Distance students’ perspectives about a formal learning management system at a Swedish university
Abstract

This thesis has conducted interpretive qualitative research to investigate the impacts and limitations of LMS Moodle in distance students’ learning process from distance students’ perspectives. The qualitative data was collected from mediated semi-structured interviews with distance students participating in a Master program at Linnaeus University. Through empirical findings and analysis, the positive experiences and limitations of using Moodle in facilitating distance learning process have been revealed from distance students’ perspectives. The positive experiences include that LMS Moodle was used by distance students for interacting with other students, teachers and accessing study contents during their distance learning process. Moodle was used to know new classmates, teachers and the new learning system, recruit group members for the collaborative works, communicate with teachers and other classmates, and obtain significant information about courses. Especially, accessing study contents in Moodle easily was critical for distance students' learning. However, there were still some limitations. Distance students preferred Facebook to Moodle for student-student interaction during the process of collaborative works. The interaction with teachers was not adequate and timely for distance students. The limitations also include unsatisfactory Moodle interface design and poor usability of Moodle.

Some suggestions about improving LMS Moodle in different ways had also been acquired from the research. The suggestions from distance students mainly focus on integrating Moodle with other web conferencing platforms for improving the quality of student-student, student-teacher interaction in Moodle, ameliorating the interface design of Moodle, and adding Moodle tutorials. The result will help the development of LMS based on distance students' needs and finally benefit distance students' learning process.

Key words: Distance education, Learning Management System Moodle, interaction, students' perspectives.
Acknowledgement

This work has not been possible without the guidance, help and support of my supervisor and other professors. I would like to acknowledge the advice and guidance of the supervisor of this thesis, Konstantina Pentarchou. I am so grateful to my supervisor who helped me to finish this thesis, and other professors for their efforts and guidance. Special thanks to all the people who participated in this study, the study would not have been successful without them. I owe my deepest gratitude to my family: my parents, for their endless love and support. And I appreciate the opportunity they gave me to start master degree in Sweden.

Yangyang XU
Table of Content

1. Introduction................................................................................................................6
   1.1. Purpose Statement and research questions..........................................................7
   1.2. Previous studies...................................................................................................7
   1.3. Topic Justification................................................................................................8
   1.4. Research settings..................................................................................................8
      1.4.1. Distance education at Linnaeus University..................................................9
      1.4.2. Moodle.........................................................................................................9
   1.5. Scope and Limitations.......................................................................................10
   1.6. Thesis Structure.................................................................................................10

2. Literature Review.....................................................................................................11
   2.1. Transactional theory..........................................................................................11
   2.2. The implementation of LMS in distance learning.............................................13
   2.3. Conclusion.........................................................................................................14

3. Methodology............................................................................................................15
   3.1. Philosophical Tradition.....................................................................................15
   3.2. Methodological Approach.................................................................................15
   3.3. Methods for Data Collection.............................................................................16
      3.3.1. Participants and Selection Criteria.............................................................16
      3.3.2. Interview Procedure...................................................................................17
   3.4. Method of Data Analysis...................................................................................17
   3.5. Validity and Reliability.....................................................................................18
   3.6. Ethical Considerations.......................................................................................18

4. Empirical Findings...................................................................................................20
   4.1. Data collected from semi-structured interviews................................................20
      4.1.1. Know classmates and get information from the teachers in Moodle at the
              beginning of every program.....................................................................................20
      4.1.2. Find colleagues and get information about courses in Moodle during
              studies ....................................................................................................................20
      4.1.3. Access study materials in Moodle..............................................................21
      4.1.4. Prefer social media platforms to Moodle for communication in group
              works ....................................................................................................................22
      4.1.5. Problems in communicating with teachers through Moodle......................23
      4.1.6. Moodle is complicated and not user-friendly.............................................24
   4.2. Suggestions for improving Moodle...................................................................24

5. Discussion................................................................................................................26
   5.1. RQ 1. How do distance postgraduate students perceive that the LMS (Learning
          Management System) affects their learning process ?.................................................26
      5.1.1. The positive experiences of using LMS Moodle........................................26
      5.1.2. The limitations of using LMS Moodle.........................................................27
   5.2. RQ 2 In which areas LMS can be improved to better facilitate distance
          students’ learning process?....................................................................................29
      5.2.1. Suggestions for improving interaction in Moodle.......................................29
      5.2.2. Suggestions for improving interface design..................................................30
      5.2.3. Suggestions of adding Moodle tutorials.....................................................30

6. Conclusion................................................................................................................32
   6.1. Conclusions.......................................................................................................32
   6.2. Contribution.......................................................................................................33
   6.3. Future Research.................................................................................................33

7. Reference..................................................................................................................34
8. A. Appendix.................................................................................................................. 41

List of Figures
Figure 2.1 .................................................................................................................. 11
Figure 2.2 .................................................................................................................. 15

List of Tables
Table 1.1 .................................................................................................................. 9
Table 5.1 .................................................................................................................. 27
Table 5.2 .................................................................................................................. 31

List of Abbreviations
DE (Distance Education)
LMS (Learning Management System)
Moodle (Modular Object-Oriented Dynamic Learning Environment)
OSN (online social networking)
SC interaction (Student-content interaction)
SI interaction (Student-interface interaction)
SS interaction (Student-student interaction)
ST interaction (Student-teacher interaction)
1. Introduction

This chapter presents the background of Distance Education, research purpose and research questions, topic justification, scope and limitations of this study and the organization of the thesis.

Nowadays, distance learning becomes more and more popular in the whole world. Bartelloni (2009) reported that in the US alone, there are now more than 6 million higher education students enrolled in at least one distance learning course. Even though the distance learning can’t replace the traditional face-to-face learning, it still brings many benefits, especially if studies are combined with full-time work. Actually, people choose distance learning courses or programs in order to improve their educational level, either guided by their career development plan or because they love learning new things and developing new skills, or a combination of the two (WH Magazine, 2017).

Distance education is an institution-based formal education in which learning groups are separated and interactive telecommunication systems are taken to connect learners, resources and teachers (Schlosser & Simonson 2009, p. 1). Actually there are four characteristics which apply to distance education. Firstly, it is a kind of online teaching model held by institutions. Secondly, there must be the geographic separation between the teachers and students. Thirdly, interactive communication tools connect learning groups with teachers. Finally, distance education establish a learning group, sometimes called a learning community, which was composed of students, teachers, and instructional resource as other types of education (Berg & Simonson, 2016).

Teaching and learning process in distance education can't be face-to-face, and the delivery of information and the communication among different participants is mediated. Therefore, the successful implementation and use of Information Communication System (ICT) in distance education are necessary. The advantages of ICT in distance education is described as allowing students to get more in-depth information, customize different needs, promote higher thinking skills and knowledge structure, provide real materials and interaction from different cultural and linguistic backgrounds, and establish a learning community (Rahman, 2014).

Interaction has long been a defining and critical component of the teaching and learning process and context (Anderson, 2003), which involves student-student (SS), student-teacher (ST) and student-content (SC) interaction in distance learning. The interaction between students and interface (ST) is also important in learning process since it represents the interaction between students and technology. It is one of the key elements to be required in a quality online learning environment(Yoo, Jeong Kim & Young Kwon, 2014). Besides, it is through interaction that students can construct knowledge in a meaningful and memorable way (Rhode, 2009). Therefore, interaction is closely related to students’ learning process.

Given that the quality of interaction provided through LMS is an essential factor that defines the quality of distance learning process, the perceptions of the students about the LMS interface and functions appear to be important for their distance learning.

The research was conducted at Linnaeus University in Sweden. In Sweden, distance students of higher education benefit from Open Educational Resources (OER) project which provides free access, use and reuse of digital materials in teaching, learning and research (Hylén, 2006), and it includes content, software tools, licenses and best practice (Ossiannilsson & Schneider, 2012). In this context, Moodle (Modular Object Oriented Dynamic Learning Environment) and e-meeting tools like Adobe Connect
platform and Zoom, hosted by the Swedish national university data network SUNET, are systems that are used mostly by the distance students.

1.1. Purpose Statement and research questions
Given that the quality of the different kinds of interaction provided by the LMS is closely related to the quality of distance learning as perceived by students, it is critical to explore the distance students' perspectives towards the effects of LMS concerning interaction. Therefore, the aim of this thesis is to examine the impacts of LMS in distance postgraduate students' learning process at Linnaeus University and to reveal some limitations of LMS which may contribute to inspire LMS designers to develop LMS in order to meet distance students' needs. Meanwhile, suggestions from distance students will be presented for the improvement of Moodle in different areas. In this case, LMS refers to Moodle in the context of distance learning.

Two questions are proposed as follows.
1. How do distance postgraduate students perceive that the LMS (Learning Management System) affects their learning process?
2. In which areas LMS can be improved to better facilitate distance students’ learning process?

1.2. Previous studies
With the wide application of digital teaching and communication technology in distance education, the research agenda of distance education has also been developed in this field. Garrison, Anderson, and Archer (2000) expressed that the adoption of computer-mediated communication in higher education has far outpaced our understanding of how this medium should best be used and it was an interesting and important area to study the interactions, perceptions, and outputs of participants engaged in the use of computer-mediated communication for educational purposes. In fact, the focus of distance education research has shifted to learner-centered, focusing not only on the result but also on student satisfaction and interaction patterns (Simonson, Schlosser & Orellana, 2011). In regard to the effects of interaction in distance learning, there are plenty of studies using quantitative or qualitative methods to verify the causal relationship of mediated interaction in user experience and learning outcomes (Bernard, et al., 2009; Ferguson, 2010; Godwin, Thorpe & Richardson, 2008; Rodríguez-Ardura & Meseguer-Artola, 2016; Thoms & Eryilmaz 2014).

According to the meta-analysis of three-type of interaction in distance educations (Bernard, et al., 2009), the level of interaction of distance learning systems is important. In fact, there are three types of interaction mentioned in this study: student-student interaction (SS), student-teacher interaction (ST), and student-content interaction (SC). Researchers found that integrating ICTs into DE courses, whether to increase interaction with contents (SC), with the teachers (ST), or with peers (SS), positively affects student learning. Besides, only the enhancement SC interaction directly related to the size of the effect, which meant that the designers needed to consider the content of priority. Additionally, the SS+SC and ST+SC interaction generates significant linear effects on students learning outcomes, so SS and ST interaction are also important for distance learning. The findings can be an instruction for designers to enhance the level of interaction and concentrate on instructional design and software design.

In a quantitative study, the researchers (Eryilmaz & Thoms 2014) compared the impact of online social networking (OSN) software and learning management system (LMS) software. OSN has online discussion boards, blogs file sharing, the ability to create multiple sub-communities, and peer-to-peer networking capabilities that bring greater
interactivity. In contrast, the main interaction form of LMS software is asynchronous online discussions which provides courses peer-to-peer interaction but is not easy for sharing and embedding other multimedia. Besides, it lacks the basic social features such as avatars and links to profiles to build trust among students. Therefore, the level of student-student interaction in OSN was higher than the level in LMS. The result shows that distance students who used OSN had higher satisfaction. The average course GPA of users participating in OSN courses is higher than that of users participating in LMS courses. The result shows that higher levels of student-student interaction bring better learning outcomes and user experience of learning systems.

Another research examined the effects of computer-mediated interaction and integration on students’ performance and satisfaction. The researchers divided 36 distance education courses into four groups with the standards about different levels of interaction and integration (Godwin, Thorpe & Richardson, 2008). They collected data from students who took these 36 courses in an open university and used fixed-effect and random-effect statistics models to analyze the data. Finally, they found that students scored poorer in the courses with a lower level of interaction and integration. But in the fixed-effect model courses with a higher level of interaction and lower level of integration, students' passing rate tended to be higher. However, from the random effect mode, these trends do not seem to be significant. So these findings cannot be generalized. Besides, it seems that interaction and integration can have both positive and negative effects. From the perspective of pedagogy, interaction is undoubtedly desirable. Under the condition of diversification, it is necessary to maximize the value of the interaction.

These studies which reveal the crucial effects of computer-mediated interaction on distance students’ learning achievements and satisfactions confirm the importance of interaction in distance learning. Interaction ought to be considered in distance learning, but it has to be understood in terms of whether and how students engage with interaction in a virtual learning environment. Besides, the established ICTs used for distance learning, such as Learning Management Systems technologies, has to be developed sufficiently or examined systematically for their capacity facilitating interactivity behaviors. Therefore, in this study, I conducted a qualitative study to explore exploring the effects of LMS concerning interaction from students’ perspectives.

### 1.3. Topic Justification
Distance students who take the master programmer courses by using LMS Moodle at Linnaeus University. For these distance students, the e-learning system profoundly influences their learning process. Knowing students’ perspectives about their learning systems and suggestions concerning promoting their systems could bring better distance education for distance learners. For the university, concerning alternative forms of free educational opportunities grow rapidly (Miyazoe & Anderson, 2015), knowing distance students’ need about the different kinds of interaction to ensure less cost and facilitate students’ learning effectiveness is significant for distance education institutions to keep competence in the distance education market. Besides, the result could contribute to inspiring the designers to develop learning management systems such as Moodle in compliance to distance students’ needs.

### 1.4. Research settings
The research was conducted at Linnaeus University in Sweden. The main research subject is the LMS Moodle which is used as the formal distance learning system for the distance students in the master program of ‘Informatics’.
1.4.1. Distance education at Linnaeus University

At Linnaeus University, web-based courses and programs are offered via online learning system. The advantage is flexibility, which is valuable for students who want to decide where and when to study by themselves. As for ‘Information System’ master program, there are both distance and conventional students in this program. The distance education in the Department of Informatics provides distance students with almost the equal learning environment as campus students. The LMS Moodle supports the teaching and learning process for distance students. Besides, the synchronous online courses are provided for distance students. The pedagogical design of this program includes a large amount of collaborative group works among distance students.

1.4.2. Moodle

LMS is based on the characteristics of communication (chat, forum, wiki, blog, vocabulary, test) and information (text data, audio and video links and search) channels. Moodle is a free LMS which is widely used in universities. It has the basic functions of monitoring registration, personalization and differentiation, the management of learning process, the record of learning results and test results, the integration with synchronous and asynchronous communication mechanism, and the integration with the external information system (Kerimbayev, et al., 2017). It also has some extra and innovative functions such as Calendar and Grade book. Moodle is an example of a LAMP application written in a web scripting language and stored in an SQL database (Moore, 2010). It was originally designed to enable educators to create online courses and encourage interactive and collaborative construction of learning content (Amandu, Muliira & Fronda, 2013). A table displays almost all the components of Moodle (Ssekakubo, Suleman & Marsden, 2013).

Table 1.1 The service components in Moodle (Ssekakubo, Suleman & Marsden, 2013)

<table>
<thead>
<tr>
<th>Service component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Announcements</td>
<td>View current and time-critical information</td>
</tr>
<tr>
<td>Assignments</td>
<td>View, post and submit assignments</td>
</tr>
<tr>
<td>Blogs</td>
<td>Course or Project Blog or Journal</td>
</tr>
<tr>
<td>Calendar</td>
<td>View deadlines, events and so on</td>
</tr>
<tr>
<td>Chat room</td>
<td>Written real-time dialogue</td>
</tr>
<tr>
<td>Course outline</td>
<td>Summary and/or course requirements</td>
</tr>
<tr>
<td>Drop box</td>
<td>Private file sharing between teachers and students</td>
</tr>
<tr>
<td>Email archive</td>
<td>View e-mails sent to the site</td>
</tr>
<tr>
<td>Forums</td>
<td>Show discussion areas and topics for this course</td>
</tr>
<tr>
<td>Maps</td>
<td>Use Interactive Google Mapping</td>
</tr>
<tr>
<td>Messages</td>
<td>Use Interactive Google Mapping</td>
</tr>
<tr>
<td>News</td>
<td>Display news and updates from online sources</td>
</tr>
<tr>
<td>Participants</td>
<td>List of course participants</td>
</tr>
<tr>
<td>Podcasts</td>
<td>Manage individual podcasts and podcast feed information</td>
</tr>
<tr>
<td>Polls</td>
<td>Anonymous voting</td>
</tr>
<tr>
<td>Q&amp;A</td>
<td>Students can answer questions for electronic assessment</td>
</tr>
<tr>
<td>Resources</td>
<td>Acquire documents, URLs, or other web sites</td>
</tr>
<tr>
<td>Search</td>
<td>Search for content within or across courses</td>
</tr>
<tr>
<td>Slideshow</td>
<td>Display and view slides of image collections from resources</td>
</tr>
<tr>
<td>Tests and quizzes</td>
<td>Online Testing</td>
</tr>
<tr>
<td>Wiki</td>
<td>Collaborative editing of pages and content</td>
</tr>
</tbody>
</table>
1.5. **Scope and Limitations**

Concerning the importance of interaction supported by LMS in distance learning, this study aims to explore the roles of LMS in distance learning. The main focus of this study is to reveal students’ interaction activities in LMS and the effects of LMS on supporting the interaction in distance learning based on distance students’ learning experiences. In addition, this study also devotes to explore distance students’ suggestions concerning improving the performance of LMS in distance learning.

Limitations in this study come from two sources. At first, this study object is Moodle as one of the most used LMS (Susana, et al., 2015), which can’t represent all the kinds of LMS (Learning management systems). Therefore, the result of this study could not reflect the comprehensive effects of all the LMSs in distance learning. Secondly, since the research contest is in one master program at Linnaeus University, instructional design and the characteristics of students and/or teachers may influence the results. There are both distance students and in-school students in this program, and the research objects are only a few distance students. Under such situation, the results of research cannot be generalized.

1.6. **Thesis Structure**

This thesis includes six chapters. There are many sections in each chapter. In chapter one, the researcher presents an introduction of this study, including research purpose, research questions, research background, research scope, and research limitations. In chapter two, the relevant literature of Moore’s transaction theory and related four types of interaction (student-student, student-teacher, student-content and student-interface interaction) in distance learning are reviewed as the main theoretical framework for this research. In chapter three, the researcher explains the methodology tradition, methodological approach, data collection methods, data analysis methods, and ethical consideration. In chapter four, the researcher presents the empirical findings related to the research questions, the data is coded and then categorized which are presented along with the conversation quotes from the interviewees. In chapter five, the findings are discussed, and the analysis results are used to answer the two research questions. In chapter six, the research writes conclusions, contributions and suggestions for future research.
2. Literature Review

This chapter introduces a literature review of transaction distance theory which involves four types of interaction (student-student interaction, student-teacher interaction, student-content interaction, student-interface interaction) in distance learning process. I have also introduced LMS, components of integrating LMS into teacher-learning process and the relationship between interaction and these components. The literature review provide categories for the semi-structured interviews and analysis.

2.1 Transaction theory

The theory of transaction distance is introduced as the guiding framework to better understand the distance learning process. Moore’s (1993) transaction distance theory focuses on the relationship between teachers and students when they are separated by space or time. Generally, the theory describes the relationship among the three variables of dialogue, structure and learner autonomy, and how the interactions among these variables affect the intensity and quality of transaction distance learning. Technology-based interactive learning environment includes four types of interaction, respectively student-student, student-teacher, student-content and student-interface interaction (Chou, 2003; Moore, 1989). The interplay of these different types of interactions is closely related to the distance learners experience throughout their academic programs (Ustati & Hassan, 2013). One study proposed a model about the interplay of four types of interaction in the process of educational transaction in distance learning settings (Chen, 2001).

![Figure 2.1 Transaction distance and typology of interaction in distance learning environments (Chen, 2001)](image)

- **Student-student(SS) interaction**
  Student-student interaction is mainly about students to discuss, negotiate mutually and share knowledge, interact cooperatively or competitively, or work together as collaborators in the learning process (Littleton & Häkkinen, 1999; Dillenbourg, 1999; Hwang & Arbaugh, 2009), which is at the heart of notions about constructivist learning environments in distance education (Anderson & Kanuka, 1999). Student-student interaction enables distance students to experience a sense of social presence, feeling that they are engaging in real people. Student engagement is linked to grades and motivation (Kuh et al, 2007; Ferguson, 2010). This kind of interaction is necessary in distance learning both for cognitive purposes and motivational support.
Concerning distance learning, international distance learning has many barriers to interaction like isolation, but the engagements of ICTs have improved this situation for these years. The interaction between students and students is achieved through synchronous modes, such as video conferencing and chat, or asynchronous modes, such as discussion board or e-mail messaging (Bernard, et al., 2009). The virtual learning environment should provide a safe and comfortable space for students to provide certain tools for communication and cooperation with others (Wang, 2008).

### Student-teacher(ST) interaction

Student-teacher interaction refers to the interaction between students and teachers. The purpose of this interaction is to increase students' understanding or clarification of learning content (Thurmond, 2003). During the student-teacher interaction, the teacher attempts to stimulate students' interest in the course content, to encourage the student, and to facilitate the learning process (Swan, 2003). In one quantitative study about student-teacher interaction contributing to the sense of community, the results support that the teacher plays an important role in participating in and guiding student discussions and students value the guidance of the teacher during discussions in any formats (Shackelford & Maxwell, 2012). Another article (Brown, 2001) presents that the support from the online teachers was critical at the early stages of the semester as students dealt simultaneously with new content, new technology, and a novel learning environment. Moreover, interacting with teachers improves students' motivation to learn and maintains their interest in the learned content (Moore, 1989).

According to Perez, many students reported that the main disadvantage of distance education was the lack of personal interaction between teachers and students. There was no opportunity for students to meet with teachers in a face-to-face environment, which prevented students from asking questions, participating in discussion and exchanging non-verbal cues with teachers (2001). A study by McIsaac et al. (1999) learned from distance students that they needed immediate and frequent feedback on their work, on their overall progress, as well as personalized and group feedback. Rogers et al. (2003) found that postgraduate teachers believed that distance students benefited from one-to-one telephone communication besides e-mail communication and interaction in the course.

In distance education, student-teacher interaction can be synchronous, such as through telephone, video conferencing and chat, or asynchronous, such as through communication, e-mail and discussion boards (Abrami et al, 2011). Therefore, both the performance of ICT tools and teachers’ effort are critical to the quality of student-teacher interaction in distance learning.

### Student-content(SC) interaction

As for student-content interaction, Moore (1989) proposes that it is defining the characteristic of education. student-content interaction is the process of students interacting intellectually with the content that results in changes in the students’ understanding, the students’ perspective, or the cognitive structures of the students’ mind. In one article, the author supported that student-content interaction was the most critical form of interaction because it was the place where students learned (Zimmerman, 2012). A study (Bernard et al., 2009) found only strengthening SC interaction was directly related to the increasing effect size of students’ learning achievement outcomes. Therefore, interaction is a significant factor that affects distance students’ learning outcomes. Zimmerman (2012) explains that student-content interaction involves teaching tools and assignments, including PowerPoint presentations, streaming audio
and video presentation or individual projects, such as embedded links to the internet or other resources.

- **Student-interface(SI) interaction**

Student-interface interaction is the interaction between students and the technology used in education. It is a process of operating applications to complete tasks (Hillman, Willis, & Gunawardena, 1994). Mediums provided by the technological tools that offer chances for students to share their ideas, talk and discuss or communicate, access learning resources, and thus forming student-interface interaction (Alhih, Ossiannilsson & Berigel, 2017). Variables related to student-interface interactions include students' computer skills, ICT experiences, perceptions of technology, and easy access to technologies (Dzakiria, 2012).

The interface design of each technology will have a great impact on user interaction. Good student-interface interaction facilitates the interaction between students and students, students and teachers, students and contents which influence the usability of a learning management system. The usability defines whether a learning system allows a set of tasks to be accomplished in an efficient and effective way that satisfies users (Kirschner et al., 2004). The interface design must be designed in a comfortable way to ensure the usability of this system so that users will not encounter any difficulty in using it (Ramakrisnan et al., 2012). Therefore, the interface should be easy to operate, meet user needs, and avoid user confusion and errors (Bevan, 1995).

### 2.1. The implementation of LMS in distance learning

Learning management systems as one kind of information systems focus on online learning, acting as a platform for fully online courses. Most learning management systems provide tools, such as forum, e-mail, blogs, walls (asynchronous communication); chat (synchronous communication); wiki, vocabulary, text and survey (collective construction and interaction tools); books and videos (educational tools); overview of online learning, registration, grouping, database, frequency control and daily courses (management tools) (Garbin et al., 2012). In LMS, students can have a comprehensive environment for communicating with teachers and other students, submitting assignments, reviewing course objectives, downloading course materials, participating in course discussions and checking course progress (Thoms & Eryilmaz, 2014). In fact, many organizations claim that the potential benefits of LMS include greater convenience without time and place constraints, increased cost savings, increased learning experiences (O’ Leary, 2002), and increased students' motivation (De Lange, Suwardy & Mavondo, 2003; Potter & Johnston, 2006). According to educational literature, increased motivation and goal commitment can help improve students' participation and ultimately improve learning outcomes (Kember, 1995). Motivation may stimulate access to learning materials through improved use of LMS, timely feedback to students through online assessment (Breen, Cohen & Chang, 2003) and improved communication among students and between students and teachers through the availability of online forums, discussion forums and email facilities (Beard & Harper, 2002; Kang, 2001). Besides, it can be known that students' perspective of LMS can influence students' participation in LMS and finally influence their learning outcomes (Basioudis et al., 2012).

The technical, social, psychological, and pedagogical design are important factors which influence the perceptions, adoption, and ultimate success of using LMS in the learning process (Emelyanova & Voronina, 2014). One article described a general model about integrating LMS into the teaching-learning process. This model includes three important components: pedagogical design, social design and technological design.
These three components are closely related to different types of interaction (Figure 2.2). In this model, there are some significant criteria of these three components. Teaching design which focuses on content interaction should make the content meaningful, authentic and relevant to students, so that students can share resources suggested by teachers. The socialized design of learning management system includes more real tasks, group work or project-based learning to promote student-student interaction and student-teacher interaction, and include synchronous and asynchronous communication which can be achieved through text, oral chat or visual communication. The technical design of a learning environment pays attention to the interaction with student interface. The interface design of computer programs should focus on ease of learning, ease of use and aesthetics (Wang, 2008).

One important issue is the effectiveness of the learning management system, which can be analyzed by several parameters: the degree and satisfaction of stakeholders (universities, teachers and students) using LMS (Naveh, Tubin & Pliskin, 2010). One study showed that the most influential factor of LMS success is the human factor, namely the perception and attitudes of two groups of stakeholders: students and teachers (Emelyanova & Voronina, 2014).

However, many technology applications and tools are designed and developed without considering students as end users, which affects the successful adoption and use of the technology (Downes, 2005). The concept of student experience is directly related to the usability of LMS (Ramakrishnan et al, 2012). A study identified critical successful factors of LMS implementation from students’ perspectives (Selim, 2007). These factors include teachers with enough computer skills and enthusiasm; strengthening and improving technology and interactive learning through staff planning; developing different teaching and learning styles to meet the new curriculum; improving students’ computing ability and e-learning application skills, and establishing e-learning support services. These factors reveal the need for LMS to be successfully adopted and used in DE from the technical, managerial and human perspectives.

2.2. Conclusion
In literature review, based on transactional distance theory, this study elaborates that the main four types of interaction happened in distance students’ learning process. Besides, these four types of interaction are supported by the formal learning system LMS Moodle at Linnaeus University. Therefore, this study will reveal the effects of LMS concerning interaction based on distance students’ learning experiences.
3. Methodology

This chapter presents the methodological tradition, methodological approach, and research strategy. Moreover, it presents data collection methods and data analysis. This chapter concludes with a discussion on reliability and validity, and the ethical considerations.

3.1. Philosophical Tradition

All research (whether quantitative or qualitative) is based on some underlying philosophical assumptions concerning what constitutes valid research and which research methods are appropriate (Myers & Avison, 2002). This research is based on the interpretative paradigm because the research content is mainly about a deep understanding of learning management systems design, its technology development and their social implications (Myers, 2013). Interpretative paradigm emphasizes that human's perception and acceptance of the external world is not passive, but active cognition and interpretation. In recent years, interpretive research has played an important role in information systems research (Walsham, 1995).

Interpretative research can help IS researchers understand human thoughts and behaviors in social and organizational context. It has the potential to generate profound insights into information system phenomena, including information system management and information system development (Klein & Myers, 1999). Ontologically, the interpretive research on information system assumes that the social world is generated and strengthened by human behaviors and interaction. Therefore, understanding social reality requires understanding how practices and meanings are formed and communicated by languages and implicature (Orlikowski & Baroudi, 1991). Because interpretative research assumes that people create and relate their subjective and intersubjective meanings when interacting with the world around them, interpretative researchers can understand phenomena by visiting the meanings given to them by participants (Myers & Avison, 2002).

Since this study follows the interpretative paradigm, it is assumed that the impact of Moodle on distance learning is not objective with known attributes or dimensions. The effect depends on the actual functional environment of Moodle. It is also inductive. According to the study by Guba and Lincoln (1985), it is appropriate to use inductive methods when studying organizational phenomena from a primarily interpretive perspective.

3.2. Methodological Approach

Qualitative research methods are designed to help researchers know about people and the social and cultural context in which they live. As the transfer of the focus of information system from technical issues to managerial and organizational issues, qualitative research methods become more and more useful (Myers, 1997). The main aim of qualitative research used in IS field is to understand and explain Information System. Qualitative research can well help understand the unstructured complexity of information system implementation. This lack of structure is mainly due to the complex interaction between social and technological factors. Qualitative research in these areas can help reveal the underlying reasons why information systems are less successful than expected (von Hellens, Beekhuyzen & Kerr, 2006). This means that IS researchers can use qualitative research to provide complete and satisfactory accounts of success, failure, effectiveness, efficiency, freedom, and conquest, as well as the use of information systems around people, groups, organizations and social problems that occur in computer technology and the use of information system (Lee & Liebenau, 1997).
Generally, the purpose of qualitative research is to understand problems or specific situations by investigating people’s views and behaviors in these situations and their environments. In order to achieve this, qualitative research is carried out in the natural environment, using data in the form of words rather than numbers. Qualitative data mainly come from observations, interviews and literature, and are analyzed by various systematic techniques (Kaplan & Maxwell, 2005).

This study aims to reveal the performance of Learning Management System in affecting distance students’ learning process from distance students’ perspectives in the context of using LMS Moodle as formal distance learning system at Linnaeus University. The semi-structured interviews with distance students would be the main method to collect data and raw data would be the transcription of interviews. The effects and improvement of Moodle and other similar distance learning management systems can be revealed based on the results.

The purpose of inductive methods is to help understand the meaning of complex data by developing summary topics or categories from raw data, which can be called data reduction (Thomas, 2006). The main purpose of inductive methods is to enable the results of research to emerge from the frequent, main or important topics inherent in the original data without the restriction of structured methods (Jain & Ogden, 1999, P. 1597)

In conclusion, since this study aims to reveal the impact of Learning Management System performance on distance students' learning process from students' perspective, using LMS Moodle as the formal distance learning system at Linnaeus University. This study covers the perspectives and methods in the field of interpretive and qualitative research. At the same time, the main research method is induction.

### 3.3. Methods for Data Collection

In this study, qualitative research methods were used to collect data with semi-structured interviews as the main tool. Individual interviews were carried out with students who are in the distance master program at Linnaeus University. Individual interviews were conducted with students of the Distance Master Program at Linnaeus University. The questions which were proposed based on the theory in literature review would guide them to comment on different types of interaction provided by Moodle due to their own experience and encourage them to give suggestion about this learning system which can improve its performance in their learning process. The semi-interviews would be conducted through Skype. In order to obtain interview data more effectively, it is believed that recording interviews is an appropriate choice. This study used transcription applications on mobile phones to record the interviews.

#### 3.3.1. Participants and Selection Criteria

The main participants are distance students in a master program at Linnaeus University and the researcher. A special feature of this master program is that the types of students in this program include campus students and distance students, but the study objects are only the distance students since the theme is the distance learning management system. Identification of a good informant means that it is important to choose suitable interviewees. The qualities of a good informant include these prerequisites (Whiting, 2008):

- Understand the subject - an expert by virtue of involvement in specific life events
- Ability to reflect and provide detailed empirical information about the area under investigation
• Willing to talk

Five interviewees were interviewed by the researcher since only five students replied and accepted the interview after the researcher sent invitations to almost all the distance students in this program. They are distance Master students who have used LMS Moodle in their distance learning for at least half a year. They have knowledge about distance learning and this LMS and they were willing to talk with me about their experience and perspectives of Moodle.

3.3.2. Interview Procedure
As for the semi-structured interview, there are the procedures according to some suggestions from DiCicco-Bloom and Crabtree (2006):
- Prepare a suitable interview schedule.
- Negotiate with distance interviewees about suitable time for the interview.
- Conduct the interview with distance interviewees at the designated time using Skype.
- Ask the interviewees a set of predetermined questions and explored more with extra question emerged from the dialogue.
- Record the conversation using record APP for the later conversation.
- Transcribe the conversations into text for later analysis.

Firstly, the researcher formulated interview questions based on the previous literature and the research aim. The interview was pre-executed and some interview questions were corrected. Next, the researcher sent invitations to almost all the distance students in this program by e-mail, and then negotiated the suitable time for interview with distance students. The researcher conducted the interview with distance interviewees at designated time by Skype and the interview process were recorded by record App. Before interview, the researcher declared the research purpose, and the use of the collected data, and the protection of respondents' privacy. Each interview was controlled within 30 minutes. After the interview, the conversations were transcribed into text for later analysis.

3.4. Method of Data Analysis
In the field of information systems, data analysis focuses on exploring the language, communication and meaning among system developers and organizational members (Myers, 1997). This study focuses on analyzing the data collected from the semi-structured interview with distance students.

After all preparations for analyzing collected data, this study needs to decide how to move from raw data to meaningful concepts or themes which can be called the three Cs of analysis from Lichtman (2013): from coding to categorizing to concepts. After some data was collected, they were transcribed into a format that was useful for analysis. In this study a large quantity of vocal data from the semi-structured interviews were transcribed into written words. It is important that qualitative researchers need creativity and discipline as they conduct data analysis under a systematic approach to analyze and interpret. The challenge is that the methods taken in this study are flexible and open to discussion and interpretation. There are mainly six steps to accomplish this process, which are taken as the main indicators for data analysis. The six steps are as follows.

1. Initial coding. Obtain the initial codes by a careful reading of the transcription. It can be a word, a phrase, or the interviewees’ own words.
2. Revisit initial coding. In this step, I aimed to modify the codes based on an examination of what I have already collected and new raw data. It is important to focus on deleting redundancies, renaming synonyms or clarifying terms.
3. The preliminary list of categories. A long list of codes is transcribed into multiple lists of categories, with related codes as subsets of categories.
4. Modify the initial list. At this point, I may give up some minor categories and combine some relational categories. Actually, it is an iterative process and I need to continue to do it.
5. Revisiting categories. At this point, I need to revisit the list of categories and remove redundancies and identify critical elements which depend on my own judgment.
6. When organizing the codes into concepts, it is the researcher's assignment to decide the most informative or logical manner of classification. I need to reorganize and rewrite and rethink to find powerful ideas.

3.5. Validity and Reliability
The validity of qualitative research refers to the appropriateness of methods, processes and data. It includes the validity of research questions to expected results, the selection of appropriate methods to answer research questions, the validity of research design to methods, the suitability of sampling and data analysis, and the validity of final results and conclusions to samples and situations (Leung, 2015). In order to ensure internal validity, there are eight strategies from Creswell (2014).

1. By examining the evidence from information sources, triangulating different information sources, and using the evidence to establish consistent reasons for the theme.
2. Feedback final reports or specific descriptions or topics to participants to determine whether they think that they are accurate, and use member check to determine the accuracy of qualitative results.
3. Use rich and heavy descriptions to convey the results of the survey
4. Clarify the bias of the researchers
5. Present negative or inconsistent information opposite to the theme
6. Spend enough time in the field
7. Peer review is assisted to improve the accuracy of accounts
8. Use external auditors to review the entire project

Reliability is mainly about the methods used in this research is consistent with other researchers’ methods in a similar area (Creswell, 2014). There are also several procedures to ensure the reliability of qualitative research proposed by Gibbs (2007).

1. Check transcripts in case that there are obvious mistakes made during transcription. Ensure the stability of the definition and meaning of code during the coding process.
2. If the researchers are in a team, they must coordinate communication among coders through regular documentation meetings and shared analysis.
3. By comparing the results of independent derivation, cross-check codes are developed by different researchers.

3.6. Ethical Considerations
Since the role of researchers and the explanation of the whole inquiry is fundamentally subjective in qualitative research (Brennen, 2012), the ethical consideration is important. In general, the protection of human rights, informed consent, human participation in research, publications of the findings and confidentiality belong to the ethical issues that researchers are faced with in their studies in different disciplines (Vehviläinen-Julkunen, 1993). Here, explained three types of ethical issues are described as follows.
1. The relationship between researchers and participants. Firstly, participants subjects have the right to know what will happen. If they decide to participate in a study, they will not take any psychological and physical pressure, manipulation or coercion in the process of the qualitative research. Before the interview, the research has declared the purpose of this research, the use of the collected data, and the protection of personal privacy. At the same time, the researcher has interpreted that if participants wanted to quit in the process of survey, they could quit without affording any responsibilities. Therefore, the concept of informed consent should be taken seriously and fully realized. The informed consents were issued to the respondents and asked them to sign. Typically, informed consents include the title, purpose, and explanation of the research and the procedures to be followed (Munhall, 1988). In this research, voluntary participants and the protection of the anonymity of individuals and institutions in the informed consent was emphasized.

2. Data collection. In qualitative research, a semi-structured interview was taken to collect data. It means that the researchers participated in the study and become the tool for data collection and analysis. This means that the interviewees become collaborators in the research process (Vehviläinen-Julkunen, 1993).

3. The publication of the findings. The basic ethical aspect of publication is to guarantee the anonymity of participants. It means that there would not be any personal information of interviewees about their identification appearing in any report. As for the publication of findings, all participants were aware that this was going to be an academic dissertation and would be published in that form (Vehviläinen-Julkunen, 1993).
4. Empirical Findings
This chapter presents the findings from the data that was collected in this research. The chapter presents each finding in detail.

4.1. Data collected from semi-structured interviews
After transcribing data collected by semi-structured interviews, all of the raw data were coded. In essence, 13 categories were gotten and 7 main themes were ultimately obtained:
1. Know classmates and get information from the teachers in Moodle at the beginning of the program.
2. Find colleagues and get information about courses in Moodle during studies
3. Access study materials in Moodle
4. Prefer social media platforms to Moodle for communication in group works
5. Problems in communicating with teachers through Moodle
6. The interface of Moodle is complicated and not user-friendly
7. Suggestion for improving Moodle

4.1.1. Know classmates and get information from the teachers in Moodle at the beginning of the program
Concerning using Moodle, some situations about distance students using Moodle for communication between students and students were obtained. At first, Moodle was the only way for distance students to know other students and to communicate with each other when they started the specific program.

“For the first time, the first semester, yes, because we didn’t know each other, that’s the only platform that we could know who study with us.” (Interview 3)

“The first connect happened in Moodle because you need find names.” (Interview 4)

One interviewee expressed that at the beginning of the course, they got information from teachers through dashboard or discussion forum in Moodle. The information was about courses, where the useful functions in Moodle are and how Moodle works.

“At the first time I used more like dashboard and the forum. At the beginning, I use more in Moodle to communicate with professors. I would need more time in the first lecture to be guided by teachers in Moodle to know where the function is, how Moodle works and the important information about the courses”. (Interview 4)

4.1.2. Find colleagues and get information about courses in Moodle during studies
The activities in Discussion Forum of Moodle show that the main topics are about finding group members and discussing some questions about courses there. These topics are consistent with some interviewees’ description.

“It is useful in café and latest news, you can know other students. I usually find a group and see what’s going on within a course. I will go to back to see some news there.” (Interview 2)

“After we all know each other, we mainly use Moodle to ask question, and use it to discuss questions with professors and each other.” (Interview 3)

One interviewee stated that it was appreciated to see that teachers answered questions
uploaded by other students in Discussion Form.

“*It is good that teachers answer and explain questions uploaded by other students in Moodle.*” (Interview 5)

Three interviewees affirmed that the communication with teachers was good for their distance learning in giving professional instruments, solving students’ questions. It facilitated them to obtain more useful information which would benefit their knowledge construction.

“*Since we are all from different bachelor backgrounds and some of us have no idea about IT and programming, Teachers’ instruments are really important.*” (Interview 3)

“We have a group, two people usually meet the professor, ask questions about assignments and then have the discussion, they got more useful information from teachers.” (Interview 4)

“It is good that you have some confusion about assignments. You are distance student, you can’t have the same interaction with professors as campus students. So it is good that you can communicate with teachers using Moodle or emails.” (Interview 5)

Email seems to be the main way for them to connect with teachers personally, and they used emails to communicate with teachers for solve their own questions (Interview 1, 2, 4, 5).

“Sometimes I had some problems. I emailed the teachers in Moodle” (Interview 1)

“we send email to teachers to ask questions.” (Interview 2)

“But now I use email when I have some questions personally.” (Interview 4)

“I use email instead. I will ask something special for me.” (Interview 5)

4.1.3. Access study materials in Moodle

Most interviewee expressed that they could find course materials in Moodle effectively (Interview 1, 3, 4, 5). They mentioned that the study material in Moodle was easy to access and the structure of these contents were satisfactory.

“The study material in Moodle is easy to access.” (Interview 1)

“The course contents are presented clearly in Moodle. It is easy to find them and use them for my learning.” (Interview 3)

“When you enter the panel of course, the structure in that case is good.” (Interview 4)

“I read and download the course materials in Moodle without too many difficulties.” (Interview 5)

Three interviewees stated that the study materials in Moodle were really useful for their distance learning (Interview 1, 3, 4). Two interviewees mentioned the study materials included recorded course video, PowerPoint lectures of each class, course literature, the requirements of the assignments and so on.
“Interacting with contents in Moodle is the most important part in my study which is about accessing the content, to download the materials.” (Interview 1)

“The recorded online course video and course PPT slides is essential for distance students since sometimes we couldn’t attend the online course. It is about self-management of distance students. We should learn to manage our time.” (Interview 3)

“You can access the course literature and important dates, assignments and their explanation. And you can access the recorded lectures either PDF or recorded materials. It benefits your learning.” (Interview 4)

Two interviewees mentioned that interaction with study materials were the most important things for their distance learning (Interview 1, 5).

“The most important thing is that I can find information that teacher put up there, the lecture materials. I can’t attend many lectures, so the study materials are the most important to me.” (Interview 5)

4.1.4. Prefer social media platforms to Moodle for communication in group works

As we have mentioned before, there were a large amount of collaborative group work in this program, nearly all the distance interviewees approved the significance of interacting with other distance group members in group works (Interviewee 1,2,3,4,5).

“We usually had group works, finished assignments together. We need interact with each other. We can discuss the solution of the assignments together and take charge of different parts. The group members can share their knowledge and information which facilitates our group to finish the assignments quickly.”. (Interview 3)

“ I think that it is good to have better communication with classmates in order to help each other, understand better and share knowledge especially in group work.” (Interview 4)

However, the result of interviewees shows that all the interviewees expressed that they didn’t usually use Moodle to interact with other students in collaborative group works. Most interviewees described that they connected with other distance students through social media applications such as Facebook, Skype, Whats App and so on.

“When we interact with distance students and do collaborative work, we don’t use Moodle. We use Skype, Whats App and we use face time. We use Facebook. So concerning student-student interaction, I used very little on Moodle” (Interview 1).

“We don’t usually use Moodle, we use other platforms like Messages and Skype. So I don’t think that it provides enough interaction” (Interview 2).

“We don’t usually connect through Moodle. I wouldn’t say that it is the most interactive platform.” (Interview 4)

Some interviewees mentioned the reason why they didn’t usually use Moodle to communicate with other classmates. One interviewee stated that she proactively checked Moodle everyday but without automatic reminds of new information, discussions or new announcements from Moodle and there were too many steps to enter her personal page in Moodle (Interviewee 3).
“I am not reminded by Moodle that there are new information or discussions, so I always check the Moodle to know what is the news, what is the schedule. There are too many steps to enter your own pages. But it is like a routine, and you check your email, you check your Instagram, Facebook, WhatsApp.” (Interview 3)

Other interviewees mentioned that the functions in Moodle were limited and there was the only basic text message function and it is not convenient to start video conferencing in Moodle.

“When we find a group, we will start to talk in Skype and in Facebook. We don’t chat in Moodle, we don’t work in Moodle. The function for interaction in Moodle is limited, for example, we can’t build discussion group in Moodle.” (Interview 1)

“It just has basic text email. The function like video meetings is not convenient in Moodle for teamwork.” (Interview 2)

Meanwhile, Moodle was more official than other social media platforms. Distance students chose Facebook or similar platforms to interact when they became more familiar with other students.

“I think that using Facebook more often than Moodle, but Moodle is more official. It is good to use Facebook when you can be a little friend with other students.” (Interview 5)

4.1.5. Problems in communicating with teachers through Moodle

Concerning student-teacher interaction, some of interviewees felt that it was not easy to get enough instruments from teachers (interview 2, interview 3) through Moodle. One interviewee (interview 2) expressed their belief that teachers were too busy for their own life to communicate long time with distance students. He also complained that they had to wait some time for the feedback from teacher.

“It is not easy because teacher have busy life. Sometimes it needs 24 hours before I know something. I want better communication from teacher.” (Interview 2)

Meanwhile, some interviewee expressed that they expected direct vocal interaction with teachers which implied that they were not satisfied with the inadequate non-vocal interaction with teacher (Interview 2, 3, 4).

“We have to talk. But it is impossible for teachers to spend two hours or three hours talking with you.” (Interview 2)

“Actually we want more professional instruction. In campus, you can ask help from professors directly and maybe you can ask other students who are good at the technical area. But it is not easy for us, we use email and we need arrange suitable time.” (Interview 3)

“I want to communicate more with teachers. And the email is not usually as quickly as face-to-face speaking. When you speak with teachers, new question and new ideas can rise. It would be good that we have more time to speak directly with the processor.” (Interview 4)
One interviewee especially emphasized that they actually lacked professional help from professors during their distance learning process so they expected for more interaction with teachers through Moodle.

“Because none of us are really technical persons to exactly know what we need to do. No tutorial persons help us. We need more professional help.” (Interview 3)

4.1.6. Moodle is complicated and not user-friendly

Three interviewees complained that there were too many menus and columns which can’t be removed in the panel (Interview 1, 4, 5). There was too much information in both sides of one page which could make them feel messy and confused.

“Design is a little bit too much. There are too many menus, columns, when you are in a course, you can’t really remove it.” (Interview 1)

“Sometimes on the right and on the left, you have a lot of lasted announcements and search forms. Then it gets a bit confusing. It needs a bit of time to know the forms.” (Interview 4)

“I don’t like the design. You don’t want to see too much information. There are too much information in the pages. When you arrived in the main page of the course you can see the menu on the left, the menu on the right. A lot of information screw down so I can agree with that it is messy. It still will be good without that much information, but too much things everywhere.” (Interview 5)

One interviewee expressed that they wanted cleaner and slender modern interface design of Moodle.

“I would like that it would be a little more clearer and slender. More modern design.” (Interview 1)

And most of them didn’t think that it was user-friendly (Interview 1, 2, 4, 5). For one interviewee, many functions couldn’t be used. They mistakenly entered and clicked out some pages. It made them feel confused. Other interviewees expressed that there were too many steps to accomplish their activities in Moodle. One interviewee directly described the worries about Moodle’s less user friendliness toward elderly people without too much technology experience.

“I think that there are many menus that we couldn’t use. You click out and you enter some areas. Sometimes it feels a bit confusing”. (Interview 1)

“It has too many steps that you log in and go down to the bookmarks and then you need to go to the extra link to join the class”. (Interview 2)

“ I don’t know if I get messages in discussion forum immediately since I need log in and then enter my personal pages, I need find the small icons of Discussion or Forum posts or I need enter the panel of each course to find the discussion. It is not easy to use the functions in Moodle ”. (Interview 3)

“It is not that user-friendly, I can figure it out. But if I was elderly person, not with the technology a lot, maybe it could be much more difficult”. (Interview 5)

4.2. Suggestions for improving Moodle
Improving interaction with their colleagues and teachers in Moodle

Most interviewees expressed they usually used other applications to communicate with each other in group works. Based on this situation, some interviewees expressed their suggestions about improving the level of interaction with their colleagues and teachers in Moodle. One interview mentioned that it would be good if they all used Moodle for communication. Another interviewee mentioned that it would be better that Moodle can integrate with some other platforms like Adobe connect or Zoom. These third parties can provide functions like video conferencing for distance students’ group work.

“I would like that Moodle can provide good video conferences. I think that it can provide platform for communication like better chat room and ways to give lectures straight in Moodle. It can connect to Zoom and connect to Moodle. It will be a good improvement.” (Interview 1)

“We have a group work, it is good that everyone has the same platform to speak. It would be good that it can happen in Moodle. It would be good that members are gathered in Moodle. Though chat in Moodle, we don’t usually check and use it. We want some regular group discussion in Moodle.” (Interviewee 4)

Design of the interface of Moodle

One interviewee suggested that Moodle can put all the menus and sub-menus on the top of the panel in case she would be distracted since there was too much information in one page.

“It would be good that everything on top like search menus, it would be easier to read, not many things will catch the eyes. So it is easier to get information and it is good that it gets some menus and sub-menus on top.” (Interview 4)

Tutorial of Moodle

Three interviewees expressed that it took some time to know where the functions were and how to use them in Moodle at the beginning. (Interview 2, 3, 5).

“If you are not familiar with Moodle, it is not easy to figure out how to search the instructors’ email address or students. You need to search.” (Interview 2)

“I can’t easily use it for the first time, it took me some time to understand where the functions are. When I get used to it, now it is easy for me.” (Interview 3)

“Actually I just figured out how to send email directly from Moodle a couple months ago.” (Interview 5)

Besides, one interviewee (Interview 5) mentioned that they did not receive the tutorial which was about how to use Moodle at the beginning of this program. Therefore, she suggested that it would be good if students could receive tutorial of Moodle at the beginning of this program (Interview 5).

“I suggest that it will be good to receive tutorial about using Moodle. It will help me to know the functions in Moodle.” (Interview 5)
5. Discussion

This chapter presents the discussion on findings, the answers for the research questions and also how the findings verify or opposite the previous literature.

5.1. RQ 1. How do distance postgraduate students perceive that the LMS (Learning Management System) affects their learning process?

<table>
<thead>
<tr>
<th>How do distance postgraduate students perceive that the LMS (Learning Management System) affects their learning process?</th>
<th>Effects</th>
<th>Different types of interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Know classmates and get information from the teachers in the beginning of every program</td>
<td>Positive experiences</td>
<td>Student-student interaction, Student-teacher interaction, Student-content interaction</td>
</tr>
<tr>
<td>Find colleagues and get information about courses during studies</td>
<td>Positive experiences</td>
<td>Student-student interaction, Student-teacher interaction, Student-content interaction</td>
</tr>
<tr>
<td>Access study materials in Moodle</td>
<td>Positive experiences</td>
<td>Student-content interaction</td>
</tr>
<tr>
<td>Prefer other social media to Moodle in group works</td>
<td>Limitations</td>
<td>Student-student interaction, Student-interface interaction</td>
</tr>
<tr>
<td>Problems about communicating with teachers through Moodle</td>
<td>Limitations</td>
<td>Student-teacher interaction</td>
</tr>
<tr>
<td>Moodle is complicated and not user-friendly</td>
<td>Limitations</td>
<td>Student-interface interaction</td>
</tr>
</tbody>
</table>

5.1.1. The positive experiences of using LMS Moodle

According to the result of interviews, at the beginning of this program, the effect of Moodle is essential for distance students in facilitating them to know the new program, new technology and new classmates. Moodle was the only platform for distance students to know each other and interact with these classmates in the beginning. Knowing other students’ information in Moodle was the prerequisite to start further student-student interaction in the later distance learning process. The first communication with other students also occurred in Moodle. Meanwhile, according to the description from one of the interviewees, they communicated with teachers and obtained the significant information about the courses and instructions concerning how to use Moodle correctly and effectively from teachers in Discussion Forum in the beginning. It corresponds to Brown’s opinion in the literature review that online teachers were crucial in the early period of semester because students had to deal with new content, new technologies and new learning environment at the same time (2001). Those essential learning activities which involve student-student, student-teacher, and student-content interaction had been accomplished in Moodle. Therefore, Moodle is vital for distance students at the beginning of the program.
During this program, since a large number of collaborative group works ought to be accomplished, Moodle was used to find group members when distance students need build the groups. Meanwhile, different questions concerning about courses started to appear during their learning process. Distance students uploaded the questions about courses and discussed with other students in the Discussion Forum. Teachers also took part in these discussions in the Discussion Forum to help students solve problems. This process involved student-student interaction and student-teacher interaction. Concerning student-teacher interaction, they usually used email to communicate with teachers when they had problems of their own. The distance students stated that they acquired professional instruments and answers of questions by communicating with teachers and they emphasized the significance of interaction with teachers. It actually verifies Shackelford and Maxwell’ (2012) study in the literature review that teachers play an important role in participating in and guiding students' discussion, and students value teachers' guidance in the discussion. In addition, the distance students mentioned the situation about accessing study materials in Moodle. The acquisition and use of information are very important for distance learning students (Ustati & Hassan, 2013). Most interviewees admitted the quality of student-content interaction in Moodle. They appreciated the easy access to the study contents and the good structure of these contents in Moodle. From their descriptions, the learning contents in Moodle include recorded course video, PowerPoint lectures of each class, course literature, the requirements of the assignments and so on. It corresponds to Zimmerman’s depictions about the components of student-content interaction in distance education. Besides, they stated that the learning materials were essential and crucial for their distance learning. Two interviewees mentioned that interaction with the study contents was the most important part of their distance learning. These findings verify that Zimmerman’s opinion that student-content interaction is the most critical form of interaction in distance learning.

5.1.2. The limitations of using LMS Moodle

Concerning SS interaction, as it has been mentioned before, Moodle was the only platform for distance students to know each other. Distance students also discussed questions and found group members in Moodle. But it is not enough for the demands of SS interaction in distance learning. There are also a number of limitations.

At first, the number of discussion topics in Discussion Forum was very limited, and the important functions in Moodle for communication like messages (asynchronous) and chat (synchronous) were barely mentioned being used from the result of interviews. Secondly, a large number of collaborative group works ought to be finished in this master program. The collaborative works were significant components of distance learning. Most interviewees approved the significance of interaction among students in this process. Two interviewees expressed that they could help each other, share knowledge and information through student-student interaction to obtain better understanding and accomplishment of assignments. This description corresponds to the opinion that the interaction is closely related to the process of knowledge convergence and construction among the group members (Oliveira, Tinoca and Pereira, 2011).

However, the result of interviews shows that they hardly used Moodle to communicate with other group members in the collaborative group works. According to the interviewees, after they knew each other, they chose other social media platforms such as Facebook, Skype, WhatApp to communicate with other students when they did collaborative group works. It means that this crucial student-student interaction process was actually supported by other social media platforms instead of Moodle. The finding reveals several reasons for this phenomenon. At the technical level, the limited
functions and inconvenient use of Moodle present distance students from using Moodle for student-student interaction. Firstly, the communication functions in Moodle couldn’t meet the demand of student-student interaction for collaborative group works. The interviewees depicted that only the basic text mail function was used which was not enough for remote synchronous group meetings. Conversely, other social media platforms, such as Facebook or Skype, own more functions, own voice or video conferencing functions for group meetings. Individuals seem to prefer synchronous applications to asynchronous applications (Mabrito, 2006). Secondly, it is difficult to use the communication functions of Moodle effectively. One interviewee mentioned that this version of Moodle did not have the messages feeds features on its homepage. In this case, she needed to enter the system to know if there were new messages or discussions. Besides, distance students also expressed that it needed too many steps to arrive at the page where they can communicate with other students in Moodle. The user experience is not satisfactory. Instead, other social media applications are much easier to access and be used on smart phones. In fact, a more user-friendly interface, coupled with news feeds on social media platforms, enables distance students to quickly learn new updates and respond in a timely manner (Alhih, Ossiannilsson & Berigel, 2017). At individual and community level, an interviewee expressed that she felt that Moodle was more official. This interviewee said that after they knew each other more they could be a little like friends. They were friends on Facebook and they used this kind of social media platforms. These descriptions are consistent with Dengva and Tavares’ (2013) viewpoint, “comparing to the serious academic features of Moodle, social media applications such as Facebook have served a mixture of informational, social and academic purposes which sometimes are more suitable for peer interaction”. These things explain why distance students preferred to use these social media platforms to communicate with other students during collaborative group works. This finding reflects the limitations of Moodle in supporting student-student interaction for distance students to share knowledge and information, obtain better understanding and accomplishment of assignments during collaborative group works. This situation was further explained by the same researcher (Deng & Tavares, 2013) that social networking websites like Facebook or Skype, as crucial components of Web 2.0 technologies, encourage a participatory culture which allowed students to develop their own group. Although LMS, such as Moodle, they are largely confined to the thinking mode of Web 1.0. Besides, Deng and Tavares (2013) proposed that the interface of Moodle puts course information and content uploaded by teachers at the forefront, which partly hinders students from actively taking part in sharing, discussing and constructing knowledge. It could be one of the reasons to explain less student-student interaction in LMS Moodle. Additionally, the media habits of students influence their choices. They are more familiar with using smart phone and social media platforms than using LMS (Garavaglia & Petti, 2015).

Concerning student-teacher interaction, some interviewees thought that they didn’t get enough student-teacher interaction using discussion forum and email in Moodle. For example, one interviewee expressed that she didn’t receive the professional help from teachers during completing an assignment. Besides, they couldn’t receive immediate feedback from teachers. One interviewee complained that he needed to wait for 24 hours before he got feedback from teachers. It reflects that distance students want feedback from teachers in time. Additionally, some interviewees expressed that they were not satisfied that they couldn’t talk with teachers directly or they couldn’t spend too much time on talking with their teachers. Either through Moodle or email, the main method was through text mail, the interaction with teachers was not enough for them. They expected the long-time vocal interaction with teachers. The finding corresponds to Perez’s description that distance students lack personal interaction between teachers and
students in distance education. It also partially supported the study of McIsaac et al. (1999) that distance students needed immediate and frequent feedback on their work, feedback or their overall progress, and personalized and group feedback.

The student-interface interaction is usually related to the usability of a useful system (Wang, 2008), good student-interface interaction can facilitate the interaction between students and students, students and teachers, student and contents (Kirschner, 2004). However, most interviewees complained about the quality of student-interface interaction when using Moodle. Three interviewees expressed their dissatisfaction with the interface design of Moodle. There was redundancy information at the interface which made them feel confused and messy. One interviewee stated that they preferred a clearer and slender interface design. Actually overcrowded screens raise the cognitive load for the user, causing information anxiety and interfering with users’ speed, comprehension, and success (Cooper, Reimann & Cronin, 2007). Besides, the interface metaphors should be simple, familiar, and logical (Horton & Lynch, 2017). In addition, most interviewees expressed that Moodle was not user-friendly. The interviewees mentioned that it needed too many steps to enter the course pages or discussion forum in Moodle. One interviewee expressed that sometimes she clicked into and out some function areas which she never used, which reveals that there were not clear navigation aids at the interface. One article about the evaluation of user interface design of LMS proposed that the design of clear navigational control (e.g. Types, color, visibility and label name) should guide the students directly to the function area (Alturki & Aldraiweesh, 2016). Therefore, there are some limitations of Moodle to ensure the good quality of student-interface interaction for distance students.

5.2. RQ 2 In which areas LMS can be improved to better facilitate distance students’ learning process?

<table>
<thead>
<tr>
<th>Different types of interaction</th>
<th>Improving interaction with their colleagues, teachers in Moodle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student-student interaction</td>
<td>Design of the interface of Moodle</td>
</tr>
<tr>
<td>Student-teacher interaction</td>
<td>Tutorial of Moodle</td>
</tr>
</tbody>
</table>

5.2.1. Suggestions for improving interaction in Moodle

The current situation is that distance students usually used other social media applications to communicate with other group members when they did the collaborative group work. One of the main reasons is Moodle's poor utility and usability as a communication tool. The primary suggestions are related to improving the level of student-student, and student-teacher interaction supported by Moodle. One interviewee suggested that they would appreciate gathering group members in Moodle for group meeting and discussion. Another interviewee suggested that they benefited from adding video conferencing function in Moodle for collaborative works since video conferencing was great for bringing physically distant people together in meetings, conferences, training, live events, coaching, recruiting, consultations and also casual
community chat. He/she suggested that LMS Moodle could integrate with other platforms such as Zoom or Adobe Connect which could provide easy-to-use functions like video conferencing for their group meeting. After all, there are disadvantages using social media platforms like Facebook for the purpose of learning. For example, there are too much different kinds of information which may be incorrect in Facebook which can distract students' attention. Students may add unnecessary stuff in the group which may influence the quality of the virtual learning environment (Garrigos-Simon et al., 2015). Therefore, these suggestions are reasonable and can be considered by LMS developers instead of using LMS and other social platforms in parallel.

5.2.2. Suggestions for improving interface design
Interviewees also suggested the improvement of Moodle' interface design. Interface design results have the most direct impact on system usability (Gulliksen, Goransson & Lif, 2001: 284). The usability is related to the learnability, operability, memorability, errors and satisfaction of an application (Nielsen, 1994). However, most interviewees complained about the interface design of Moodle. One interviewee expressed that there were too many function blocks at the original interface of Moodle which distracted her attention, she suggested putting all the menus and sub-menus at the top of the page to make the interface simpler and clearer and predicted that it would allow students read and get information more easily. It seems that clean, fluent, organized and carefully designed interfaces can have a positive psychological impact on users, and maintaining a clear visual structure is important to ensure good navigation (Cooper, Reimann & Cronin, 2007). They are important areas where Moodle can be improved.

5.2.3. Suggestions for adding Moodle tutorials
Apart from the suggestions about improving interface design, interviewees also proposed that the tutorials of Moodle could be offered at the beginning of the program to benefit students who were not familiar with technology. Several interviewees expressed that it spent some time to find out the way to use Moodle effectively, where the functions were and how to use them. One interviewee mentioned that there was no tutorial concerning how to use Moodle at the beginning of the program. It shows that it was not easy for distance students to know and use the functions of Moodle at the beginning and reveals students' needs about tutorial. The concrete tutorial content could include browser recommendations, login information, access and navigation, course formats, course blocks, assignment activity, forum activity, quiz activity, grades. It would help them to know and use the functions in Moodle rapidly and accurately.

This theme reveals students' needs about improving LMS Moodle in different ways. The first suggestion about improving student-student interaction and student-teacher interaction supported by LMS through adding easy-to-use functions, like video conferences, shows students' needs about synchronous communication in the form of video in LMS. It partly verifies the credibility of the social design standard from the LMS integration model proposed in literature review, which is that LMS could promote student-student and student-teacher interaction, and involve both synchronous and asynchronous communication in forms of text, verbal chat and visual exchange (Wang, 2008). The second suggestion is about improving the interface design of Moodle in order to get information more easily. It reveals students' need on easy-to-use LMS through a simpler and clearer interface. This finding supports the technology design criteria of the LMS integration model proposed in literature review that the interface design of LMS aims to achieve ease of learning, and ease of use and aesthetics (Wang, 2008) from distance students' perspectives. The final suggestion concerns the demand of distance students to know and use the functions of Moodle effectively through providing Moodle tutorials. It verifies the credibility of two of critical success factors about successfully integrating LMS into distance learning proposed in the literature.
review. The two critical success factors are to improve students' e-learning application skill and provide LMS support services (Selim, 2007).
6. Conclusion

This chapter presents the conclusion, suggestions for future research and the contribution of this study.

6.1. Conclusions

In this thesis, I conducted qualitative research to reveal the benefits and limitations of LMS Moodle in distance learning from students' perspectives at Linnaeus University. This research also explored distance students’ perspectives about LMS’ improvements according to their own user experiences. Although the use of LMS in distance learning continues to grow rapidly, it still remains a certain distance from full utilization. To impel LMS to bring more benefits for distance learning, developers and deliverers of distance learning need more understanding of how students perceive and react to elements of LMS in distance learning.

Through semi-structured interviews with distance students and analysis from empirical findings, LMS Moodle performs an essential role in distance education in supporting student-student, student-teacher, student-content and student-interface interaction for distance students. However, there are both positive experiences and limitations about using LMS Moodle for interaction in distance learning based on distance students’ descriptions. Concerning positive experience, in the beginning of the program, distance students knew classmates, communicated with teachers and students, obtained significant information about new contents, new technologies in Moodle. During the program, distance students found group members for collaborative group works, discussed questions with teachers and students in Moodle. They also used email to connect with teachers. Meanwhile, accessing study material uploaded in Moodle was one of the most crucial learning activities for their distance learning. These are positive experiences of distance students concerning using LMS Moodle for distance learning. It reveals that distance students used LMS Moodle effectively for these interaction patterns in their distance learning. Concerning limitations about using Moodle, at first, the important student-student interaction process in collaborative work which benefited knowledge convergence and construction was supported by other social media platforms instead of LMS Moodle. Secondly, there were some problems with student-teacher interaction. Distance students couldn’t receive enough interaction with teachers. Besides, the delayed feedback from teachers and lack of face-face vocal communication with teachers were mainly complained by distance students. The final limitation includes messy and redundant information at the interface of Moodle, too many steps to finish the task and unclear navigation. Moodle seems complicated and not user-friendly for distance students. These limitations reveal that LMS Moodle couldn’t provide a fully comfortable and useful environment for student-student, student-teacher interaction since it lacks functions for easy-used synchronous interaction in the forms of verbal chat or visual communication. In addition, the complicated and not user-friendly human-computer interface design decreases the usability of Moodle.

Based on the findings, distance students proposed some meaningful suggestions for improving LMS Moodle. These suggestions reveal the areas where LMS Moodle can be improved for distance learning. The first suggestion is about improving the quality of student-student, and student-teacher interaction in Moodle through integration with extra platforms. The second suggestion is about improving interface design by putting all the menu and sub-menus at the top of the page. A few tools and a clean layout without cognitive overhead can support students’ use of the LMS (Garbin et al., 2012). Thirdly, the suggestion about adding Moodle tutorials shows that the distance students’
difficulties in using the functions of Moodle effectively. These suggestions can help the system developers deeply understand distance students’ needs.

6.2. Contribution
Concerning the unequal situation of education resources in the whole world, the development of distance learning devotes to break the inequality. The implementation of technology in distance learning is the best solution. This thesis reveals the interaction patterns in distance learning and the effects of LMS on supporting these interaction patterns based on distance students’ learning experience. The result and students’ suggestions can benefit the development of Moodle as a learning management system based on distance students’ needs, which finally benefit distance students themselves. This research can largely contribute to the quality of distance education.

This article contributes to revealing students’ perspectives about different types of interaction in distance learning which benefits improving effective implementation of LMS in distance education from social, technology and pedagogical design aspects. According to this article, we know that distance students need high-quality and convenient student-teacher interaction, student-student interaction during their distance learning. They also appreciated the significance of good-quality student-content interaction achieved by accessible adequate study materials. Finally, they expected clearer and slender interface and easy-to-use LMS. Therefore, many aspects should be taken into consideration in LMS development, this article provides more front-line information for LMS and enable it to develop toward powerful learning system providing high-level interaction for distance learning.

6.3. Future Research
My study aims to examine the impact of LMS in postgraduate students' learning process and reveals some limitations of Moodle. However, due to the limitation of the context and time, there are still some deficiencies in the research. Concerning the research method, only the interview is used to collect qualitative data, therefore the research is not comprehensive. Besides, the reading amount of related journal literature is not enough, and the understandings of LMS distance education and mediated interaction behavior are not perfect and profound. It is proposed to conduct in-depth exploration and research in the following study. It is hoped that questionnaire to collect quantitative data can be introduced into the research method, so that more scientific methods can be used in the data analysis of network platform records, and the research on distance learning behavior can be more detailed and in-depth.
7. Reference


Nielsen, J., 1994, April. Usability inspection methods. In Conference companion on Human factors in computing systems (pp. 413-414). ACM.


Rahman, H., 2014. The Role of ICT in Open and Distance Education. Turkish Online Journal of Distance Education, 15(4), pp.162-169.


Rhode, J., 2009. Interaction equivalency in self-paced online learning environments: An exploration of learner preferences. The international review of research in open and distributed learning, 10(1).


8. Appendix

A.1 Interview guide

1. Describe your experience comparing receiving distance education and traditional education.
2. How would you describe your learning experience through the use of Moodle?
3. How would you describe the interaction between students and students through Moodle?
4. How would you describe the interaction between students and teachers through Moodle?
5. How would you describe the interaction between students and contents through Moodle?
6. What do you think about the interface of Moodle?
7. Which functions of Moodle you use more? Which sections do you visit more often?
8. Does Moodle help you in your distance learning? In which areas?
9. What would you change in Moodle in order to make it more effective for distance students?
10. Which functions you would add to Moodle if you could and why?
A.2 Information Letter

Hello!
My name is Yangyang XU, I am a students of Information system at Linnaeus University and I am doing my degree project about investigating the influence of LMS Moodle in distance learning from distance students’ perspectives. Therefore, this study is to conduct the semi-structured interviews with distance students who are taking the distance education by LMS Moodle to get a deep understanding of which features of Moodle in facilitating the learning process of distance students. Meanwhile, It will reveal the limitations of Moodle as an LMS in facilitating distance learning.

I will do interviews about your experience of using Moodle for distance learning. You can describe the effects of Moodle in facilitating your learning concerning different interaction provided by Moodle’s function modules. You can also propose suggestion about Moodle’s improvement.

The interviews are confidential and if you at any time doesn’t feel comfortable with talking to me, you are free to stop the interview at any time. Your personal information will not be revealed to anyone. The interviews will take about 30 to 45 minutes and will strive to make it as a natural conversation. I will record the interview only with the intention to go back and listen if we missed something. The recordings will not be listened to by anyone but me as the researcher. Furthermore, the interviews will be through Messages, WhatsApp or Skype.

This project is going to end up with a report which is my examination for my one-year master degree. It will benefit the design of Moodle and similar online Learning Management System concerning distance learning. This project will also benefit Linnaeus University which devotes to the distance education and finally benefit distance students.

If you have any questions, I am happy to answer them.
You can e-mail me at: 17301670786@163.com

Best Wishes
Yangyang XU
A.3 Consent for Participation in Interview Research

I volunteer to participate in a research project conducted by Yangyang XU from Linnaeus University. I understand that the project is designed to gather information about academic work of faculty on campus. I will be one of approximately 6-8 people being interviewed for this research.

1. My participation in this project is voluntary. I understand that I will not be paid for my participation. I may withdraw and discontinue participation at any time without penalty.
2. If I feel uncomfortable in any way during the interview session, I have the right to decline to answer any question or to end the interview.
3. Participation involves being interviewed by researchers from Linnaeus University. The interview will last approximately 30-45 minutes. Notes will be written during the interview. An audio tape of the interview and subsequent dialogue will be make. If I don't want to be taped, I will not be able to participate in the study.
4. I understand that the researcher will not identify me by name in any reports using information obtained from this interview, and that my confidentiality as a participant in this study will remain secure. Subsequent uses of records and data will be subject to standard data use policies which protect the anonymity of individuals and institutions.
5. Faculty and administrators from my campus will neither be present at the interview nor have access to raw notes or transcripts. This precaution will prevent my individual comments from having any negative repercussions.
6. I understand that this research study has been reviewed and approved by the Informatics Department at Linnaeus University.
7. I have read and understand the explanation provided to me. I have had all my questions answered to my satisfaction, and I voluntarily agree to participate in this study.
8. I have been given a copy of this consent form.

__________________________________  ________________________
My signature                      Date

__________________________________  ________________________
My Printed Name                   Signature of the Investigator
A.4 Codes

- **Interviewee1**
1. Choose distance education for career development
2. Better self-learning ability after work
3. Use half-year Moodle to accept distance education
4. Communication with other distance students frequently
5. Do collaborative group work
6. Use Moodle to find group members
7. Seldom use Moodle to communicate with group members
8. Seldom use Moodle to do collaborative work
9. Use other platforms like Skype, Facebook to communicate with other students
10. The function of Moodle for communication is limited
11. Student-student interaction is important
12. Enough motivation and involvement from herself
13. Don’t need too much student-student interaction
14. Communicate with teachers when having academic problem
15. Use email to communicate with teachers
16. Use Moodle to access the study materials easily
17. Misleading schedule in Moodle
18. Useless menus in Moodle
19. Useless functions in Moodle
20. Enter into unknown function areas in Moodle
21. Too many menus, columns on the Moodle’s interface
22. The most useful Moodle functions are accessing study materials and handling assignments
23. It is unsatisfactory to use Moodle
24. Moodle improvement in providing functions like Facebook
25. Add video conferencing function in Moodle
26. Integrated with Adobe Connect or Zoom
27. Avoid wrong schedules and information
28. Distance learning systems should be worth to trust
29. Cleaner interface design
30. More modern interface design

- **Interviewee2**
1. Choose distance education for more master degrees
2. Used to receive distance education in America
3. Swedish education was less organized than American distance education
4. Moodle is an out-of-date online distance education platform
5. The study material, e-text, group members have been arranged from the beginning in American distance education
6. Use Moodle to access the study materials, take e-text
7. Use ‘Café’ and ‘Lasted news’ to know classmates in Moodle
8. Use ‘Café’ and ‘Lasted news’ to see some news about courses
9. Use student email to connect with classmates
10. The most useful function in Moodle is to know classmates and receive news and event schedule
11. Seldom use Moodle to communicate with classmates
12. Use other platforms like Skype, Facebook to communicate with classmates
13. Moodle only has basic mail function
14. Student-student interaction is important
15. Student-student interaction is difficult for distance students
16. Student-teacher interaction is difficult for distance students
17. Impossible to talk with the teachers for more than two hours
18. Send the email to communicate with teachers
19. The replies from teachers are not timely
20. The mixture happened in using both the student mail and the private mail
21. Student-student interaction is difficult for distance students
22. Student-teacher interaction is difficult for distance students
23. Some study contents are not accessible
24. Some study contents need to be searched by distance students
25. Too many steps to enter in the bookmarks
26. Need links to take the synchronous online courses
27. More team meeting function in Moodle
28. Improve the instructional design
29. Avoid connectivity problem when having the synchronous online courses
30. More student-student interaction

■ Interviewee 3
1. Choose distance education for more master degrees
2. Difficult to ask questions when having synchronous online courses
3. Difficult to manage learning time
4. Difficult to do collaborative group work
5. Knowledge sharing through SS interaction is important in collaborative group work
6. Less professional help
7. Group members in the different destinations and time zones
8. Usually, use Moodle to know the news about courses and schedules and important information from teachers
9. Only use Moodle to know classmates at the beginning of the course
10. Use Moodle mainly for discuss questions with teachers and students
11. Use other platforms like Skype, Facebook to communicate with classmates
12. It need too many steps to use Moodle for communication
13. Use Moodle APP on mobile phone
14. Student-teacher interaction is important for distance students
15. It is easy to find and use study materials in Moodle
16. Sometimes difficult to find extra study contents in Moodle
17. Need some time to learn to use Moodle
18. No improvement suggestions

■ Interviewee 4
1. Choose distance education for expanding new knowledge
2. New difficulties in distance learning
3. Use half-year Moodle to accept distance education
4. Do collaborative group work
5. Seldom use Moodle to communicate with group members
6. Use other platforms like Skype, Facebook to communicate with classmates
7. Use Moodle to know personal information of classmates
8. The first connection with other classmates happened in Moodle
9. The importance of interacting with classmates to share knowledge and help each other
10. Used to use Moodle to communicate with teachers at the beginning of the program
11. Use the email to communicate with teachers later
12. Students got useful information from face-face communication with teachers
13. Not timely reply from teachers
14. Prefer more communication with teacher
15. The structure of study contents in Moodle is good
16. Use Moodle is usually for accessing the study materials
17. The navigation of Moodle’s interface is ok
18. Confusing announcements and search forums on the interface
19. The demand of time to be familiar with the procedures of using Moodle
20. The interface design of the course panel is good
21. Put all the search menus and sub-menus at the top of page
22. Moodle can be improved to be the main platform for student-student interaction
23. Gather group members in Moodle

■ Interviewee 5
1. Choose distance education for conducting study and full-time work at the same time
2. Recorded course video, PPT and study materials uploaded by teachers are useful
3. Use Moodle to communicate with classmates at the beginning of the program
4. Use Facebook and use Moodle at the same time
5. Get information from discussion among students in Moodle
6. Moodle is more official than Facebook
7. Use more Facebook to communicate with classmates
8. Student-student interaction is important
9. No more student-student interaction
10. It is good that teachers give professional answers and explanation to students in Moodle
11. Usually use email to communicate with teachers
12. It is good to communicate with teachers
13. Use Moodle to access study materials is useful
14. The study materials in Moodle is quiet accessible
15. Moodle is not use-friendly
16. Too much information on the Moodle’s interface
17. Moodle tutorial course
18. Need some time to know functions
19. Improve the interface design

A.5 Categories

1. Know classmates in Moodle and interact with new classmates
2. Communicate with teachers in discussion Forum
3. Obtain important information uploaded by teachers and students in Moodle
4. Find group members through interacting with other students in Moodle
5. Use email to interact with teachers
6. Access study materials in Moodle
7. Prefer other social media platforms to Moodle for student-student interaction during collaborative work
8. Some problems about interacting with teachers
9. Complicated interface design
10. Not easy-to-use Moodle
11. Suggestion concerning improving interaction with teachers and students
12. Suggestion concerning adding Moodle tutorials
13. Suggestion concerning improving interface design.