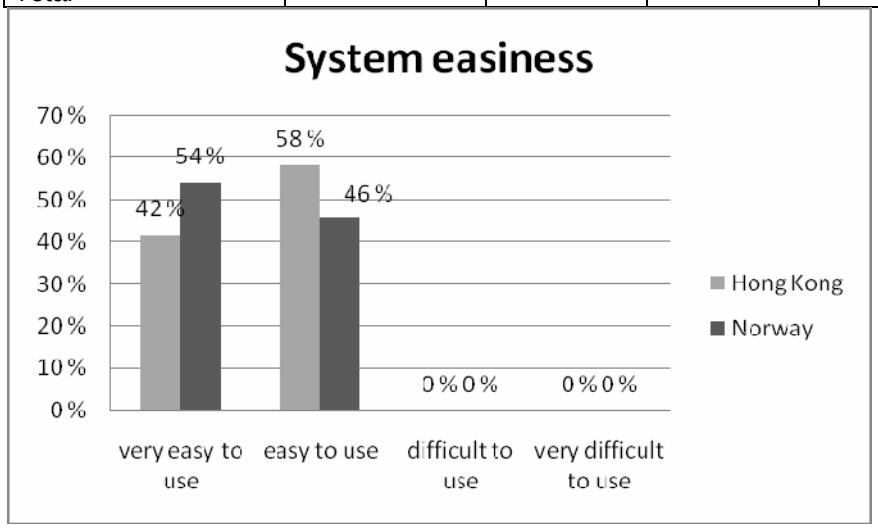
Feedback1.htm(covered subthemes)

Appendix E

Comparison between studies performed in Norway and in Hong Kong

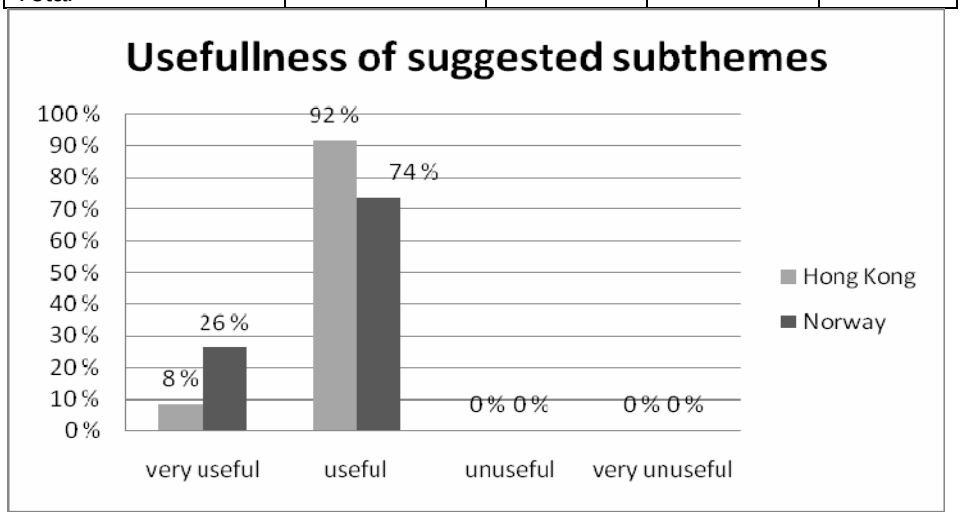
5: This EssayCritic is

System easiness	Hong Kong		Norway	
	Number	%	Number	%
very easy to use	5	42 %	13	54 %
easy to use	7	58 %	11	46 %
difficult to use	0	0 %	0	0 %
very difficult to use	0	0 %	0	0 %
Total	12	100 %	24	100 %



6: The suggestions on the missing ideas (sub-themes) in your essay provided by this system are

Usefullness of suggested subthemes	Hong Kong		Norway	
	Number	%	Number	%
very useful	1	8 %	6	26 %
useful	11	92 %	17	74 %
unuseful	0	0 %	0	0 %
very unuseful	0	0 %	0	0 %
Total	12	100 %	23	100 %



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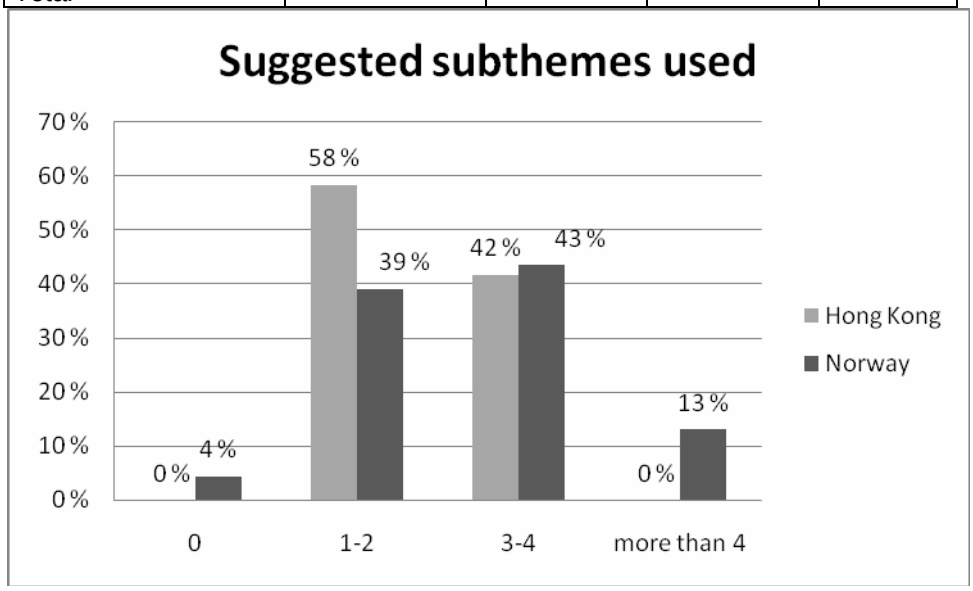
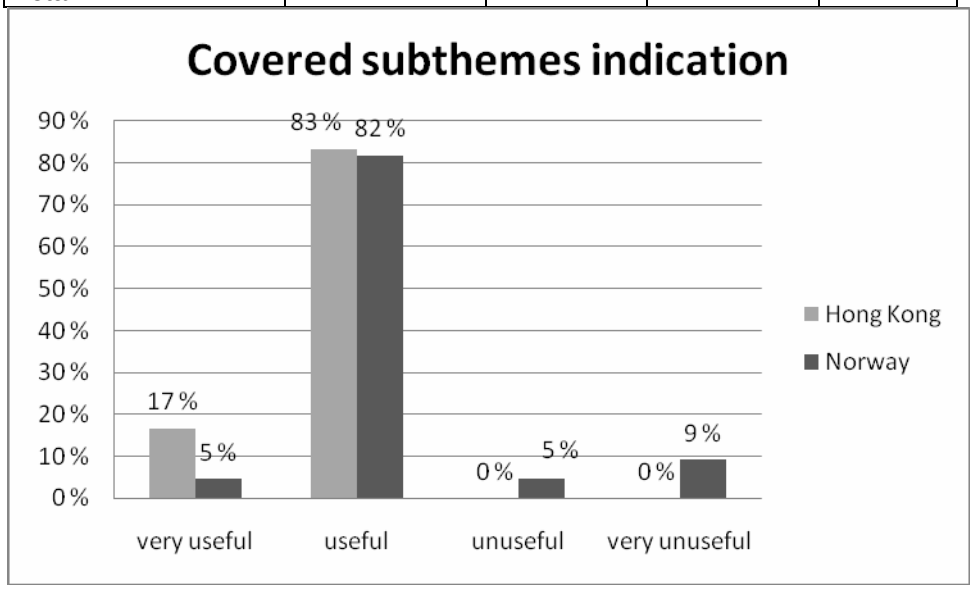
7: How many sub-themes suggested by this system did you use in your essay?

Suggested subthemes used	Hong Kong		Norway	
	Number	%	Number	%
0	0	0 %	1	4 %
1-2	7	58 %	9	39 %
3-4	5	42 %	10	43 %
more than 4	0	0 %	3	13 %
Total	12	100 %	23	100 %



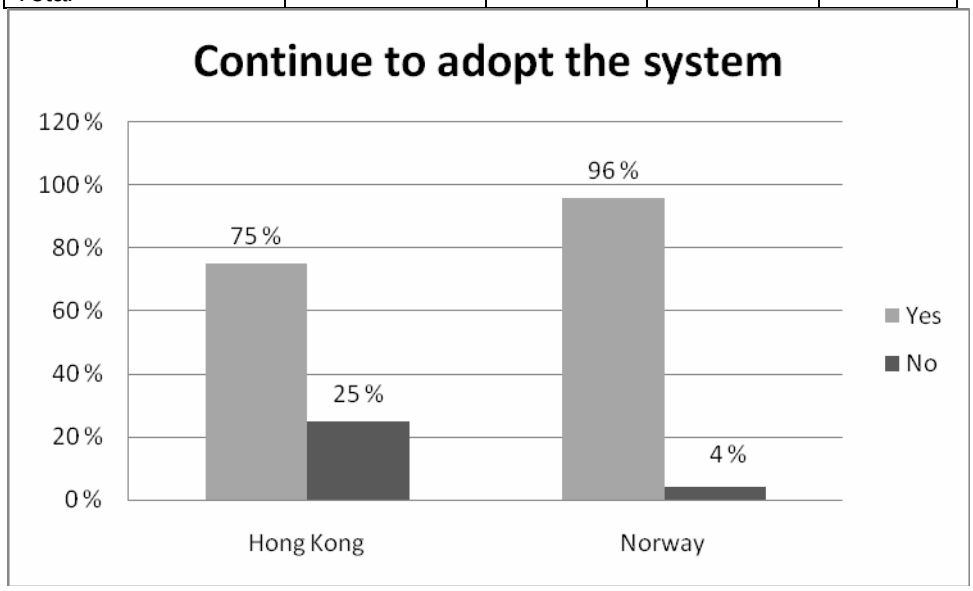
8: The covered sub-themes in your essay indicated by the system are

Covered subthemes indication	Hong Kong		Norway	
	Number	%	Number	%
very useful	2	17 %	1	5 %
useful	10	83 %	18	82 %
unuseful	0	0 %	1	5 %
very unuseful	0	0 %	2	9 %
Total	12	100 %	22	100 %



9: Do you think the teacher should continue to adopt this system for your essay writing in the future?

Continue to adopt the system	Hong Kong		Norway	
	Number	%	Number	%
Yes	9	75 %	23	96 %
No	3	25 %	1	4 %
Total	12	100 %	24	100 %



Nr.	Group	Use of computer			Remarks regarding adopting the system for further use
		Avg. hrs	uses	Remarks	
014	HK	>20	1,2,4		some points could not be detected; it may hinder students' creativity as they will follow the suggested points
015	HK	20	1,2,3		it's useful
016	HK	70	1,2,3,4,5	homework	system may misinterpret the meaning; it accepts poor grammar
017	HK	>28	1,2,3		teacher can see how students elaborate on the suggested points; good to learn from others
018	HK	12	1,2,3		limited suggestions; let students rely on system instead of creating own ideas
019	HK	84	1,2,3		reduce teachers' workload
020	HK	14	1,2,3		provide many ideas for students in writing
021	HK	20	1,2,3		reduce teachers' workload
022	HK	30	1,2,3		teachers can correct more easily
023	HK	80	1,2,3,4		students can know the missing points easily
024	HK	30	1,2,3		help students to write the essay more

					easily
025	HK	50	1,2,3,4		generate more ideas
N1	Norway	10	1,3	Projects etc	It is a very instructive program and it saves the teacher for unbelievable amount of work. It was also a fun way to learn!
N2	Norway	10	1,3	Projects	It saves the teacher of some revision and the student get tip even if they don't come from the teacher. It is also a good and different way to learn!
N3	Norway	10	1,3	Projects	It is a very useful program, with good tip for writing a better essay. You can use it more often then the teacher have time to revision your essays.
N4	Norway	10	1,3	Projects	It is a good program that helps us to write and it is easier for the teacher as well. It does not take long time to revision.
N5	Norway	1-2	1,2,3		Yes, becaus it is an easier way to find errors/things missing in the essay
N6	Norway	20-30	3		Because it is nice if you get a writing block and it is nice to get a feedback prior to delivery to the teacher
N7	Norway	once a week	1,2	Facebook etc	Because it's good!
N8	Norway	4	1,2,3		It's easy respons. Nice and so on
N9	Norway	7	1		It is better that a living human with a brain consider based on skill and experience, than a programmed computer.
N10	Norway	5	1,2	Forums	It's a good way to check what sub-themes you've covered and how well you've stuck to the subject, even though it has no clue about structure or quality.
N11	Norway	7	1,2		Because it can help people write better essays
N12	Norway	15-20	1,3		Because it gives good advice. And it gives good training to improve our own skills
N13	Norway	10	1,3		It is useful
N14	Norway	10	3		Yes it is of great help if you don't find any themes
N15	Norway	18	1,2	Series at net	It is interesant and it get easier to correct
N16	Norway	once a weel	1,2,3		Because we got to know more about what we missed and so on for the essay
N17	Norway	8	1,3	Music	I've been sick so I haven't tried the program
N18	Norway	4-5?	1,2,3		Because I think it is useful and I learn much more.

N19	Norway	ca 20	1,3	Graphic programs(Photoshop, Corel Painter osv) Internet communities	Yes, maybe. I don't think it should be used every time (my opinion is that it hand over too much of the work process to the computer), but maybe som times as training. (It should be adjusted to recognizing more synonyms)
N20	Norway	15-20	1,3		Because it gives good advices and it is good writing practice to improve.
N21	Norway	50-60	1,2,3	Linux	The system will surely be helpful for the teacher correcting assignments, so further use by the teacher will be positive. The case is different for the pupils, as I can't imagine the system (as it is now) useful for them. It's having too many errors for that.
N22	Norway	10	1,2,3		Because ut makes it much easier to write a good essay, and to cover the most important subject.
N23	Norway	20	1,2,3		Because it makes it much easier to write a good essay, and it tells you about which subjects are important
N24	Norway	8	1,2,3		It can be useful if you lack something to write about/ideas

1- communication
2- searching information
3- entertainment
4- conduct online transactions
5- others