UNIVERSITY OF GOTHENBURG

DEPARTMENT OF EDUCATION, COMMUNICATION & LEARNING

FACTORS INFLUENCING STUDENTS' PERCEPTION OF USEFULNESS OF CANVAS AS A LEARNING MANAGEMENT SYSTEM

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Supervisor:	Markus Nivala
Examiner:	Mona Lundin
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Abstract

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Purpose: The primary aim of the study is to find out students' perception of usefulness of Canvas as a learning management system and factors that might influence their perceived usefulness of Canvas.

Theory: There are several theories utilized to explain the phenomenon emerging in the study and to understand more about the subject matter. Initially, adult learning theory is taken into consideration to provide more insights into the research focused participants - graduate students of two master's programs. Also, to explain their actual usage and perception of usefulness of Canvas, consumer's behaviors of innovative products, and two frameworks about user's acceptance of use of technology: Technology Acceptance Model (TAM) and The Unified Theory Of Acceptance and Use of Technology (UTAUT) are utilized.

Method: A mixed methods research design (a combination of qualitative and quantitative methods) was adopted to collect and analyze data. An online open-ended questionnaire and semi-structured interviews were utilized to collect quantitative and qualitative data. Both descriptive statistics and inferential statistics were implemented to analyze quantitative data. To analyze qualitative data, content analysis method, was implemented.

Results: It was found out that students showed quite neutral opinions of the usefulness of Canvas. They mainly used Canvas to manage their course progress with some administrative tasks such as having an overview of the course, handling their assignments, receiving grades, and feedback from teachers. Therefore, students perceived the usefulness of Canvas as a course administration tool; also, they regarded the flexibility and mobility of the application as useful. Moreover, concerning the factors influencing their perception of usefulness of Canvas, self-regulated learning skills were found to have a statistically significant correlation with students' perception of usefulness of Canvas. Besides, technology service quality support was shown to have a positive correlation with their perceived usefulness of Canvas; however, the correlation was not statistically significant. Lastly, it was interesting to know that there was a difference in perception of usefulness of Canvas of students from different groups of technology skill self-efficacy and prior experience with LMSs, but the difference was not statistically significant.

Foreword

In the first place, I would like to express my gratitude and great appreciation to my respectful supervisor, Dr. Markus Nivala. During the process of conducting the research, he has been supportive, giving precious advice, and guiding me to accomplish the paper. Thanks to his insight and expertise in the research area, all of the difficulties and hardships I have encountered when working on the paper have been overcome.

Additionally, I am also immensely grateful to first and second-year students of two international master's programs at the University of Gothenburg for spending time answering my research questionnaire and participating in interviews. Without their considerable support, my research would have not been intact.

Lastly, I want to express my sincere thanks to my whole family for motivating and supporting me during the research project. I would like to say "Cam on bo me" - "Thank you mom and dad" to my parents for their sacrifice and endless love for me. Also, I would like to send my sincere thanks to my dearest friend Aleks. During the most discouraging and stressful period, he has been always beside and encouraged me.

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1. Introduction

1.1. Statement of the problem and rationale for the study

With the ever-growing development of information communication technologies (ICT), higher education institutes have adopted different technology-integrated approaches in teaching and learning, which is helpful to increase a more flexible and supportive educational system. Many universities and colleges, nowadays, have been opening more distance learning courses to meet the individual needs of current students as well as to provide learning opportunities to other learners who could not attend on-campus based programs (Lee, 2010). To develop distance learning courses, the implementation of a learning management system (LMS) is necessary. The utilization of LMSs in higher education institutes has been on the rise since the late 1990s (Najmul Islam, 2012). It can be stated that LMSs have become one of the most important educational tools in higher education (Islam, 2013). The benefits of LMSs in supporting teaching and learning in different learning environments (e.g.: classroom-based, fully online learning, and blended learning) have been studied over the time by many scholars worldwide such as Alsobahi (2017), Azizan (2010), Wuensch et al. (2008), etc. No matter where teaching and learning took place, the implementation of LMSs was evident to support course management and student learning, and enable educators to enhance their educational quality and learner-centered approach in teaching and learning (Islam, 2013; Islam, 2016).

Previous studies have focused on the factors influencing the system's usage and its effects on students' learning outcomes in blended and online learning environments. Particularly, many papers gave further insights into the technology acceptance of students and teachers towards LMSs and its outcomes (Alkhalaf et al., 2010; Claar, 2014; Eom, 2012; Ghosh, 2016; Islam, 2016; Lee, 2010). Although each study adopted different analytical models, the common finding was that the technology acceptance beliefs were strengthened when the perception of ease of use and usefulness of a system were ensured. The results also agreed upon the dependent relationship of some variables such as the perceived ease of use and perceived usefulness, attitudes, and behavioral intentions of use and actual usage. The perceived usefulness in the context of this study was defined as the users' beliefs about the positive impacts of using a particular system on their job performance (Davis, 1989). It is noted that the concept of usefulness as a capability of "being used advantageously" was based on to develop the concept of perceived usefulness (Davis, 1989, p. 320). There were some other factors possibly leading to differences in perceived system usages namely facilitating conditions (instructional approach, computing resources, technical supports) and users' characteristics (technology self-efficacy, self-regulated learning strategies, demographics). More interestingly, it was revealed that there was an indirect correlation between the usage of LMSs and learning outcomes of university students (Islam, 2013; Islam, 2016). Therefore, it is more likely that the satisfaction of students with LMSs can predict their satisfaction with courses and impact their academic achievement. With the importance of perceived ease of use and usefulness of LMSs, this paper aims to shed light on master students' perception of usefulness of Canvas as an LMS, especially the factors that might influence their perceived usefulness of Canvas namely their technology self-efficacy, prior experience with LMSs, self-regulated learning skills, and technical service support quality. Moreover, this study will take into consideration the aspect of an international study environment in which students come from different cultures and educational backgrounds. It is noted that these factors have not been considered by other scholars, especially in the context of Swedish higher education. Additionally, most of the previous studies focused on quantitative analysis, which led to the shortage of some interesting insights into the issue. Hence, this paper would adopt a mixed methods research design, a combination of both quantitative and qualitative approaches in data collection and analysis, to figure out the researched problem and investigate further into the researched area.

1.2. Brief introduction about Canvas

To gain more understanding of this thesis's topic, it is necessary to provide more background information related to Canvas as an LMS.

Launched in 2011, Canvas has developed worldwide and become one of the most popular LMSs in higher education institutes (Correia, 2018). Canvas could be used on different electronic mobile devices such as computers, smartphones, and tablets. This LMS was designed for the usage of both instructors and students; however, there were some differences regarding the usage purpose and users of the system. Compared to other LMSs, Canvas was distinctive regarding its option for the ability to integrate other open-source software to enhance the learning experience (Correia, 2018).

Concerning the implementation of Canvas as an LMS at the university under study - University of Gothenburg, it is a rather new LMS at the university and will be fully implemented in spring 2020. In the masters' programs under study, the master's program in IT and Learning has used Canvas since September, 2018. And the master's program in Educational Research has fully implemented Canvas since September, 2019.

1.3. Purpose of the study

The aims of this study are to figure out: (1) students' perceived usefulness of Canvas as an LMS, and (2) factors influencing their perception of usefulness of Canvas as an LMS. Some determinants of the differences in students' opinions are considered to be related to students' self-regulated learning skills, and technical support service quality. Also, it is expected that there might be a difference in students' perception of usefulness of Canvas between different groups of technology skill self-efficacy and prior experience with LMSs.

This study will be delimited to the Swedish higher educational context. Additionally, samples are students of two international master's programs at the University of Gothenburg, Sweden. Moreover, the focus of this study is the learning management system Canvas. Lastly, open-ended questionnaire and semi-structured interviews are used to collect data about students' perception of usefulness of Canvas and possible factors impacting their opinions.

This research is going to adopt a mixed methods research design to collect and analyze data. As a result, more objective and insightful results can be reached. This study will adress three research questions as follows:

1. How do students perceive the usefulness of Canvas as an LMS?

2. Are self-regulated learning skills and technical support service quality correlated with students' perception of usefulness of Canvas?

3. Are there any differences in perceived usefulness of Canvas between students with different levels of technology self-efficacy and prior experience with LMS(s)?

1.4. Significance of the study

With the increasing usage of Canvas in Swedish higher education institutions, it is quite significant to collect students' opinions about the system to enhance the quality of technologically integrated teaching and learning. Hence, initially, the results of this paper can be used as a foundation for further investigation about the same topic but with a larger scale. Moreover, the findings can contribute to university instructors to adopt a more suitable approach for implementing Canvas in designing courses' instructions. Lastly, this study can be helpful to the university's administration board in evaluating the effectiveness of Canvas usage because the implementation of an LMS might be costly and affect an institution's educational policies.

Although there was a study working on the experience of both teachers and students toward Canvas (Wilcox et al., 2016), their research findings seemed outdated as Canvas has been updated recently. Besides, another study by Endozo et al. (2019) adopted a quantitative method to analyze the technology acceptance of university instructors in using Canvas. It is noted that a technology acceptance model (TAM) was applied to find out the relationship between perceived usefulness and perceived ease of use and teachers' usage of Canvas. However, as can be seen from the two research above, they did not investigate into students' perception of usefulness of Canvas, and not adopt mixed methods research. Therefore, this study is expected to complement previous research by providing insights into the aspect of students' perception of usefulness of Canvas as an LMS at the tertiary educational level.

1.5. Organization of the paper

The research is comprised of six parts in sequence as follows: Introduction, Literature review, Theoretical framework, Method, Findings, Discussion, and Conclusion.

2. Literature review

2.1. Learners' factors, instructional factors and learning outcomes in distance, online and blended learning environments in higher education

2.1.1. Distance, online, and blended learning

With the emergence of the Internet, World Wide Web, and advanced technologies, the learning environments in higher education have changed dramatically from a physical learning environment to a distance learning environment (Picciano, 2009). According to Al-Qahtani and Higgins (2013), distance education seemed to be beneficial to higher education regarding both learners and higher education institutions. In particular, while distance education allowed learners to be more flexible with their learning, this alternative form of education enabled higher education to be more democratic and scalable. It was reported that online enrollment for higher education increased by 28 percent over a period of 10 years, from 2002 to 2012, in the United States (Protopsaltis & Baum, 2019). In other parts of the world, Zawacki-Richter and Qayyum (2019) informed that the percentage of students enrolling in open and distance education in Brazil, China and Turkey grew dramatically over the years, with the growth rate of 9.9% to 20.1% from 2009 to 2014. The statistics showed the potential and growing trend of online learning in the near future (Protopsaltis & Baum, 2019; Zawacki-Richter & Qayyum, 2019). In the context of this study, three learning environments - distance, online, and blended - would be taken into consideration. It is quite necessary to differentiate between the definitions of three learning environments because the clear understanding of the concepts could reduce the miscommunication in the research community (Tsai et al., 2001).

First, distance learning was defined as a means of delivering instructions to learners who were geographically distant from teachers (Moore et al., 2011). Moore et al. (2011) also highlighted that distance learning materials could entail both printed and electronic materials. It can be seen that the definition by Moore et al. (2011) focused on the aspect of learning access and technology used to deliver learning materials. Meanwhile, Tsai et al. (2001) emphasized the interaction between instructors and learners in distance learning environments. In particular, according to Tsai et al. (2001), the interaction should ensure timely and two-way communication between instructors and learners such as giving and receiving feedback and responding to learners' queries.

Concerning online learning, Tsai et al. (2001) emphasized the accessibility of learning content on a computer. This definition seemed to be quite narrowed down to the use of computers, which was rather outdated for the time being in which online learning contents could get access from different advanced technological devices such as tablets and smartphones. Regarding this aspect, Moore et al. (2011) also agreed to some extent that online learning was associated with getting learning experiences through the use of some technology, but not restricted in the computer as a technological medium. Although there were some disparities in the definition of online learning, it was commonly characterized that learning must take place over the Internet, and the communication between teachers & students and among students must be over the Web (Alsobahi, 2017; Means et al., 2013; Pearcy, 2009). If the traditional approach was claimed to be teacher-oriented, the online learning environment was perceived as a more student-centered learning environment because learners should take more initiatives and responsibilities for their learning to be successful (Alsobahi, 2017).

Lastly, with respect to blended learning, it has drawn significant attention from instructors and researchers worldwide due to its advantages over two approaches (traditional face to face and online learning) combined. According to Graham (2006), blended learning was a mixed instructional approach from two different learning environments namely traditional face to face and fully online learning. This definition was shared among other scholars namely Sharpe et al. (2006), Macdonal (2006), Oliver (2005), and Garrison and Kanuka (2004). In particular, Graham and Allen (2011) explained that a blended learning environment should involve face-to-face interactions between

instructors and learners at the same physical place, and the usage of technology-mediated instructions to facilitate learning experience regardless of physical places and time. Concerning learners, blended learning was perceived as an instructional approach that could "accommodate the various learning needs of a diverse audience in a variety subjects"(Collopy & Arnold, 2009, p. 87).

2.1.2. Learners' factors and learning outcomes

To begin with, the definition of learning outcomes would be described so that the consistency among the following studies can be ensured. According to Paechter, Maier, and Macher (2010), learning outcomes of a distance course consisted of both cognitive and affective attributes. It should be highlighted that learning achievement was considered as an important attribute of the cognitive variable; and, course satisfaction was a significant affective variable. Concerning affective factors, Kintu et al. (2017) mentioned that motivation should be perceived as an affective outcome because it could be used to predict the learners' persistence and participation in blended and online learning environments. It is worthily noted that students' satisfaction was significant to predict their decisions about online instruction approach in the future (Artino, 2010). Overall, learning outcomes were utilized to evaluate the educational quality of distance learning courses (Lim et al., 2006).

Initially, self-regulated learning (SRL) strategies have been studied over the years about the correlation with learning outcomes. Self-regulated learning was defined as "an active and constructive process that involves the students' active, goal-directed, self-control of behaviors, motivation and cognition for academic tasks" (Pintrich & Zusho, 2002, as cited in Wang et al., 2013, p. 303). It is highlighted that SRL behaviors were quite significant to learners who wanted to be successful in online learning environments (Dabbagh, 2012, Wang et al., 2013). A systematic review of Broadbent and Poon (2015) about the correlation between SRL strategies and learning outcomes of students in higher online education showed that some learning strategies have a slight correlation with students' academic achievement. It is worthily noted that learning outcomes in this context were restricted in cognitive achievement, or in other words, students' final grades. According to Broadbent and Poon (2015), to acquire SRL behaviors, a learner should incorporate three following abilities: self-observation, self-judgment, and self-reactions. Broadbent and Poon (2015) revealed that among 9 SRL strategies namely metacognition, time management, effort regulation, peer learning, elaboration, rehearsal, organization, critical thinking and help seeking, four of them (metacognition, time management, effort regulation, and critical thinking) were evident to have a weak association with academic achievement of higher education students. There were some explanations for the weak relation between SRL and academic achievement of higher education students. First and foremost, online learning environments were said to minimize the effects of SRL strategies. In other words, SRL strategies seemed not to be fostered by learning in online learning environments. Moreover, online instructions seemed to adopt the same approach with traditional face-to-face learning environments, which might not lead to the expected learning outcomes. Hence, it is suggested that teachers should be aware of the benefits of online learning environments to maximize self-regulatory learning behaviors. The systematic review paper has reaffirmed the vital role of instructional design in correlation with students' academic achievement notwithstanding learning environments.

Another research by Wang et al. (2013) has strengthened a systematic review study of Broadbent and Poon (2015). However, it was found out that self-regulated learning strategies worked as a mediator between students' prior online learning experience and their motivations rather than a direct contributor to successful learning outcomes. In particular, students who were more experienced with online learning seemed to obtain more self-regulated learning skills, which helped increase their motivations for learning. Moreover, SRL skills were evident to maintain the persistence of learners in online learning spaces. According to Lee et al. (2013), when comparing online drop-out group and completers, they figured out that the students who were more self-directed and capable of academic locus control, which was known as students' beliefs about their control of academic outcomes, were more persistent in online courses. Also, the researchers confirmed that SRL strategies had positive impacts on students' academic achievement. Specifically, the more metacognitive SRL students were

able to apply, the higher their final grades were. However, the limitations of the study of Wang et al. (2013) should be considered as they might make huge impacts on the result interpretations. Particularly, it was reported that the study was a non-experimental quantitative research approach in which SRL and students' final grades were self-reported. The self-reported results might not reflect the reality well enough compared to experimental approach. Also, the response rate was quite low, and the study was conducted in one university in America.

Along with self-regulated learning strategies, the correlation between self-efficacy and learning outcomes has been taken into consideration. Self-efficacy was defined as "the belief of the capabilities of what one can do in a specific domain" (Wang et al., 2013, p. 304). Wang et al. (2013) claimed that technology self-efficacy could associate with the course outcomes. Particularly, they found out that students whose higher levels of technology competency, specifically general computer skills and ability in using online learning platform, tended to get higher scores for the online course. Although this claim was quite convinced based on statistical analysis, Wang et al. (2013) did not describe the format of the test and students' academic competences before their self-reported online learning result. The lacking information without having addressed as the limitations of the study might be criticized against the final interpretations. More interestingly, the authors suggested that prior experience with online learning could positively influence levels of technology self-efficacy. Hence, instructors of online courses were suggested to support first-time online learners regarding technology capacity to enhance their motivation and persistence during the online course. The aspect of technology fluency was also mentioned as one of the emerging online learner's characteristics to succeed in online learning environments (Dabbagh, 2012). However, it could be argued that the paper of Dabbagh (2012) was not so convincing as the author provided a general description of successful online learners without concerning the effects of variance of demographics. Moreover, the sources the author used to support her argument were quite out of date, which accordingly decreased the strength of her claims. In other studies, it was argued that technology self-efficacy or online learning self-efficacy's beliefs could be influenced by learner's prior experience with online learning (Bates & Khasawneh, 2007; Oh & Lim, 2005). It was justified that learners who were more experienced in online learning seemed to be more confident about their capabilities in following online learning courses and beliefs about the effectiveness and efficiency of online learning tools. In return, self-efficacy was attributed to students' predicted learning outcomes' expectations, "mastery perceptions, and hours spent using online learning" (Bates & Khasawneh, 2007, p. 188). Aside from being correlated with academic outcomes, self-efficacy beliefs were found to influence students' future choices about online learning (Artino, 2010). Specifically, it was claimed that students who were more confident in their online learning capabilities had a higher tendency to opt for online learning in the future.

Another aspect of learning outcomes was found to be related to learners' prior experience with online learning. In a study with undergraduate students in one online course, Haverila (2011) figured out that students' prior experience with e-learning directly influenced their perception of learning outcomes. A similar result was found in the study by Oh and Lim (2005) even though the two papers were conducted with different targeted samples, in different times and with dissimilar online courses. In particular, students who used to study online learning courses showed a strong belief in the course effectiveness and efficiency. Additionally, Oh and Lim (2005) revealed that prior e-learning experience of students, together with their technology self-efficacy, helped reduce their anxiety with online learning. Similarly, lower anxiety, which was shown to significantly associate with higher learning satisfaction with online courses, was found to have resulted from students' master of technological challenges of prior online learning courses (Heckel & Ringeisen, 2019). Additionally, it was pointed out that prior experience with distance learning could have effects on learning motivation (Lim & Morris, 2009). Therefore, it was suggested by Haverila (2011) that educational institutes should provide supports for students with none or little experience with online learning before the course started.

With regard to students' learning styles, a mixed result about the correlation between learning styles and learning outcomes in online learning environments have been recorded. According to Lu et al. (2007), learning styles had no significant relationship with the academic achievement of online learners. The same result was drawn by Kauffman (2015) and Oh and Lim (2005) in which cognitive learning styles were proven not to affect academic performance. However, it is noted that the differences in learning styles could affect the total online discussion and reading time (Lu et al., 2007). While learning styles seemed not to correlate with course outcomes, learner personalities, interestingly, were found to mediate the success of online learners (Kauffman, 2015). Specifically, successful online learners tended to demonstrate the following characteristics:

- self-awareness of needs;
- adequate management of feelings;
- self-regulation skills, self-discipline, time management, organisation, planning, self-evaluating;
- reflective/visual learning styles;
- internal locus of control.

(Kauffman, 2015, p. 7)

Some other correlated factors such as e-learning readiness, age, gender, and social support have been taken into consideration. Concerning readiness factors, they were categorized into three aspects namely technical, organizational, and social factors (Keramati et al., 2011). Based on this study, readiness factors mediated the relationship between E-learning factors, which includes instructors, students, university support and Information Technology (IT), and course outcomes. According to Keramati et al. (2011), organizational factors were found to have the highest effect on the academic achievement of students although they acted as a moderator. Specifically, it was pointed out that organizational factors, which were consisted of management permanence and organizational regulations, could influence E-learning factors, which then affected course outcomes. Moreover, it was suggested that gender did not correlate with learning outcomes in the blended learning environment (Lim & Morris, 2009; Kintu & Zhu, 2016). However, differences in ages seemed to create a distinction in course outcomes regarding both cognitive and affective factors. Specifically, it is evident that the students whose age range was between 20-29 were shown to perform significantly better in the final test and feel more satisfied with the blended learning course (Lim & Morris, 2009). Additionally, learners' attitudes were strongly related to course satisfaction (Kintu & Zhu, 2016). Lastly, an interesting investigation about the reasons behind adult learners' persistence in online learning concluded that age or gender marginally explained their dropouts (Park & Choi, 2009). Instead, their family and/ or company supports were proven to be the main reason why they would choose to continue their online learning.

To summarize, there were mixed results about the correlation between learners' variables, which were comprised of self-regulated learning strategies, technology self-efficacy, prior experience with e-learning, learning styles and demographic factors, and their learning outcomes in online and blended learning environments. Despite the disparities of the research conclusions, the variance of learners' characteristics should be regarded as a significant factor influencing different aspects of distance education.

2.1.3. Instructional factors and learning outcomes

Along with students' characteristics, instructional factors such as instructors, instructional design, were quite important to construct knowledge construction and ensure the success of courses. In general, instructional design was described as a process of solving instructional problems by analyzing systematically learning conditions in order to design a satisfying learning experience (Moore et al., 1999). Additionally, Kintu et al. (2017) perceived that design features of an online or blended course would include "interactions, technology with its quality, face-to-face support and learning management system tools and resources" (p. 5).

A study by Chen and Yao (2016) revealed that the perceived usefulness and perceived ease of use of a course's design features were important contributors to students' perception of e-learning satisfaction. More interestingly, the younger the students were, the more they highly evaluated the role of the design dimension in their course satisfaction. With regard to motivation as a learning outcome, it was indicated that design features that comprised technology quality, online tools, and interactions were able to predict students' intrinsic motivation, a vital contributor to learning success in the blended learning environment (Kintu et al., 2017). Additionally, technology quality and interactions could help predict the knowledge construction of learners, an important cognitive process that can contribute to learners' academic success (Kintu et al., 2017). By contrast, Lim and Morris (2009) revealed that instructional factors did not have any effects on the learning outcomes of the blended learning environment. According to these scholars, learners' motivation and level of involvement in the course would impact the course outcomes.

To summarize, concerning the instructional design for distance learning courses, along with teaching methods, the aspect of user experience design should be regarded as it was found to impact students' motivation and course satisfaction. However, it is worthily noted that students' characteristics were reaffirmed to influence their learning outcomes to some extent.

2.2. Learning management systems (LMSs) and learning outcomes

2.2.1. Learning management systems (LMSs)

Learning management systems (LMSs) was conceptualized as a web-based software utilized widely by higher education institutes to distribute and manage online courses over the Internet and online collaboration (Islam, 2016). Islam (2013) added that the usage of LMSs was not restricted in online courses but can be used to support course management and student learning of blended learning courses. Additionally, according to Ellis (2009), an LMS was supposed to assist instructors in planning, evaluating, automating administration, reporting training events and implementing the learning process. There were some features of LMSs that were commonly used by university instructors namely "posting course content, communicating with students, and updating events" (Sharma et al., 2017, p. 1053). Besides, LMSs were not only helpful to teachers but also beneficial to students. Correia (2018) mentioned that LMSs could enable students to manage their learning process based on their own progress, communicate with their teachers and classmates, and work in the collaboration with their fellow classmates on assigned tasks. In other words, it was claimed that LMSs were said to maximize the learning experience of students and maintain their persistence with the courses (Agustini, 2017).

Additionally, a particular LMS could be helpful to signify students' perception of "learning assistance" and "community building assistance" (Islam, 2013, p. 389). Particularly, while learning assistance referred to the role of LMSs in assisting a learner's learning process, LMSs could be capable of building a community of learning (Islam, 2013). More interestingly, no matter the advancement of technology was, instructors were considered playing a significant role in implementing technology in teaching and learning; in other words, the success and continuance of LMSs' implementation depended heavily on teachers' intention of uses and their levels of satisfaction (Sharma et al., 2017).

Regarding prominent features of LMSs, Alshorman and Bawaneh (2018) summarized six characteristics as follows:

- Easy access
- Providing fast and continuous feedback
- Facilitating and improving communication
- Follow-up
- Skills development
- Taking account of differences among students

(p. 3)

In a nutshell, Correia (2018) highlighted that there would not be a commonly built model for all of the LMSs because of the production from different companies and a variety of available features. However, she claimed that there were some main features of LMSs namely asynchronous and synchronous form of communication, course's content development and management, both summative and formative types of assessment, and classroom management.

2.2.2. Acceptance of use of LMSs, online support service quality of LMSs and learning outcomes

Since distance learning activities were mediated through learning management systems, the success of technology mediated learning, accordingly, relied considerably on students' acceptance of use and their "correct use" of the system (Ghosh, 2016, p. 14). Regarding theories about users' perception and acceptance of use, there were some prominent ones as follows.

Based on a theory about Diffusion of Innovations by professor Rogers (1962), he explained that only when innovation was communicated over the time by many participants of a social system could an innovative technology be vastly adopted into the society. Accordingly, the role of humans was quite important in the self-sustaining span of innovation in a social system. It was noted that Rogers' theory had been adopted for research about consumers' adoption behaviors of many innovative technologies such as laptops or mobile phones but not yet educational software (Claar, 2014). Other well-known models related to users' acceptance of use, which was frequently used to analyze consumers' behaviorism in the technology field, were TAM (Technology Acceptance Model), UTAUT (Unified Theory of Acceptance and Use of Technology), and IS (Information System) continuance model. The following paragraphs would describe some research about users' acceptance of use of LMSs.

Claar (2014) combined TAM and UTAUT models into her study about the association between students' acceptance of the learning management system and their demographic variances. The result revealed that most of the variables of TAM model were in a dependent relationship. Particularly, students' perception of use would impact their perception of the usefulness of the system. Their perception of usefulness would impact their usage attitudes. And, their attitudes would influence their behavioral intentions of use. However, it is worthily noted that her study showed the weak link between behavioral intentions and actual use of students. It was explained that the lack of actual use was due to students' disappointment with the actual use and their reluctance to use. Regarding the correlation between demographic factors and students' acceptance of use toward the LMS, it was pointed out that there were relationships between age, education, and perceived usefulness; and between education and perceived ease of use. Particularly, the older the students were, the more they perceived the LMS as usefulness. Also, the less educated students were, the more difficult they found with the ease of use of the system. Although the focus of the study was to explore the correlation between students' acceptance of use of LMS and demographics, it was reported that the demographics of the majority of research participants were not diverse, nearly 77% of respondents were non-Hispanic and 63% of them were female.

Another study by Ghosh (2016) utilized TAM model and other two factors namely individual characteristics and facilitating conditions to find out the impact of the LMS's acceptance of use on students' learning outcomes. It was indicated that the perception of usefulness, ease of use of system usage were correlated strongly with the features of an LMS. This study also showed the dependent relationship between variables of TAM model. Particularly, the system would be used more if the student perceived it as useful. Interestingly, the perceived ease of use did not impact system usage. Facilitating factors such as "technical support, computing resources, and instructions about e-learning system" impacted positively students' perception of ease of use (p. 20). However, these conditions did not show any significant associations with the perception of usefulness and the usage of the system. In fact, students' characteristics were shown to have the strongest relationship with system usage and

their learning outcomes. The worth noting point of this study was that it was a case study of an elearning platform with which business students of a university were learning. Hence, the process of their learning and their learning outcomes were followed in details. The rich understanding of the research participants and the academic performance was proven with test results rather than self-report results seemed to contribute to the validity of the research findings. However, as it was a case study, the small number of participants, on the other hand, was detrimental to the interpretability of the final results.

In the study by Islam (2013), he adopted IS and TAM models to figure out the relationship between e-learning adoption determinants and e-learning adoption outcomes. The result confirmed the conclusion about the effect of perceived usefulness on system usage (Ghosh, 2016). However, while Ghosh (2016) revealed that there was no significant correlation between perceived ease of use and system usage, the opposite finding was claimed in this study. Regarding the learning process, it was proven that the usefulness of the LMS could make positive impacts on assisting the learning process and building community learning. Nevertheless, there was no correlation found between perceived ease of use, as well as the system's actual usage, and learning assistance or community building assistance. Hence, it is worthily noticed that the role of instructors and teaching approach were regarded as highly important in building a successful technology-mediated learning environment. Lastly, the paper implied that e-learning systems could benefit learning outcomes as long as a social community was established among students and teachers. Also, students believed that the LMS contributed to their learning process, which affected their academic performance. Overall, the usage of LMSs could indirectly influence students' learning outcomes in online learning environments.

Along with perceived usefulness and ease of use, perceived compatibility was taken into consideration with e-learning system usage (Islam, 2016). Perceived compatibility was referred to the consistency between an e-learning system and learners' values, needs, and experiences (Moore & Benbasat, 1991, as cited in Islam, 2016, p. 50). The study revealed that an e-learning system would make positive impacts on students' academic achievement as long as the compatibility of the system was taken into consideration. It was recommended that an e-learning system should be relevant to study needs in order to generate better learning outcomes.

Concerning LMS effectiveness in higher education, with the adoption of the DM model (an integrated model of IS models), Eom (2012) figured out that students' self-efficacy did not affect system usage. Additionally, the use of LMSs was not significantly related to system quality, information quality, self-managed learning, and user satisfaction. Nevertheless, system quality, information quality, and self-regulated learning behavior were proven to impact learners' satisfaction (Saba, 2012). Moreover, this study did not find the positive relationship between user satisfaction and self-efficacy; between user satisfaction and self-regulated learning. However, it is worthily noted that self-regulated learning behaviors could take effects on self-efficacy, which then affected learner's satisfaction with the system (Saba, 2012). It should be noted that Saba (2012) and Eom (2012) implemented different models to conduct their studies. Specifically, while Eom (2012) conducted his study utilizing DM model, Saba (2012) adopted TAM and UTAUT frameworks in her study.

Finally, in addition to the effect of acceptance of use on e-learners' satisfaction with an online learning environment, Lee (2010) took into consideration the aspect of online support service quality. Online support service quality was defined as "the quality of personal support services that are provided through the online learning system such as help with online registration, course selection, financial aid by institutions, online technical support services (including computer and browser compatibility, access online learning systems) by online support service coordinators, and timely feedback" (Lee, 2010, p. 278). The study revealed the perceived service quality played an important role in predicting online learning acceptance and student satisfaction with online courses. Hence, it was implied that higher education institutions should be able to support online learners and teachers technically. One note-worthy point about this study is that Lee (2010) conducted his research with the participation of

cross - national participants (Korea and America). The combination of views from different culture might contribute to the strength of his arguments.

2.3. User satisfaction with the use of LMSs in higher education

2.3.1. User satisfaction with the use of LMSs in higher education

Initially, user satisfaction was defined as the gap between users' expectations about an informational system and its ability to meet their requirements (Ives, Olson, & Baroudi, 1983). User satisfaction analysis was quite significant for improving the quality of products as well as enhancing competitive indicators of the product in the marketplace (Almarashdeh, 2016). Moreover, according to Haddad (2018), the successful implementation of LMSs could be predicted by analyzing user satisfaction.

Concerning university instructors' satisfaction of an LMS, Almarashdeh (2016) found that service quality, perceived usefulness, system quality, and information quality made significant impacts on instructors' satisfaction. Moreover, of four aforementioned affecting factors, perceived usefulness service quality of an LMS was considered to be the most influential factor in instructors' satisfaction of the use of LMS in distance education. Additionally, it is quite interesting to know that perceived ease of use of the system was found to be not significantly influencing their satisfaction.

In addition to the studies about user satisfaction, Tjong et al. (2018) revealed factors affecting students' satisfaction with an LMS based on End-User Computing Satisfaction (EUCS) factors. Among five factors of EUCS (content, accuracy, timeless, ease of use, and format), the accuracy of an LMS was considered a determining factor influencing user satisfaction with an LMS. Moreover, the timeliness of an LMS could affect user experience with the system. However, it is noted that students were not satisfied with the LMS under study based on the EUCS's evaluative aspects.

Contrary to Tjong et al. (2018), Shayan and Iscioglu (2017) found that students at two sampled universities in Tehran were quite satisfied with their universities' LMSs. Among different factors influencing user satisfaction with LMSs, the perceived usefulness of the system was also considered an important determinant. This finding is similar to the study of Almarashdeh (2016). However, while Almarashdeh (2016) did not find any correlations between perceived ease of use of the LMS and user satisfaction, the opposite result was revealed by Shayan and Iscioglu (2017). The difference in research participants might explain the contrasting findings.

Another study by Ohliati and Abbas (2019) strengthened the arguments of Shayan and Iscioglu (2017). In particular, perceived ease of use of the LMS could significantly affect students' satisfaction. Moreover, aside from the perception of ease of use, this study also found the significant links between service quality, information quality, and students' satisfaction with the system. It is quite intriguing that the service quality of the LMS was evident to be the most determining factor influencing user satisfaction.

A similar pattern was found in the study by Haddad (2018) in which the perceived usefulness of the LMS played a significant role in students' satisfaction with the LMS in distance learning courses. Additionally, the researcher revealed that service quality and information quality of the LMS could make impacts on user satisfaction as well. The findings seemed to align with other studies by Almarashdeh (2016), and Ohliati and Abbas (2019).

Conducting a study about the attitudes of university faculty members and students toward the use of LMS in teaching and learning, Alshorman and Bawaneh (2018) found that both students and teachers showed positive attitudes towards using LMS in teaching and learning. In particular, teachers believed that the use of LMS could benefit their teaching namely subject matter clarification, constructive communication with students, and administration works. More interestingly, the result of the research confirmed that the use of LMS in teaching and learning could enhance the student-centered approach

in teaching. With respect to students, it was pointed out that students' motivations for learning were increased thanks to the use of LMS, which overall affected their satisfaction with the courses. Lastly, concerning the differences in the attitudes in terms of gender, the study revealed that there was a statistically significant difference between male and female teachers while there was no disparity between male and female students. In particular, male teachers were recorded to have more positive attitudes than their female fellows towards their university's LMS. Also, regarding academic working experience, it was found that there was no significant difference in the attitudes of instructors. In terms of students' attitudes, the result showed that there were some differences between students of different academic departments and academic years. It is worthily noted that the attitudes seemed to be mediated by cultural facts. In the context of this paper, which is in a Middle-East country, the justification for differences between males and females was related to social practice.

Another study investigating the attitudes of undergraduate students toward the use of an LMS for blended learning courses showed that genders and prior experience with LMS were not significantly related to their differences in attitudes. Overall, students showed a positive attitude towards using the LMS as a tool for managing their study. Particularly, they were satisfied with the flexibility and mobility of the LMS. However, to enhance the usage of the LMS, it was suggested that the institutions should organize some workshops or orientation before the courses began (Alsobahi, 2017).

To summarize, although different factors can influence user satisfaction with the use of LMSs in higher education, it can be seen that there are several similar patterns in the mentioned studies. Particularly, seemingly, perceived usefulness, perceived ease of use, and service quality of the system have been found to have significant correlations with user satisfaction regardless of their demographic background.

2.3.2. Previous studies about the use of Canvas as an LMS in higher education

To gain more understanding of this thesis's topic and research gaps, it is necessary to provide some previous research about Canvas as an LMS in higher education. Up to now, some researchers have studied the learning management system Canvas in higher education institutes.

Initially, it should be mentioned the study of Wilcox et al. (2016) about the difference in the Canvas's adoption experience of instructors and students. The result revealed that while students and instructors were generally quite contented with Canvas, there were some distinctions in their daily usage, which might affect their overall opinions. In particular, students found modules quite easy for them to follow lessons' contents meanwhile teachers perceived modules as being too structured, which forced them to adapt their teaching approach to suit the module. Additionally, the Canvas app on smartphones seemed not to be in sync with the interface of the desktop version, which caused students' confusion and frustration. Lastly, students commented on untimely feedback of teachers; however, it should be noted that the definition of timely feedback was different between teachers and students.

In addition to research about adoption behaviors, Endozo et al. (2019) focused on the teachers' usage experience of Canvas. It is noted that this study adopted UTAUT model to develop the survey and analyze. The result showed that the usage of Canvas could enhance students' engagement and motivation for learning. The system was commonly used for sharing knowledge between teachers and students, and among students. Finally, it was pointed out that several aspects could influence user's behaviors namely performance expectancy, social influence, effort expectancy, and facilitating conditions. Hence, it was suggested that encouragement and support from peers could enhance the adoption of Canvas in the teaching and learning process

2.5. Research gaps and the significance of this study

Although studies about LMSs in higher education are quite common, most of the aforementioned studies have applied mainly quantitative method research to collect and analyze data, especially to test some models related to the acceptance of use of LMSs. The limitation of the quantitative method could be restricted in the shortage of deep understanding about a phenomenon (Cohen et al., 2013). In particular, although these research could show the relationship between tested variables, for example, the correlation between users' perception of use, perception of ease of use of the system and their intentions to use the system, the statistical results could not explain further why users believed or behaved that way. Therefore, the thesis has decided to adopt a mixed methods research design to both collect and analyze data so that more insights about students' behaviors and beliefs could be gathered.

Concerning the aspect of students and/ or instructors' perception of usefulness of LMSs, while research by both Alshorman and Bawaneh (2018) and Alsobahi (2017) seem to share some similarities with the thesis, there are several research gaps. First, the two research focused on different LMSs; and none of them worked on Canvas. Additionally, their research populations mainly targeted at Middle East students and teachers. The homogeneity of research participants could raise the curiosity about a more heterogeneous group. Hence, this thesis would target a diversely demographic group. Lastly, it is a gap in their focus of study. It can be seen that none of them worked on other variables such as students' self-regulated learning skills, technology self-efficacy, and other facilitating conditions, which were considered to make impacts on users' perception of usefulness and satisfaction towards the system (Eom, 2012; Ghosh, 2016, Lee, 2010). It is noted that the aspect of facilitating conditions have been analyzed to some extent by Endozo et al. (2019) with Canvas. However, this study paid attention to a quantitative method, their targeted population was different from this thesis, specifically, this study targeted at business undergraduate students; and they did not focus on students' evaluative opinions. Moreover, the update of Canvas might influence users' opinions differently compared to the study by Wilcox et al. (2016). Lastly, although perceived usefulness of an LMS was found to influence user satisfaction (Almarashdeh, 2016; Haddad, 2018; Ohliati & Abbas, 2019), none of the previous studies focused on the factors that influence users' perception of usefulness of an LMS.

To conclude, the distinctive aspects of this paper are the research methods, focuses of study, and target population. This study can be quite significant to the studied university in reevaluating the use of Canvas as an LMS and having students' voices heard, which can contribute to customers' feedback to Canvas's design team. Lastly, it was pointed out by Islam (2013) that students' learning outcomes in online learning environments could be influenced indirectly by the usage of LMSs. Therefore, a study about students' perception of usefulness of Canvas is quite vital and possibly contributes to future research whose focus is on the correlation between the perceived usefulness of Canvas and course outcomes of blended learning and/ or online learning environments.

3. Theoretical framework

3.1. Knowles Model of Adult Self-Directed Learning (SDL)

Adult learning theory was first developed by Knowles (1975). Knowles pointed out the differences between children learners and adult learners, which contributed to the establishment of andragogy - teaching approaches for adult learners. According to Knowles (1975), adult learners possessed several distinctive characteristics such as self-directedness, personal experience, readiness to learn, problem-centeredness in learning, and internal motivations to learn. These characteristics of adult learners were the foundation for the development of some orientations in teaching adult learners. First, as adult learners were self-regulated, it was necessary to explicitly state the purposes of their learning. Additionally, it was suggested to provide enough space for adult learners to share their personal experiences related to a subject lesson, which was said to motivate them to learn (Oring, 2010). Besides, learning components should be relevant to adult learners' jobs and/ or personal life. Lastly, it was advised that teaching practices should focus on a problem-centered approach rather than content-oriented.

It can be said that SDL was a model which was developed along with andragogy by Knowles (1975) to help define the differences between adult learners and children as learners, and provide a "brief experential encounter with the concepts and skills of SDL helps adults to feel more secure in entering into an adult educational program" (p. 136). SDL was defined as a learning process in which learners were involved in "diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning strategies, and evaluating learning outcomes" (p. 18) individually or collaboratively. It is also noted that adult learners should be able to make their own decisions about finding suitable learning strategies. Hence, based on the SDL model, the learning process should be assisted with a facilitator such as a tutor, teacher, peer, and mentor.

This theory was adopted to give more insights into the targeted research population, who were graduate students of master's programs at the University of Gothenburg. The understanding of the research population was helpful to the process of formulating and shaping the research questions, and structuring research questionnaire. In particular, theory of adult learning inspired the researcher to explore the correlation between students' self-regulated learning strategies and their attitudes towards the use of Canvas. Additionally, adult learners' characteristics such as personal experience and internal motivations to learn have helped formulate research question about the relation between students' prior experience with LMSs and their attitudes.

3.2. Diffusion of Innovation theory

The Diffusion of Innovation theory (DOI) by professor Rogers (1962) concerned the process of how an innovative idea, a product, practice, etc., was adopted by a society. Based on this model, four factors influenced the process of an innovation's adoption namely time, channels' communication, innovation, and the social system. It is noted that DOI model could be applied to individual, organizational and global levels. Roger's framework took into consideration three main aspects: adopter characteristics, characteristics of an innovation, and innovation decision making. Regarding adopter characteristics, there were five onwards stages of innovation adoption in a society: innovators, early adopters, the early majority, the late majority, and laggards. The differences between these stages were discussed with focuses on socioeconomic status, personality values, and communication behavior. With respect to the characteristics of an innovation, it contained five factors that helped construct any innovation acceptance: relative advantage, compatibility, complexity, trialability, and observability. And, concerning innovation decision making aspect, any innovation acceptance occurred within five following stages: confirmation, knowledge, implementation, decision, and persuasion. It is mentioned that to make an innovation accepted, the mentioned steps should be processed through members of the society via different communication channels in a specific duration

of time. To conclude, it could be seen that DOI theory combined different elements related to system features, organizational and environmental attributes to explain the adoption process of innovation in society.

3.3. Perceived usefulness in Technology Acceptance Model (TAM)

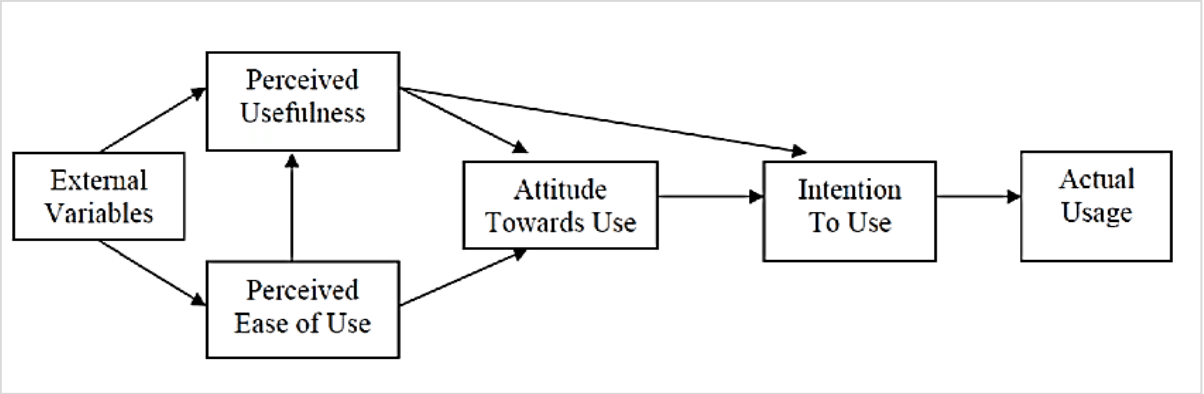
TAM model which was developed by Davis (1989) discussed the factors influencing individuals' motivations to use information systems is TAM. This framework stated that the motivation of users to adopt an innovative product would be mediated by the following constructs: perceived usefulness, perceived ease of use, attitude toward use, and intention to use. In particular, TAM model hypothesized that perception of usefulness and perception of ease of use of an information system were two factors influencing users' attitudes towards use. Then, users' intention to use and their actual usage relied on their attitudes towards use. Along with these factors, there were some external variables which were consisted of user training, system characteristics, user participation in the design, and the implementation process nature.

According to TAM, perceived usefulness referred to users' beliefs in the capability of using a particular information technology system in enhancing their job performances (Davis, 1989). Davis et al. (1992) added that users' perception of the usefulness of a system referred to their perceptions about the outcomes of their experience with a system. According to Davis (1989), the definition of perceived usefulness was associated with the definition of the word useful "capable of being used advantageously" (p. 320). Moreover, the concept of perceived usefulness was developed in the organizational context where employees' performances were enhanced by a system of rewards and promotions (Davis, 1989). Hence, an organizational system which was highly perceived as useful as long as the system was the one which "a user believes in the existence of a positive use-performance relationship" (p. 320).

Along with perceived usefulness, there were other factors that could influence users' acceptance of use of a system in TAM as follows. Perceived ease of use was defined as a certain amount of effort users need to use a system. Attitude towards use was known as the user's perception of the actual product. Lastly, users' intention to use referred to their conscious plan to use the product in the future. It is criticized that TAM model's limitation was the ignorance of the social influence on the adoption of technology; also, it did not address the intrinsic motivations of users as possible influencing variables.

Figure 1

The first modified TAM model by Davis (1989)



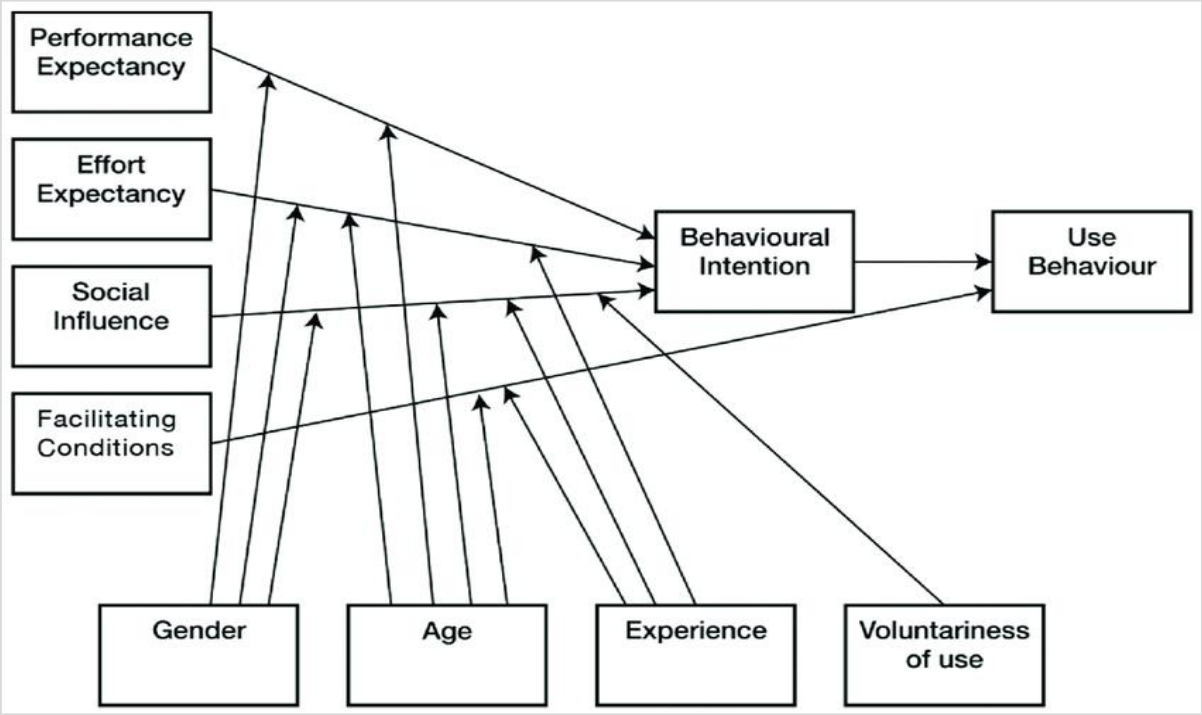
3.4. The Unified Theory of Acceptance and Use of Technology (UTAUT)

Based on TAM and some other technology acceptance models, Venkatesh et al. (2003) developed the unified theory of acceptance and use of technology (UTAUT). This model showed four primary constructs of the information systems' acceptance namely effort expectancy, performance expectancy, social influence, and facilitating conditions. More specifically, effort expectancy was defined as the ease of use of the system, which was similar to the aspect of perceived ease of use in TAM model. Performance expectancy was perceived as the degree of user's beliefs in the positive effects of the system on their job performance. Social influence was referred to the user's beliefs in the influence of other important social members on their use of the system. And, facilitating conditions which included the organizational and technical infrastructure support were regarded as the degree to which users believed in the existence of this support when they used the system.

Also, the model pointed out that these factors could be influenced by demographic features of users such as gender, age, experience, and voluntariness of use.

Figure 2

The relationship map of UTAUT model's constructs by Venkatesh et al. (2003)



To conclude, it is noted that diffusion theory, TAM, and UTAUT frameworks were utilized to explain for the phenomena emerged from data analysis. More specific discussions of the findings, which involved the participation of these three theories, were described in details in the discussion section.

4. Method

4.1. A mixed methods research design

The thesis paper adopted a mixed methods research design to conduct both data collection and data analysis procedures. There were several reasons why mixed methods research was selected to carry out this study. First and foremost, the use of both qualitative and quantitative research methods was believed to deepen the understanding of the research subject and enrich the research's results. In other words, a mixed research design could be regarded as methodological triangulation in which different approaches were used to gain a better insight into a studied theory or phenomenon (Turner et al., 2017). To strengthen this argument, Creswell and Creswell (2017) highlighted several key points of mixed methods research as follows:

- broaden understanding by incorporating both qualitative and quantitative research
- use one approach to better understand, explain
- build on the results from the other approach

(p. 205)

Similarly, Schoonenboom and Johnson (2017) agreed that the combination of both qualitative and quantitative methods was supposed to contribute to "breadth and depth of understanding and corroboration" (p. 108). Additionally, it was affirmed that mixed methods research enabled the study's conclusions to be strengthened and expanded (Schoonenboom & Johnson, 2017). Besides, the choice of mixed methods research was resulted from the aspect of feasibility to reach the targeted research population (Brannen, 2005), especially how difficult the accessibility of the population was. Lastly, it was claimed that the use of multiple methods was able to increase the validity of the results (Schoonenboom & Johnson, 2017; Turner et al., 2017) given that the limitations of each method could be compensated.

When conducting mixed methods research, this paper implemented a sequence as follows. As suggested by Creswell et al. (2017), a mixed research design should concern over the procedure of mixed research design with respect to timing, weighing, and mixing. Concerning the timing, a quantitative data collection method was followed by a qualitative data collection method. In terms of weighting, it was mentioned that the selection of methodological priority depended on the researchers' interests, audience, and the study's emphasis (Creswell et al., 2017). Regarding this paper, qualitative data was intentionally used to explain the phenomenon arisen from quantitative data. Hence, the priority was rather on the quantitative data. Accordingly, the process of mixing would be considered embedding in which the secondary dataset was embedded to provide a supporting role for the primary database (Creswell et al., 2017).

4.2. Research participants

Initially, the targeted population of this study was adult learners who were using Canvas as a learning management system. To recruit research participants, a purposive sampling method was adopted. A purposive sample was categorized as a non-probabilistic sample because the selected sample was not the representativeness of the whole targeted population (Thomas, 2017). There were some criteria to select the sample of this study as follows:

- They were students who were studying for an international master's program at the University of Gothenburg

- They were supposed to have different demographic characteristics, levels of technology skill and experience with learning management system(s)
- They were using Canvas as part of their master studies

The scope of the research focused on students from two international master's programs at the University of Gothenburg, Sweden. One program was called the international master's program in IT and Learning (ITL); and, the other program was named as the international master's program in Educational Research (IMER). The total number of active students in two programs was 79 of which 32 students were from ITL program and 47 from IMER program. The total number of actual participants in this study was 19 students (N = 19) from two master's programs for the survey, and a total of 12 out of 19 participants for the interview.

Concerning the demographic patterns of the survey participants, the vast majority of research participants were female, which accounted for nearly 74%, while male participants were around one-fourth of the total participants, as shown in the figure 3. Regarding age, the pie chart (figure 4) shows that the majority of respondents (approximately 74%) were from 25 to 34 years old. The other groups distributed around the age ranges of 18-24, 35-44, and 45-54. It was noted that none of the respondents were under 18 and over 55 years old.

Figure 3

Gender's report of participants

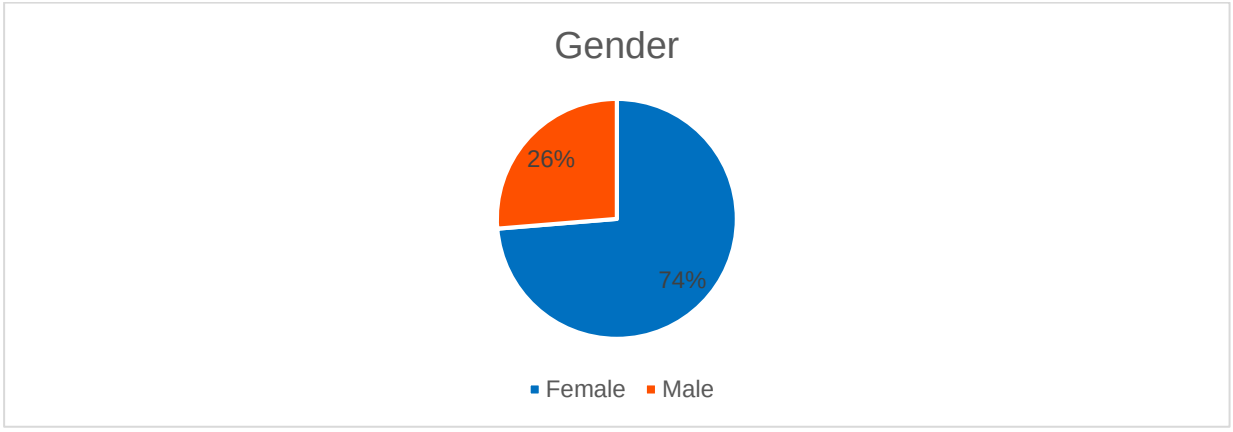
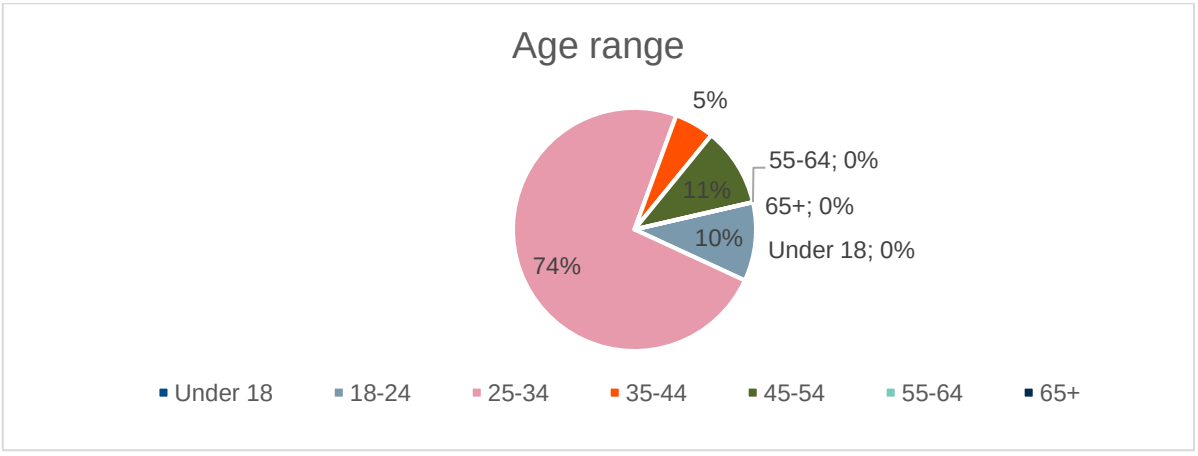


Figure 4

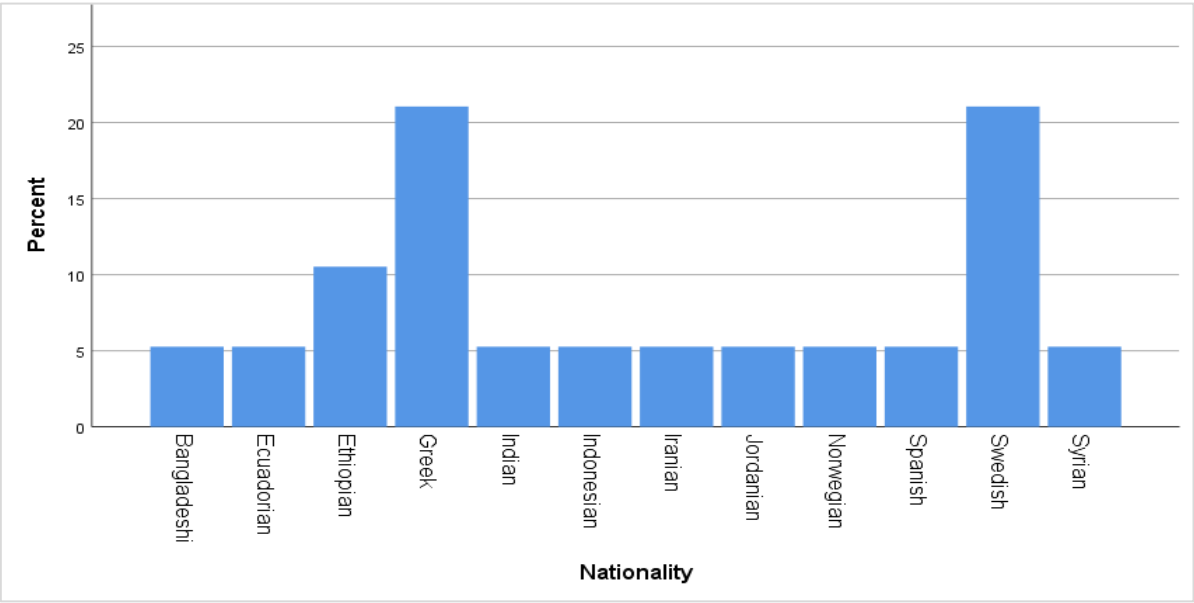
Age range's report of participants



Along with age and gender, the participants were surveyed about their nationality, master's program, and year of the program. As can be seen from the bar chart (figure 5), the participants' demographics seemed to be quite heterogeneous given that their nationalities were quite diverse. However, it was worthily noted that a large number of participants were reported to come from Greece and Sweden, which accounted for roughly 40% in total. Accordingly, it could infer that most of the students originated from Europe.

Figure 5

Nationality's report of respondents



With regard to their master programs, it was recorded that nearly 90% of the respondents majored in the international master's program in technology and learning (ITL) while only around 15% of respondents were studying at the international master's program in Educational Research (IMER). Concerning their year of the program, the majority of participants (roughly 60%) came from the second-year program and the other group, which accounted for approximately 40%, was consisted of the first-year students.

4.3. Ethical considerations

The ethical issue was taken into consideration from the beginning of the research. In particular, the research participants were notified of the informed consent form in which their agreement to participate and their data usage for the research were raised awareness. The consent form was based on the ethical and legal guidelines about data provided by the University of Gothenburg (Personuppgiftslagen, 1998:204). Moreover, for the interviews' voice recordings, all the interviewees were asked for permission to be voice recorded for data analysis.

As the targeted populations of this study were adults (above 18 years old), they were able to make decisions themselves to take part in the study. Moreover, it is noted that they were not regarded as vulnerable populations who might need extra care privacy protection (Markham, 2018). Research participants were notified about their right to withdraw their database from the study at any time of the research procedure. Their data would be used for the purpose of this study only and would not be shared with any other individuals or organizations without their agreement. Additionally, all of the

personal information about research participants were kept confidential. Specifically, their identities were kept anonymous throughout the research procedure. The act of keeping personal information confidential was to protect the research participants' identity and data privacy even though the research topic was not considered a sensitive one (Markham, 2018).

Concerning the relationship between the researcher and research participants, it can be said that the researcher has quite a close relationship with research participants from the master's program in IT and Learning given that the researcher is also a student of the program. However, the researcher has been aware of the situation regarding both the data collection and analysis process. In particular, there were two methods of data collection (qualitative and quantitative methods). Regarding quantitative data collection, a survey was utilized to minimize the effect of the relationship between the researcher and participants on their responses or behaviors (Allen, 2017). Concerning the qualitative data collection method, the close relationship has both advantages and disadvantages in conducting interviews. According to Allen (2017), the rapport between researcher and participants, which was established before the research, enabled the participants to feel more comfortable expressing their viewpoints because they could feel the empathy from the researcher. Notwithstanding the advantage, a limitation was the personal assumptions and carried emotions of the researcher toward the research subject, which was related to the researcher's experience with Canvas. Hence to minimize this effect, the researcher decided not to take part in the study. Lastly, to protect the identity of the research participants, interview scripts were not provided in the appendix.

4.4. Data collection

4.4.1. Data collection instruments

The study implemented two data collection instruments namely open-ended questionnaire and semi-structured interview.

4.4.1.1. Open-ended questionnaire

The questionnaire consisted of 3 main parts: respondents' background information, self-regulated learning strategies, and their opinions about the usefulness of Canvas as a learning management system.

Regarding background information questionnaire, it mainly comprised six questions about the participants' gender, age range, nationality, year of the master's program, experience with learning management system(s), and their self-reported technology skill. More specifically, the technology skill self-evaluation was to categorize students into three levels of technology skill (*novice, fairly skilled*, and *power user)*.

Concerning the self-regulated learning strategies' questionnaire, it was adapted from the modified motivation strategies for learning questionnaire (modified MSLQ) used in the research of Wang et al. (2013). The original survey of the modified MSLQ was designed based on social-cognitive models of motivation and learning and information processing (Pintrich et al., 1993, as cited in Wang et al., 2013, p. 308). The modified was comprised of two subscales: motivation (task value, self-efficacy, and test anxiety) and learning strategies (elaboration, critical thinking, metacognitive self-regulation, and time/ study environmental management). It was noted that this survey was modified to measure self-regulated learning strategies in the online learning setting.

Due to the focus of this study, the only questionnaire about learning strategies which was consisted of 27 items was utilized to measure students' self-regulated learning skills. Also, while Wang et al. (2013) paid attention to one online course, this paper aimed at a whole master's program. Accordingly, to fit the context of this study, all of the items were used to measure students' self-regulated learning strategies for the program, instead of the online course.

More specifically, this questionnaire was designed based on a seven-point Likert-type scale, which was ranged from *not at all true of me* (1) to *very true of me* (7). The higher scores students had, the higher levels of using appropriate learning strategies they were to be predicted (Wang et al., 2013). Additionally, some reversed items were marked as 10r, 13r, 14r in table 1.

Table 1

Modified learning strategies questionnaire

Learning strategies	Items	Statements
Elaboration	1	When I become confused about something I'm reading, I go back and try to figure it out
	2	When I study, I pull together information from different sources, such as readings, online discussions, and my prior knowledge of the subject
	3	When reading for the courses in the programme, I try to relate the materials to what I already know
	4	I try to understand the instructions for the courses by making connections between the readings and online & offline learning activities from the courses
	5	I log in to Canvas for this programme regularly
	6	When studying, I try to determine which concepts I don't understand well
	7	I try to apply ideas from course readings in other class activities such as online discussions
Time management	8	I usually study in a place where I can concentrate on my course work
	9	I make good use of my study time for this master's programme
	10r	I find it hard to stick to a study schedule
	11	I have a regular place set aside for studying
	12	I make sure that I keep up with the required readings and assignments for this master's programme
	13r	I often find that I don't spend very much time on this programme because of other activities
	14r	I often find that I don't have enough time to review my notes or readings
Metacognitive and self-regulation	15	When reading, I make up questions to help focus my reading.
	16	If course readings are difficult to understand, I change the way I read the materials
	17	Before I study new course material thoroughly, I often skim it to see how it is organized

(Continue)

	18	I ask myself questions to make sure I understand the materials I have been studying.

Table 1 *(Continue)*

Learning strategies	Items	Statements
Metacognitive and self-regulation	19	I try to change the way I study in order to fit the courses' requirements and the instructional methods used in these classes.
	20	I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying.
	21	When I study for this programme, I write brief summaries of the main ideas from the readings and online discussions
	22	When I study for this programme, I set goals for myself in order to direct my activities in each study
Critical thinking	23	I often find myself questioning things I hear or read to decide if I find them convincing
	24	When a theory, interpretation, or conclusion is presented in the online discussions or in the readings, I try to decide if there is good supporting evidence
	25	I treat the course material as a starting point and try to develop my own ideas about it
	26	I try to play around with ideas of my own related to what I am learning in this programme
	27	Whenever I read an assertion or conclusion about an issue, I think about possible alternatives

Regarding the reliability of the modified learning strategies questionnaire, Wang et al. (2013) tested each aspect of learning strategies with Cronbach's alphas. Specifically, it was reported that the alpha coefficients were .87, .84, .81, and .82 for elaboration, time management, metacognitive and self-regulation, and critical thinking respectively.

The questionnaire about students' opinions of the usefulness of Canvas was extracted and adapted from studies of Alsobahi (2017) and Alshorman and Bawaneh (2018). While the former researched the LMS named Blackboard, the latter worked on their university's LMS. Hence, to fit the context of this study, all of the statements referred to features of Canvas. Moreover, item 16 was added to the original questionnaire because it was aimed to answer a research question related to the correlation between technical service support quality and students' perception of usefulness of Canvas.

More specifically, the evaluative questionnaire was consisted of 16 items and was measured on a five-point Likert-type scale ranging from *Strongly disagree* (1) to *Strongly agree* (5). The higher score indicated that the students perceived Canvas as more useful. The list of questions is shown in the table below:

Table 2

Adapted questionnaire about students' perception of usefulness of Canvas

Items	Statements
1	have a clear overview of the course requirements (course objectives, modules, assignments, marking rubrics, deadlines)
2	follow the sequence of course contents more easily
3	navigate more quickly which materials to read before class
4	access course materials in a more interesting way
5	learn anytime and anywhere
6	develop my self-learning skills (actively self-identify learning needs, goals, materials for learning, and self-evaluate learning outcomes)
7	to be more engaged in group discussions in both offline and online class
8	have more effective online group discussions compared to other online platforms
9	understand the instruction for the lecture better
10	handle my assignments more easily
11	track my grades more easily
12	receive instant feedback from my instructors
13	seek for learning supports from peers and instructors more easily
14	develop my technology skills.
15	I prefer to contact with my instructors and classmates via Canvas
16	I am provided with information about technical supports for Canvas from instructor before the course

For the reliability of the above survey, Cronbach's alpha was tested with the reliability coefficient .84 (Alshorman & Bawaneh, 2018). Additionally, it was mentioned that the pilot test and content validity were conducted to check the validity of the survey in the study of Alsobahi (2017).

To check the validity of the whole survey, the author had sent the complete survey to get commented and crosschecked by research professionals and targeted audience. In particular, the survey was checked by five people of which two were research professionals and the others were students from a master's program. The survey was asked to give comments about the clarification of questions and the structure of the survey. After several edits, the final survey was completed and sent to the participants.

Along with quantitative close-ended questions, there were three open-ended questions used to understand the phenomenon better and provide participants with enough spaces to give any comments or thoughts in their own words (Flower, 2002). Particularly, there was a question about their master's program's intentions to utilize Canvas, a question about the illustration of their most favorite and least favorite features of Canvas, and a blank box at the end of the questionnaire for them to give any further comments about Canvas if needed.

4.4.1.2. Semi-structured interview

Semi-structured interview type was chosen for this study because it allowed the researcher to collect in-depth information about students' opinions (Fox, 2009). In addition, as the interviews were intended to gain a better understanding of students' answers in the survey, the use of semi-structured interviews could enable the researcher to explore different angles of interviewees' viewpoints and extend discussions if needed. It was noted that the individual interviews were conducted for this study given that the interviews' questions were developed based on their survey's answer; hence, the

individual interviews would ensure the respondents' independence (Fox, 2009). In general, the interview's schedule consisted of some common topics as follows:

- Prior experience with other LMSs and in comparison with Canvas
- Justification for interviewees' evaluation of Canvas's use
- Experience with technical issues and technical support
- Recommendations for enhancing the use of Canvas among students

Lastly, due to the situation of coronavirus pandemic, all the interviews were conducted online via the Zoom video application. While conducting interviews, note-taking was used to note down interviews' highlights and to assist the research in making up context depended on questions during the interviews. All the interviews were voice-recorded via Zoom. And, the average length of the interviews was around 12 minutes.

4.4.2. Data collection procedure

Initially, the online questionnaire was sent to students of two master's programs via the course leader and the program's social media site. During two weeks starting from the 30th of March to the 12th of April, 2020 people were participating in the online survey, resulting in a response rate of 24%.

After a preliminary analysis of the survey result, an interview invitation was sent to those participants who left their contact information in the survey. In total, 12 people were agreeing to participate in the interview. The interviews were conducted in a week from the 13th of April to the 19th of April.

4.5. Data analysis

4.5.1. Quantitative data sources

With regard to quantitative data, the statistical analysis method was used to answer the research questions. To support the data analysis procedure, a statistical analysis software named SPSS 26 was utilized. Concerning descriptive statistics, the analysis of mean, median, mode, and standard deviation was carried out.

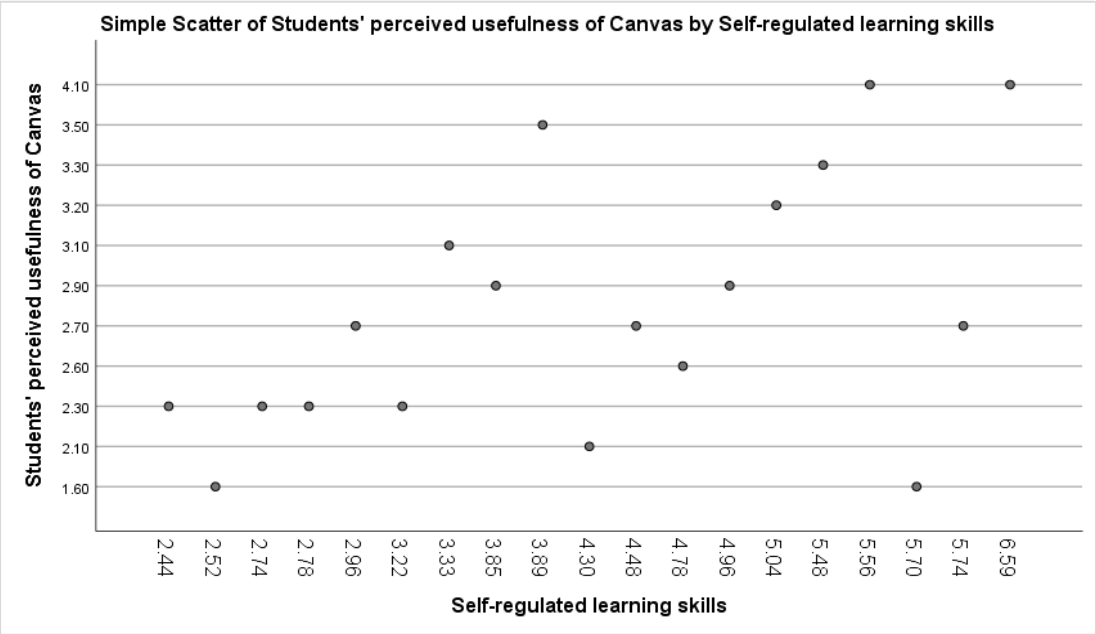
In terms of inferential statistics, Spearman's correlation test was adopted to test the correlation between students' self-regulated learning skills and their attitudes towards the use of Canvas; and the relationship between technical service support quality and their perception of usefulness. Spearman's correlation coefficient is known as a non-parametric test and used to test non-normally distributed data with a small sample size (Field, 2013). Another statistical test was taken into consideration to test the difference in students' attitudes between groups such as experience with LMS(s) and technology skills. That model is known as the Kruskal-Wallis test, specifically used to test non-parametric and non-normally distributed data (Field, 2013).

Reflecting on the data set of this study, the tested variables (students' attitudes, self-regulated learning skills, technical service support quality, prior experience with LMS(s) and technology self-efficacy skill) were non-normally distributed and the sample size was relatively small (N = 19).

Aside from a non-normally distributed data, to meet the assumption of the Spearman's correlation test, the monotonic relationship between two independent (self-regulated learning skills and technical support service quality) variables and dependent variable (students' perception of usefulness of Canvas as an LMS) was examined by using a scatterplot.

Figure 6

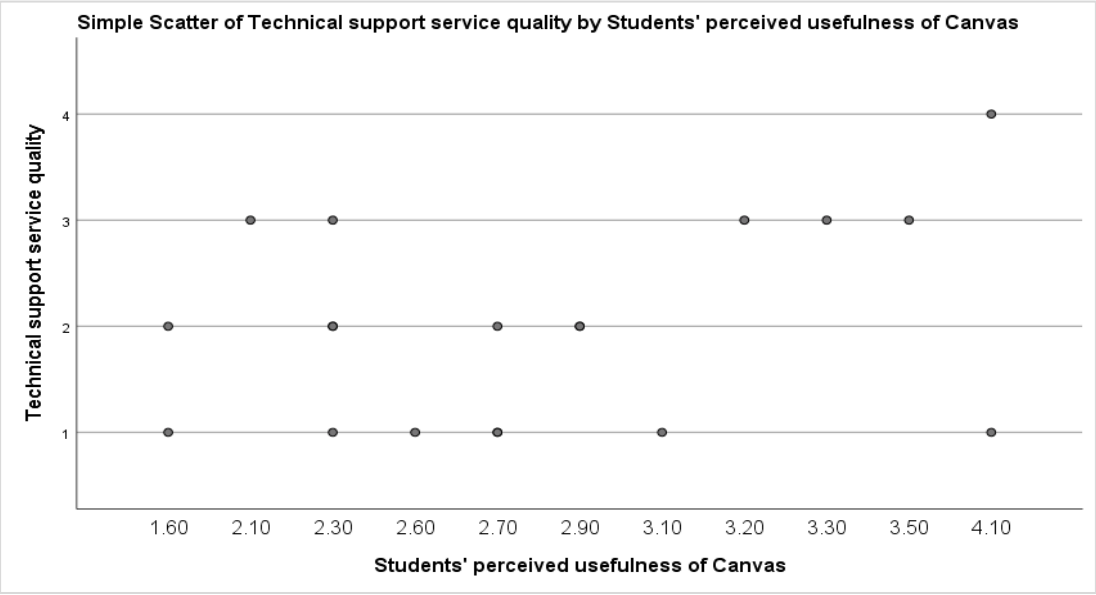
A scatterplot about the monotonic relationship between self-regulated learning skills and students' perception of usefulness of Canvas as an LMS



Note. The measurement scale of self-regulated learning skills ranges from (1) to (7). The measurement scale of students' evaluation of the usefulness of Canvas ranges from (1) to (5).

Figure 7

A scatterplot about the monotonic relationship between technical support service quality and students' perception of usefulness of Canvas as an LMS



Note. The measurement scale of technical support service quality ranges from (1) to (5). The measurement scale of students' evaluation of the usefulness of Canvas ranges from (1) to (5).

As can be seen from figure 6 and figure 7, the scatterplot graphs show that there is a monotonic relationship between self-regulated learning skills and students' perception of usefulness of Canvas as an LMS. And, there is a monotonic relationship between technical support service quality and students' perception of usefulness of Canvas as an LMS. It means that the assumptions of the Spearman's correlation test were met, and this test, accordingly, could be used in this study.

4.5.2. Qualitative data sources

Concerning data collected from open questions and semi-structured interviews, the content analysis method and Nvivo 12 software were utilized. The main purpose of analyzing open questions and interviews was to find out the patterns or themes emerging from the respondents' answers (Cohen, Manion & Morrison, 2013). Moreover, the application of content analysis could enable the researcher to understand the meaning of the communicative material (in this paper, communicative material refers to interview transcriptions) in a specific context and explore further the researched topic (Cohen et al., 2013). To carry out content analysis, the following procedure of analysis was adopted.

- Transcribing interviews and gathering all of the qualitative data into a file
- Using Nvivo 12 software to manually code the contents based on both interview questions and participants' specific answers
- Categorizing codes into big themes based on research questions

Several themes were emerging from qualitative data analysis, see Table 3:

Table 3

Examples of emerging themes from qualitative data

Emerging themes	Examples
Purposes of using Canvas in two master's programs	"Mainly to provide information, such as schedule, course literature, information about assignments, or to communicate about changes or provide clarifications. It is also used to hand in assignments such as papers or presentations, and provide feedback and evaluation of the assignments."
The relationship between instructors' usage of Canvas and students' usage behaviors	"I mainly using it because instructors expect us to do. How clear their expectations, with clear tasks that we should perform on Canvas that we don't have other choices."
The relationship between instructors' usage strategies and their user experience with Canvas	"It can be tailored differently for each course so sometimes the administrators organise the content differently, this can sometimes be a bit difficult for the user when the different features are used inconsistently. For instance, course literature can be placed under "files," or "pages" or "modules" depending on the course"
Opinions about technical support service	"From the beginning, it was like Canvas is a platform in itself. It is not difficult to use it. Just like it can be messy but I don't know if I receive any kind of support information in using it, I would kind of prefer to try and explore by myself and If I had questions, I would reach out."
Relationship between technology skill and user experience with Canvas	"[..] when you could not find something and feel struggling and sometimes you feel nervous, you lose confidence. Because you think that you need more to learn about technology and how can I use this so it makes me very frustrated sometimes."
Relationship between prior experience with LMSs and perception of ease of use of Canvas	"So I think it is also the first one who want to start Canvas, for example like me, it is very difficult at first"

5. Findings

5.1. Students' perceived usefulness of Canvas

Overall, as can be seen from table 4, the mean score of students' perception of usefulness of Canvas was 2.75 (*SD* = .69). The mean score could be interpreted that students expressed quite neutral opinions of the usefulness of Canvas as an LMS.

Table 4

Descriptive statistics of students' perceived usefulness of Canvas

N	Valid	19
	Missing	0
Mean		2.75
Median		2.67
Mode		2.27
Std. Deviation		.69
Variance		.48
Skewness		.32
Std. Error of Skewness		.52

Regardless of their neutral opinions of the usefulness of Canvas, there were some aspects of Canvas that were perceived as more useful than the others. Table 5 describes the mean values of each statement related to students' perception of usefulness of Canvas in the survey. As can be seen from table 5 that the statements 10, 1, 12, 2, 5, 9, and 11 seemed to get higher mean scores (average 3.00 and above) than the other statements. Specifically, it was noted that among these aspects of Canvas, the statements 10 (handling assignments), 1 (having a clear view of the course requirements), 12 (receiving instant feedback from instructors), and 2 (following the sequence of course contents) were considered the most useful given that their mean scores were among the highest at 3.63, 3.37, 3.37 and 3.26 respectively. However, it should be noted that the standard deviation of each statement was rather large compared to statements with lower mean scores. One justification for the phenomenon was due to the small number of survey respondents (19 participants), which led to the variability in the opinions (Field, 2013).

Table 5

Students' evaluation of the usefulness of Canvas (*N* = 19)

Item	Statements' description	M	SD
S10	**handle my assignments more easily**	3.63	1.38
S1	**have a clear overview of the course requirements (course objectives, modules, assignments, marking rubrics, deadlines)**	3.37	1.38
S12	**receive instant feedback from my instructors**	3.37	1.21
S2	**follow the sequence of course contents more easily**	3.26	1.15
S5	**learn anytime and anywhere**	3.00	1.30
S9	**understand the instruction for the lecture better**	3.00	1.16
S11	**track my grades more easily**	3.00	1.56
S3	navigate more quickly which materials to read before class	2.74	1.20
S4	access course materials in a more interesting way	2.68	1.20
S13	seek for learning supports from peers and instructors more easily	2.53	1.07
S15	I prefer to contact with my instructors and classmates via Canvas	2.53	1.17
S6	develop my self-learning skills (actively self-identify learning needs, goals, materials for learning, and self-evaluate learning outcomes)	2.16	1.21
S7	to be more engaged in group discussions in both offline and online class	2.11	0.88
S14	develop my technology skills	2.05	0.97
S8	Have more effective online group discussions compared to other online platforms	1.79	0.98

Taking a closer look at each statement, it could be seen from the descriptive table (table 5) that students tended to perceive the usefulness of Canvas with regard to its course administration's functions namely course structures, assignments, grades and feedback, and flexibility and mobility of

the platform, for instance, the ability to learn anytime and anywhere. More interestingly, the perceived usefulness of Canvas was compatible to the usage of Canvas in each course from the master's programs. There were some examples of students' opinions about how their master's program used Canvas for as follows:

> *"To download course material and to upload assignments"*
>
> *"Mainly to provide information, such as schedule, course literature, information about assignments, or to communicate about changes or provide clarifications. It is also used to hand in assignments such as papers or presentations, and provide feedback and evaluation of the assignments."*
>
> *"Sharing information from teachers to students regarding course content, organisation etc"*
>
> *"to get the course materials from the lecturers, to receive announcements, and to submit assignments"*
>
> *"facilitate and deliver learning material for each course such as course literature, provide information and guidelines, learning goals/outcomes"*

Particularly, all of the students stated in the open-ended questionnaire that all of the courses utilized Canvas to primarily manage the courses' progress, which was consisted of some main tasks such as providing general information about the course (e.g.: modules, learning materials & other resources, schedule, assignments, announcements, learning outcomes' criteria), and giving feedback and grades of the assignments.

Besides, it was noted from the interviews that students' usage behaviors and user experience were influenced by their instructors' usage behaviors and strategies.

> *"The discussion we use it mainly because we have like assignments from the courses, we're like forced to use that tool. But I never like on my own."*
>
> *"I mainly using it because instructors expect us to do. How clear their expectations, with clear tasks that we should perform on Canvas that we don't have other choices."*
>
> *"For me, it's not the case because mostly we had the in-person meetings with the teachers, so we don't have to use Canvas, but whenever we have to use it, they told us that you go there and you do it and everything was okay."*
>
> *"Teachers do not use those functions in class. We did not use calendar, information or discussion, forum there. It was mainly for uploading course materials and access them, not even to upload assignment"*
>
> *"I think you can do a lot of nice things in there but you don't need to and don't need to have all of them turn on. If instructors don't plan things to do with those features, it should not be there."*

As can be seen from students' opinions above, as long as the instructors made use of the Canvas's features, students would, accordingly, utilize these features.

Moreover, it was quite intriguing to find out that some features on Canvas such as discussion, forum, and chat were used reluctantly and students would never take the initiative. Additionally, students would prefer to use other social media platforms for their communication with either teachers or classmates due to their usage habit and privacy consideration.

"Maybe it's like a personal preference, but like I use. It's not that I don't want to use it. I think it's. I don't see it like a useful kind of like easy access. And every time they want to contact my teachers or my classmates, I use Whatsapp or Facebook or like email. Maybe because we're more used to like interact with my classmates outside of the platform so it's easier for us like to just send a message."

"I feel like I can I can be a bit more private and then I can use me like a Facebook or WhatsApp and things like that or more like private personal means of communicating"

More interestingly, some students perceived Canvas as a more formal and academic platform than other social networking sites.

"Asking questions irrelevant for the entire class I think Canvas is not suitable for that, I think Facebook group would be good for that."

"So we relate forums like very formal. So I'd prefer informal a communication when work with my classmates."

The distinction in the mental concept of each platform was possibly explained why they would not use Canvas to contact their friends and discuss their issues with teachers.

Along with usage behaviors, the usage strategies of instructors would influence students' user experience with Canvas as well.

"Sometimes it is not helping, sometimes you have to look a bit because you can feel confused sometimes with courses with finding things but I think that mostly depending on teachers, how they put up things. They can put up things in different ways, different teachers do in different ways."

"It can be tailored differently for each course so sometimes the administrators organize the content differently, this can sometimes be a bit difficult for the user when the different features are used inconsistently. For instance, course literature can be placed under "files," or "pages" or "modules" depending on the course"

"The fact that all teachers can modify the courses however they want often make the use of Canvas very confusing and messy, as each teacher use the platform differently. The layout of the platform is very uninspiring and it is hard to get an overview of assignments, upcoming classes, etc."

Based on students' viewpoints, their perceived ease of use of the system was depended quite heavily on how instructors organized the course's layout and presented instructional information.

5.2. Students' self-regulated learning skills, technical service quality and students' perceived usefulness of Canvas

5.2.1. Students' self-regulated learning skills and their perceived usefulness of Canvas

Concerning the situation of self-regulated learning strategies, table 6 reveals that students tended to be quite self-regulated since the mean value was 4.23 (*SD* = 1.27).

Table 6

Descriptive statistics of self-regulated learning skills

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Self-regulated learning skills	19	2.44	6.59	4.23	1.27
Valid N (listwise)	19				

Concerning the correlation between self-regulated learning skills and students' perception of usefulness of Canvas, table 7 reveals that there was a strong, positive correlation between students' self-regulated learning skills and their perceived usefulness of Canvas, which was statistically significant (r_s = .499, p = .03).

Table 7

Spearman's correlation test between self-regulated learning skills and students' perceived usefulness of Canvas

Correlations

			Students' perceived usefulness of Canvas	Self-regulated learning skills
Spearman's rho	Students' perceived usefulness of Canvas	Correlation Coefficient	1.000	.499*
		Sig. (2-tailed)	.	.030
		N	19	19
	Self-regulated learning skills	Correlation Coefficient	.499*	1.000
		Sig. (2-tailed)	.030	.
		N	19	19

*. Correlation is significant at the 0.05 level (2-tailed).

More interestingly, when comparing means between high and low self-regulated learning groups, the result revealed that students with higher self-regulated learning skills seemed to perceive Canvas as slightly more useful. Specifically, the mean score of their evaluation of the usefulness of Canvas was nearly 3 compared to 2.6 of the low-skill group, as illustrated in the table 8. It was noted that the value of self-regulated learning skills was considered high if its mean score was higher than the overall mean value, at 4.23; and, if the mean score was lower than 4.23, students were classified into the low self-regulated skills group.

Table 8

Mean comparison of students' perceived usefulness of Canvas between two groups of self-regulated learning skills

Report

Students' perceived usefulness of Canvas

Groups of Self-regulated skills	Mean	N	Std. Deviation
Low self-regulated skills	2.60	8	.62
High self-regulated skills	2.86	11	.76
Total	2.75	19	.69

Additionally, it was figured out from the interviews that Canvas was useful to students' time management, which was one of the self-regulated learning strategies.

> *"It can even aid the student to perfectly organize a time schedule around the activities, lectures, assignments with a push of a button (by registering the info in your google/apple calendar)"*

> *"It really helps me when I am in a foreign country to organize lectures and stuff I have to do. Because as I mention earlier, you can directly connect calendar of your programme into your phone, and you get notifications that show when is the next peer-review happens and you can organize better your time."*

The examples of students' opinions above illustrate that Canvas helped them to organize their learning progress regarding schedule and assignments thanks to the notification and calendar features.

In addition, the correlation between students' perceived usefulness of Canvas and four subscales of self-regulated learning skills (elaboration, time management, metacognitive and self-regulation, and critical thinking) has been tested using Spearman's correlation test.

Initially, the association test was conducted between students' attitudes towards the use of Canvas and their elaboration skill.

Table 9

Spearman's correlation test between elaboration skill and students' perceived usefulness of Canvas

Correlations

			Students' perceived usefulness of Canvas	Elaboration skill
Spearman's rho	Students' perceived usefulness of Canvas	Correlation Coefficient	1.000	.473*
		Sig. (2-tailed)	.	.041
		N	19	19
	Elaboration skill	Correlation Coefficient	.473*	1.000
		Sig. (2-tailed)	.041	.
		N	19	19

*. Correlation is significant at the 0.05 level (2-tailed).

As can be seen from table 9, there was a strong, positive correlation between students' elaboration skill and their perceived usefulness of Canvas, which was statistically significant (r_s = .473, p = .041).

The second aspect of self-regulated learning skills, time management skill, was also taken in the correlation test with students' perceived usefulness of Canvas.

Table 10

Spearman's correlation test between time management skill and students' perceived usefulness of Canvas

Correlations

			Students' perceived usefulness of Canvas	Time management skill
Spearman's rho	Students' perceived usefulness of Canvas	Correlation Coefficient	1.000	.414
		Sig. (2-tailed)	.	.078
		N	19	19
	Time management skill	Correlation Coefficient	.414	1.000
		Sig. (2-tailed)	.078	.
		N	19	19

Table 10 shows that there was a positive correlation between students' time management skill and their perception of usefulness of Canvas, however, the relationship was not statistically significant (p = .078).

Next, metacognitive and self-regulation, the third subscale of self-regulated learning skills, was tested its association with students' perceived usefulness of Canvas.

Table 11

Spearman's correlation test metacognitive and self-regulation skill and students' perceived usefulness of Canvas

Correlations

			Students' perceived usefulness of Canvas	Metacognitive and self-regulation
Spearman's rho	Students' perceived usefulness of Canvas	Correlation Coefficient	1.000	.344
		Sig. (2-tailed)	.	.150
		N	19	19
	Metacognitive and self-regulation	Correlation Coefficient	.344	1.000
		Sig. (2-tailed)	.150	.
		N	19	19

As can be seen from table 11, there was a positive correlation between students' metacognitive and self-regulation skill and their attitudes towards the use of Canvas, however, the relationship was not statistically significant (p = .150).

Lastly, critical thinking skill, the last subscale of self-regulated learning skills, was taken the correlation test with students' perceived usefulness of Canvas.

Table 12

Spearman's correlation test critical thinking skill and students' perceived usefulness of Canvas

Correlations

			Students' perceived usefulness of Canvas	Critical thinking
Spearman's rho	Students' perceived usefulness of Canvas	Correlation Coefficient	1.000	.457*
		Sig. (2-tailed)	.	.049
		N	19	19
	Critical thinking	Correlation Coefficient	.457*	1.000
		Sig. (2-tailed)	.049	.
		N	19	19

*. Correlation is significant at the 0.05 level (2-tailed).

As can be seen from table 12, there was a strong, positive correlation between students' critical thinking skill and their perceived usefulness of Canvas, which was statistically significant (r_s = .457, p = .049).

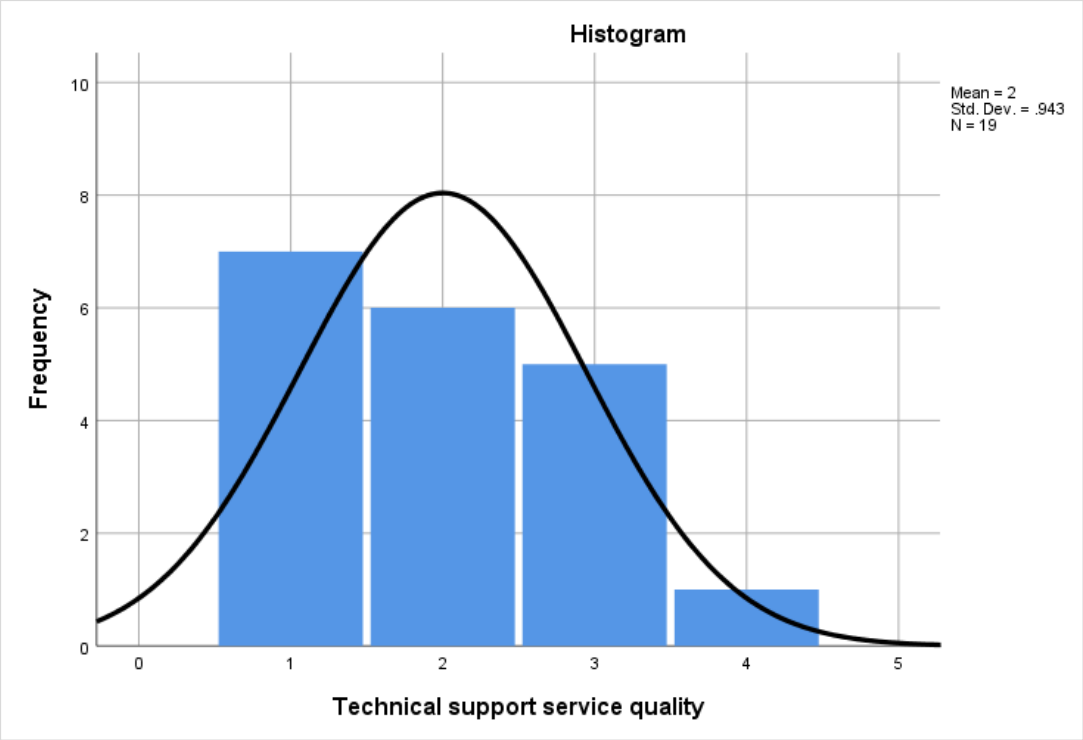
Overall, it can be seen that all four subscales of self-regulated learning skills were presented with a positive correlation with students' perceived usefulness of Canvas. More interestingly, two subscales (elaboration and critical thinking skill) were found to have a strong, positive correlation with students' perceived usefulness of Canvas, especially with statistical significance.

5.2.2. Technical service quality and students' perceived usefulness of Canvas

Overall, when being asked to evaluate the technical service quality of their institute, students tended to show their negative attitudes towards the support service. Figure 8 illustrates quite clearly that students seemed not to be satisfied with the service at their university given that it was a right-skewed distribution and the mean value was 2 (*SD* = .943).

Figure 8

A histogram of technical support service quality



Although students were rather negative towards the technical service quality, the relationship between the service quality and their perceived usefulness of Canvas was not ensured. To test the correlation between these two variables, Spearman's correlation model was used.

As can be seen from table 13, there was a positive correlation between students' evaluation of technical service quality and their perceived usefulness of Canvas; however, the relationship was not statistically significant (p = .341).

Table 13

Spearman's correlation test between technical support service quality and students' perceived usefulness of Canvas

Correlations

			Students' perceived usefulness of Canvas	Technical support service quality
Spearman's rho	Students' perceived usefulness of Canvas	Correlation Coefficient	1.000	.231
		Sig. (2-tailed)	.	.341
		N	19	19
	Technical support service quality	Correlation Coefficient	.231	1.000
		Sig. (2-tailed)	.341	.
		N	19	19

Additionally, based on the interviews with students, whenever they encountered any technical problems, they would refer to their friends and course leaders for support but rarely did they contact the technical support team at their university directly.

> *"So when we have a problem, most of the time we contact first the teacher and the teacher contacts the other."*
>
> *"I guess I would reach out to teachers or classmates. Like I guess if something happens, I will ask my classmates. I will firstly ask classmates if they say something else I couldn't find or have questions about something. And if they wouldn't know, I would probably contact teachers."*
>
> *Regarding the correlation between technical support and their perceived usefulness of Canvas, the interviews showed mixed results.*
>
> *"Encourages you to use the system."*
>
> *"I can feel less nervous. I can find myself confident actually because when you could not find something and feel struggling and sometimes you feel nervous, you lose confidence. Because you think that you need more to learn about technology and how can I use this so it makes me very frustrated sometimes."*
>
> *"From the beginning, it was like Canvas is a platform in itself. It is not difficult to use it. Just like it can be messy but I dont know if I receive any kind of support information in using it, I would kind of prefer to try and explore by myself and If I had questions, I would reach out."*
>
> *"Personally for me, not that much because I am the person who relies on looking through everything, to get familiar with the platform even if I had tutorials"*

It can be seen that while some students agreed that the more information about technical support such as onboarding tutorials and Canvas's support team contact could enhance their use and perceived usefulness of Canvas, some showed the opposite opinions due to the ease of use of the system and their preference about the trial-error approach in learning to work with the system.

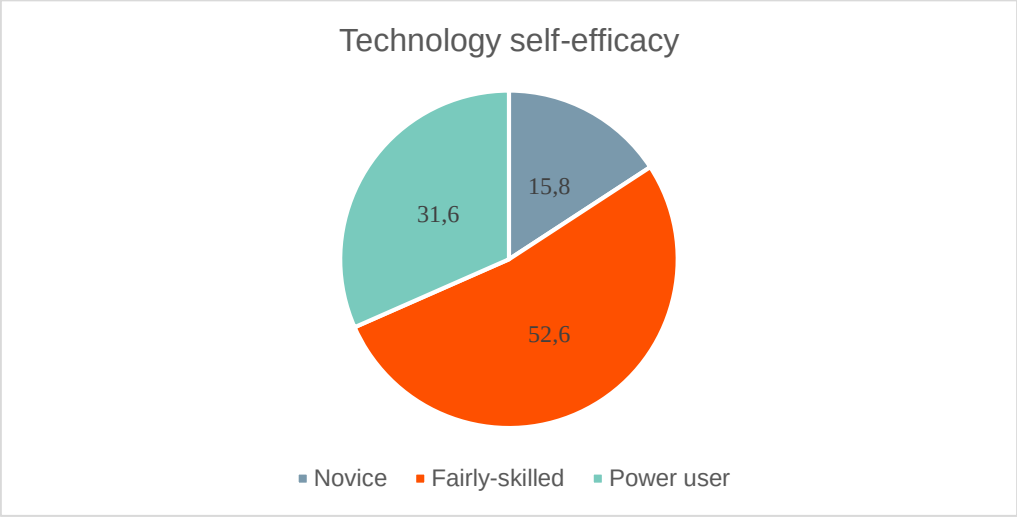
5.3. Technology self-efficacy, prior experience with LMS(s) and students' perceived usefulness of Canvas

5.3.1. Technology self-efficacy and students' perceived usefulness of Canvas

Regarding technology self-efficacy, students were asked to self-report their technology skill based on three levels namely novice, fairly-skilled, and power user. The survey's result presented that most of the students were quite confident with their technology skill at a fairly-skilled level, with nearly 53% as shown in figure 9.

Figure 9

Students' self-reported technology skill



When the mean values of students' perceived usefulness of Canvas were compared between three different levels of technology skill self-efficacy (table 14), it was quite interesting to find out that students who were in "fairly-skilled" group showed the most positive attitudes toward the usefulness of Canvas compared to the other two groups. Also, while students of the "novice" and "power user" group did not perceive Canvas as useful, students of the "fairly-skilled" group showed quite neutral opinions.

Table 14

Mean comparison of students' perceived usefulness of Canvas between three levels of technology self-efficacy

Report

Students' perceived usefulness of Canvas

Technology self-efficacy levels	Mean	N	Std. Deviation
Novice	2.43	3	.42
Fairly Skilled	2.98	10	.81
Power user	2.53	6	.54
Total	2.75	19	.70

However, A Kruskal-Wallis H test showed that there wasn't a statistically significant difference in their opinions of the usefulness of Canvas between three levels of technology self-efficacy ($H_{(2, N = 19)}$ = 2.134, p = .344).

The result from interviews revealed that the technology skill self-efficacy seemed to affect the perception of the ease of use of the system rather than the perception of the usefulness of the system.

> *"[..] when you could not find something and feel struggling and sometimes you feel nervous, you lose confidence. Because you think that you need more to learn about technology and how can I use this so it makes me very frustrated sometimes."*

> *"Last year when I wanted to reach my files and things, I could not find it, it is very complicated for me. And it was when we were at the design course, we tried to find something to, find materials, have some meetings with him but we can't find how can we log in and start the meeting […]"*

> *"[…] I felt nervous when I wanna to share a lot of file and things so I feel some nervous, nervous when I couldn't reach my goals or reach my subject from Canvas. It is very complicated. So maybe for the others, it is not a problem."*

> *"Someone who are not used to computer or LMS might feel more difficult since it is not straightforward"*

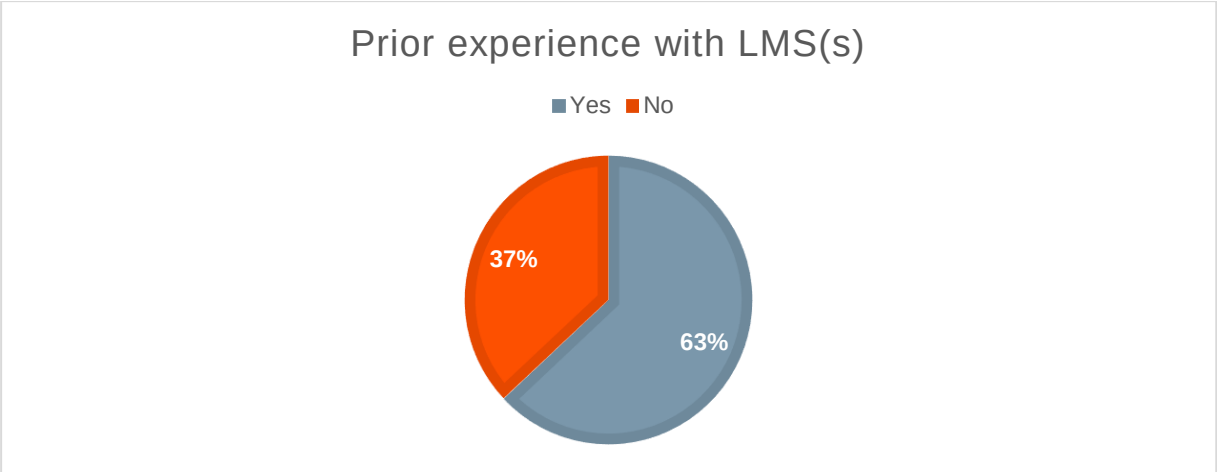
In particularly, it is revealed that the aspect of navigation was highly regarded as a problem with people who were not so confident in their technology skill. Consequently, this issue could be detrimental to the user experience with the system and possibly decreased users' confidence in their technology skill. Also, concerning the system for learning, the technology diffidence, in the long term, could affect the learning progress of students.

5.3.2. Prior experience with LMS(s) and students' perceived usefulness of Canvas

Overall, most of the students were familiar with the learning management system(s) as 63% of them reported that they had used LMS(s) before Canvas, as shown in figure 10.

Figure 10

Students' prior experience with LMS(s)



When mean values of students' perceived usefulness of Canvas were compared between two groups, it was figured out that students who had prior experience with LMS(s) tended to be slightly more positive toward the usefulness of Canvas, as can be illustrated in the table 15. Additionally, while students who were more experienced with LMS(s) tended to express neutral opinions, students who did not use LMS(s) before Canvas seemed to perceive Canvas as not useful given that the mean values of their evaluation of usefulness of Canvas were 2.9 and 2.6 respectively.

Table 15

Mean comparison of students' perceived usefulness of Canvas between two groups of prior-experience with LMS(s)

Report

Students' perceived usefulness of Canvas

Prior-experience with eLMS(s)	Mean	N	Std. Deviation
Yes	2.87	12	.65
No	2.56	7	.79
Total	2.75	19	.70

However, a Kruskal-Wallis H test showed that there wasn't a statistically significant difference in their opinions between two groups of prior experience with LMS(s) ($H_{(1, N = 19)} = 1.742$, $p = .187$).

Based on the interviews' analysis, it was found out that the prior experience with LMS(s) might affect students' perception of ease of use of the system rather than their perception of the usefulness of the system.

> *"Experience I had with working and with a system working, so why not faced any problem with a Canvas"*

> *"familiar with other LMS, I manage to use Canvas myself."*

> *“So I think it is also the first one who want to start Canvas, for example like me, it is very difficult at first”*

It is interesting to learn that students who used to utilize the other LMSs seemed not to have any difficulties in using Canvas. In reverse, the first-time users were more likely to experience problems with the ease of use of Canvas.

More interestingly, one student shared that the prior experience with other LMSs seemingly constructed her assumption about the use of a feature in Canvas.

> *"Only it's been a year I'm using Canvas, before I have used GUL. So I believe that the message can be lost."*

To summarize, it is found that students were quite neutral in their perception of usefulness of Canvas as an LMS. Particularly, Canvas was mainly regarded as an administrative tool. Also, students in this study were quite satisfied with the flexibility and mobility of Canvas. Moreover, their perception of usefulness of Canvas was significantly influenced by their self-regulated learning skills. More interestingly, two subscales (elaboration and critical thinking skill) were found to have a strong, positive correlation with students' perceived usefulness of Canvas, especially with statistical significance. Concerning technical support service quality, although there was a positive correlation between service quality and students’ perception of usefulness, the relationship was not statistically significant. In addition, it is revealed that there was no statistical difference in students’ perception of usefulness between different groups of technology self-efficacy and prior experience with LMSs. Lastly, qualitative data analysis showed that students’ perception of ease of use of Canvas was influenced by their instructors’ actual usage of Canvas, their technology self-efficacy, and prior experience with LMSs. It is also noted that students tended to regard their course leaders as the course administration on Canvas. Therefore, whenever they encountered any technical issues, they would prefer to contact their course leaders rather than the technical support team at the university.

6. Discussion and conclusion

6.1. Summary of the study

The purpose of this mixed-methods research design study was to shed light on master students' perception of usefulness of Canvas as an LMS, especially the factors that might influence their perceived usefulness of Canvas namely their technology self-efficacy, prior experience with other LMSs, self-regulated learning skills, and technical service support quality. The scope of this study focused on graduate students from two master's programs at the University of Gothenburg, Sweden. A purposive sampling method was adopted to select targeted research participants. This study provided more insights into students' usage experience with Canvas, their perception of usefulness of Canvas as an LMS, and factors that influence their perceived usefulness of Canvas. The influential factors taken into consideration were students' self-regulated learning skills, technology self-efficacy, prior experience with other LMSs, and technical service support quality. An online questionnaire was sent to all of the students via their program's leaders and their social networking page. A total of 19 participants from two master's programs completed the questionnaire. And, 12 out of 19 participants took part in video interviews. Descriptive statistics, two inferential statistics tests (Spearman's correlation and Kruskal-Wallis test), and content analysis were utilized to analyze data and thus address the research questions.

6.2. Findings and discussion

6.2.1. Students' perception of usefulness of Canvas as an LMS

Based on students' evaluation of the usefulness of Canvas as an LMS, the findings showed that some features of Canvas were utilized more than the others. Specifically, the most commonly used features of Canvas were related to the course administration's functions namely course structures, assignments, grades, and feedback. Therefore, it could be seen that students perceived Canvas as a course administration system. In addition, the flexibility and mobility of Canvas were perceived as usefulness by most of the students as it enabled them to learn anytime and anywhere. More interestingly, based on an open-ended survey question about purposes and actual usage of Canvas at their master's programs, it was figured out that their course instructors mainly used Canvas to manage the courses' progress, give feedback, and grade their assignments. It could be seen that their instructors' usage of Canvas was quite compatible with their usage and perception of the usefulness of Canvas as an LMS.

Several studies have studied university students' and teachers' usage of LMSs in learning and teaching; however, with different LMSs and none mentioned Canvas. According to Ellis (2009), teachers were capable of planning, evaluating, automating administration, reporting training events, and implementing the learning process on the LMS. Aside from the course administration works, Sharma et al. (2017) pointed out that the function of communicating with students on LMSs was commonly used among university teachers. Concerning the aspect of teachers' usage, the results of this study were quite similar to the study by Ellis (2009); however, they were quite different from the study by Sharma et al. (2017). Specifically, my study shared the same finding about the main purpose of usage of the LMS among university teachers, particularly, to manage their courses (displaying courses' outline and progress, course materials, grading and giving feedback on students' assignments). Nevertheless, my study did not agree with results from the research by Sharma et al. (2017) given that the communicative feature of the LMS was not commonly utilized by university teachers.

Regarding students' usage of LMSs and perceived usefulness, both Correia (2018) and Islam (2013) found that LMSs benefited students in assisting their learning progress management. The results from my study were not similar to these two papers in which students mostly used Canvas to manage their course progress rather than to manage their learning progress. Moreover, Correia (2018) claimed that LMSs were also helpful for students to communicate with teachers and classmates and collaborate

with their fellow classmates to work on assigned tasks. My study agreed partly with findings in Correia (2018). Specifically, although students admitted that they used Canvas to communicate with their teachers, it was depended on their teachers' usage preference. Additionally, some other communicative features of Canvas such as chatting, discussion, and forum were reluctantly used. Nevertheless, my study shared the same result with Correia (2018) in terms of students' collaboration on assigned tasks. In particular, it was agreed that only when there was an assignment requiring them to use Canvas to complete would they use it to communicate and/ or collaborate with their fellow classmates. Lastly, my study shared the same results with Alsobahi (2017) in terms of the benefit of flexible and mobile LMSs even though two research focused on two different LMSs. In particular, the former worked on Canvas, the latter focused on Blackboard.

Regarding the influence of teachers' usage on students' usage and perceived usefulness, Sharma et al.'s (2017) results align with the findings from my study that the role of teachers was quite important in the success of continuance of LMSs in teaching and learning. This result can be explained by the theory about user's behaviorism with innovative products by professor Rogers (1962). Particularly, innovation can be accepted and used widely as long as the innovation is communicated on different channels over a period of time through members of that society. The aspect of social influence is also regarded as an influential factor in the acceptance of use of technology according to UTAUT framework. Reflecting on my study, teachers could be considered as social influential factors in which their usage of Canvas influenced their students' actual usage and perception of usefulness of Canvas as an LMS.

6.2.2. Students' perception of ease of use of Canvas

Findings from the qualitative analysis revealed that students' technology skill self-efficacy and prior experience with LMSs contributed to their perception of ease of use of Canvas. In particular, the more they were confident in their technology skill and the more familiar they were with LMSs, the less they found Canvas difficult to use. This result is strengthened by UTAUT framework in which it was stated that effort expectancy to use a system depending on the users' experience with the system. More interestingly, it was figured out from the interviews that students' perception of ease of use of Canvas also relied on their instructors' ability to organize the course's layout and present instructional information. This finding was resulted from the attribute of Canvas in which teachers could freely design their courses' layout, which might affect user experience of students with the LMS.

Concerning the same issue, Ghosh (2016) figured out several factors influencing students' perception of ease of use of LMSs namely "technical support, computing resources and instructions about e-learning system". Qualitative results from this paper seemed not to share the same findings with Ghosh (2016) given that the ease of use of the system itself helped students to perceive Canvas as easy to use rather than the support from technical service. It is interesting to learn that this finding is not supported by UTAUT framework. More specifically, facilitating conditions were supposed to make direct impacts on users' usage of the system.

Discussing the problems of user experience with the Canvas app on smartphones, Wilcox et al. (2016) found out that students were quite confronted with the interface of Canvas given that it was not in sync with the desktop's version. It seemed that this issue might have been solved with the newest version of Canvas. Accordingly, students in my study did not mention this problem; more interestingly, they were quite contented with the mobile app thanks to its flexibility and mobility. In addition, Wilcox et al. (2016) pointed out that students' difficulty in course navigation was due to the user experience design ability of teachers. This finding was quite similar to what was found in my study.

6.2.3. Factors influencing students' perception of usefulness of Canvas

The results from the quantitative analysis revealed that students, overall, expressed quite neutral opinions of the usefulness of Canvas as an LMS. Concerning the factors influencing their perception of usefulness of Canvas, it was found that there was a strong, positive correlation between students' self-regulated learning skills and their perceived usefulness of Canvas, especially the relationship was statistically significant ($p = .03$). More interestingly, it was found that among four subscales of self-regulated learning strategies, two subscales (elaboration and critical thinking skill) were found to have a strong, positive correlation with students' perception of usefulness, especially with statistical significance. In addition, technical service support quality was carried out with a correlational test with students' opinions of the usefulness of Canvas. The result showed that there was a positive correlation between students' evaluation of technical service quality and their perception of usefulness of Canvas; however, the relationship was not statistically significant ($p = .354$). With respect to the difference in students' perceived usefulness between students with different levels of technology skill, it was quite interesting to find out that students who were regarded themselves as fairly skilled users showed the most positive attitudes toward the usefulness of Canvas compared to students of two other groups (novice and power user). Lastly, the result revealed that students who had prior experience with LMS(s) tended to perceived Canvas as more useful compared to students who did not experience any LMSs before Canvas. It is noted that the difference in students' perceived usefulness of Canvas between students from different groups of technology skill self-efficacy and prior experience with LMSs was not statistically significant.

Regarding the research about students' attitudes towards the usefulness of LMSs, Alshorman and Bawaneh (2018), Alsobahi (2017) and Shayan and Iscioglu (2017) shared the same result despite the difference in LMS systems (two studies implementing their university's LMSs and the other with Blackboard). In particular, they both concluded that their students showed positive attitudes towards the usefulness of LMSs, especially to manage their learning. However, while Alshorman and Bawaneh (2018) gave further information about students' perception of the usefulness of their university's LMS such as the ability to handle their assignments promptly and costs of instructional materials, Alsobahi (2017) and Shayan and Iscioglu (2017) did not present what aspects of their university's LMSs that students found useful. It seemed that their results were quite dissimilar to the result of my study. Specifically, my study revealed that students, in general, showed neutral opinions of the usefulness of Canvas. It is noted that despite differences in LMSs, the participants' demographics were different in each study. Specifically, the targeted population of my study was graduate students and from different countries, the other papers focused on undergraduate students who shared the same culture.

Concerning factors influencing students' attitudes towards the usefulness of LMSs, it was evident that students' perceived usefulness, perceived ease of use, and service quality were found to affect their attitudes (Haddad, 2018; Ohliati & Abbas, 2019; Shayan & Iscioglu, 2017) regardless of students' demographic background and different LMSs. The findings of my study seemed to share the same patterns with these studies. However, it is noted that although there was a positive correlation between service quality and students' attitudes in my study, the correlation was not statistically significant.

With respect to factors influencing students' perception of usefulness of LMSs, Eom (2012) revealed that self-regulated learning skills were not significantly associated with students' attitudes. However, Saba (2012) claimed that self-regulated learning could impact user satisfaction with the system. The findings of my study seemed to be similar to the conclusion given by Saba (2012) given that self-regulated learning skills of students were found to have a statistically significant correlation with their perception of usefulness of Canvas.

Lastly, the technology acceptance model (TAM) gave explanantions for the role of external variables in mediating users' perceived usefulness and ease of use of the system. More specifically, it was justified that the user's perceived usefulness and ease of use of a technological system/ product were likely to be influenced by external variables. However, Davis (1989) did not give any further insights

into the components of external variables. In the context of my study, external variables could be regarded as students' self-regulated learning skills, technology skill self-efficacy, and prior experience with LMSs. It was found that there was a statistically significant correlation between students' self-regulated learning skills and their perception of usefulness of Canvas. Additionally, technology skill self-efficacy and prior experience with LMSs seemed to affect students' perception of ease of use of Canvas.

6.3. Implications

Initially, the majority of students perceived the usefulness of Canvas as a course administration tool, and their perceived usefulness and actual usage of Canvas were influenced by their course instructors' usage. Therefore, to maximize the benefits of Canvas in learning and teaching, it is suggested that instructors should try to implement different functions offered by Canvas in line with their instructional approaches. Taking discussion, forum, and quiz, for example, teachers could make use of these features on Canvas to organize more diverse online and blended learning activities. Learners, on the other hand, should show more initiative by taking advantage of this tool in managing their learning progress. In addition, when students are encouraged to use the tool more, for instance, to communicate with teachers and classmates regardless of academic purposes, they might develop their habit of using and change their mental concept about the user experience of Canvas.

Moreover, regarding the ease of use of Canvas, even though the system was considered quite easy to use, students shared that the courses' layouts and navigation were not well-structured and rather individualized based on teachers' user experience design competence. Therefore, it is recommended that course layouts should be designed consistently between courses. Also, teachers should consider providing usage guidelines for course layouts and navigation in order to enhance students' user experience with Canvas and possibly course satisfaction.

Regarding self-regulated learning strategies and students' perceived usefulness, it was found out that there was a statistically significant correlation between students' self-regulated learning skills and their perception of usefulness of Canvas. Especially, some students were able to personalize some features on Canvas to manage their study more efficiently. Hence, it can be implied that program administration and course leaders should be aware of their students' ability to self-manage their study at the beginning of the course. For less self-regulated students, program leaders and/ or course instructors should provide them with guidance to use Canvas more effectively. Moreover, teachers should encourage students to take advantage of customized features on Canvas such as calendar and notification, for instance, to manage their learning. Besides, it is suggested that Canvas designers should provide students with more instructions about utilizing personalized features for their self-learning management. Additionally, as elaboration and critical thinking skills were found to have statistically significant positive correlations with students' perception of usefulness of Canvas, it is implied that these skills should be considered to develop among graduate students in the master's courses.

In terms of technical support, the result showed that technical service quality could be positively correlated with students' perception of usefulness of Canvas; however, it was a non-statistically significant correlation. More interestingly, it should be noted that students tended to consider their course leaders as the course administration so that whenever they encountered any technical issues, they would prefer to contact their instructors first. This implies that teachers should be aware of their administrative role and possible technical issues students might encounter. Also, contact information about technical service should be given to students at the beginning of the course and to whom they can contact with specific issues.

Lastly, the study figured out that students' technology skill self-efficacy and their prior experience with other LMSs could impact their perceived usefulness of Canvas differently although the difference was found non-statistically significant. The result implies that students' technology skill and their

experience with LMSs should be noted at the beginning of the program. For the first-time users and/ or students with a low level of technology skill, they should be provided with extra supports from the program and their course leaders with Canvas's usage.

6.4. Limitations of the study

There are several limitations of this paper that might affect the final results as follows. First, this study was conducted with 19 participants for the survey and 12 participants for interviews. The response rate (24%) of the survey is considered quite low for the statistical analysis. To complement the statistical analysis, this study adopted the mixed methods research to both collect and analyze data sources. The richness of data sources was expected to provide a more well-rounded insight into the research topic. Second, the sampling method, which is purposive sampling, is considered quite biased as the selection criteria are based on the researcher's purpose. Regarding quantitative data, students' technology skill levels were self-reported, which might not reflect well at their actual level. However, it is noted that when participants self-evaluated their technology skill, the detailed description of each technology skill level was provided. The detailed description was hoped to help research participants to self-evaluate their level as correctly as possible. Concerning qualitative data, although the main ideas are related partially to users' behaviors, observations of how the users experience with Canvas were not conducted. Instead, the study was carried out with interviews only. Lastly, when analyzing qualitative data, the coding of interviews' contents was completed by the researcher only, which could lead to bias. Hence, to raise awareness of bias issues, a transparent approach in the report about the working process was applied. Particularly, the coding process and examples were described and discussed in the method section.

6.5. Recommendations for future research

Even though the current study has found some interesting results, it is suggested that future researchers should take into consideration the limitations of this study before conducting their studies. Specifically, it is recommended that the same study could be carried out with a probability sampling method to test the assumptions statistically. In addition, it might be better if future studies could combine both interviews and observations in order to have a more accurate view of user behaviors. Also, when analyzing qualitative data, the bias of information coding can be reduced if there are two or more researchers to do coding or cross-checking the coded themes. Besides, as this study can focus on the linear relationships and differences in mean values between groups, the next studies should consider regression tests with quantitative data. Moreover, the viewpoints of teachers and program administration are highly recommended to take into consideration along with students' viewpoints. Lastly, as this study focused on Canvas as an LMS, future studies might compare different LMSs in higher education. Also, it might be quite interesting if the association between students' attitudes towards the use of LMSs and course outcomes in three different learning environments (traditional face-to-face, online learning, blended learning) is investigated.

6.6. Conclusion

To conclude, this thesis paper has adopted a mixed methods research design to gain a deeper insight into factors that might influence students' perception of usefulness of Canvas as a learning management system. The study was conducted with the participation of 19 survey respondents and 12 interviewees. The implementation of statistical analysis and content analysis has helped answer research questions as follows.

Overall, students showed quite neutral opinions of the usefulness of Canvas as an LMS. Their perception of the usefulness of Canvas was related to course administration and the mobility and flexibility of the platform. More interestingly, teachers' usage of Canvas and the program's intentional usage played a significant role in influencing students' perception of usefulness and their actual usage.

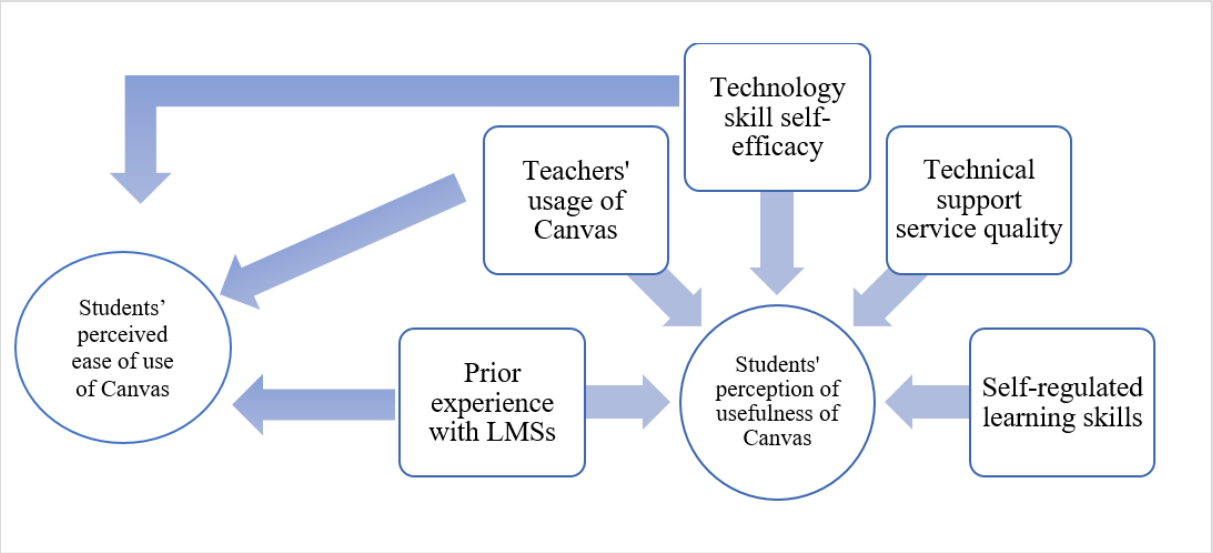
Self-regulated learning skills were found to have a statistically positive correlation with students' perception of usefulness of Canvas. Additionally, technical support service quality was positively correlated with students' perceived usefulness of Canvas, but the result was not statistically significant. Moreover, it is quite interesting to know that the comparison of mean values revealed that more self-regulated students seemed to be more positive about the usefulness of Canvas in managing their studies. Lastly, elaboration and critical thinking skills of students were found to have strong positive relations with their attitudes towards the usefulness of Canvas, and the correlations were statistically significant.

When comparing mean values between different levels of technology self-efficacy and between groups of prior experience with LMSs, the study found out that there was a difference between groups but the result was not statistically significant. Specifically, students who were more confident with their technology skill and more experienced with LMSs were slightly more positive towards the usefulness of Canvas. Moreover, it is also noted that students' perception of ease of use of Canvas was strengthened by their technology skill confidence and experience with LMSs.

The following relationship map would summarize some main and interesting findings:

Figure 11

Relationship map of findings



The above model has shown the factors that could influence students' perception of usefulness and ease of use of Canvas. As can be seen clearly from the model, there are five factors (prior experience with LMSs, teachers' usage of Canvas, technology skill self-efficacy, technical support service quality, and self-regulated learning skills) that could influence students' perceived usefulness of Canvas. Also, figure 11 depicts the influence of students' technology skill self-efficacy, prior experience with LMSs, and teachers' usage of Canvas on students' perception of ease of use of Canvas.

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Appendix 1: Questionnaire

Background information

3. What is your gender? *

   Mark only one oval.

   - ◯ Female
   - ◯ Male

4. What is your age range? *

   Mark only one oval.

   - ◯ Under 18
   - ◯ 18-24
   - ◯ 25-34
   - ◯ 35-44
   - ◯ 45-54
   - ◯ 55-64
   - ◯ 65+

5. What is your nationality stated in your passport? *

   _____

6. Which master's programme are you studying? *

   _____

7. Which year of the programme are you in? *

Mark only one oval.

- First year
- Second year

8. How many online courses have you taken before you started your master's program? *

Mark only one oval.

- None
- 1-3 courses
- 4 courses or more

9. Have you used any learning management systems before the master's program? *

Mark only one oval.

- Yes
- No

10. If your answer in the previous question is "YES", could you please name LMS(s) you have used?

_____

11. How good is your technology skill? *

Mark only one oval.

- ( ) Novice (Knew how to do basic functions, could use basic functions in a few software programs, had basic Internet skills such as opening and navigating web-sites, sending and receiving e-mail, and using key-word search engines)
- ( ) Fairly skilled (Knew how to do most things I needed, could function skillfully in a variety of software, and could perform such Internet functions as power searches, plug-in download and install, and navigate web-sites using plug-ins namely Wikipedia, Wordpress etc.)
- ( ) Power user (Could do advanced software and hardware tuning, modify systems settings and install new hardware components, was a sophisticated user of a variety of high-end software, and could create my own web-pages)

Questionnaire about your learning strategies for this master's program

12. Read the following statements and choose one option that best represents your opinion. *

Mark only one oval per row.

	(1) Not at all true of me	(2)	(3)	(4)	(5)	(6)	(7) Very true of me
When I become confused about something I'm reading, I go back and try to figure it out	⬭	⬭	⬭	⬭	⬭	⬭	⬭
When I study, I pull together information from different sources, such as readings, online discussions, and my prior knowledge of the subject	⬭	⬭	⬭	⬭	⬭	⬭	⬭
When reading for the courses in the programme, I try to relate the materials to what I already know	⬭	⬭	⬭	⬭	⬭	⬭	⬭
I try to understand the instructions for the courses by making connections between the readings and online & offline learning activities from the courses	⬭	⬭	⬭	⬭	⬭	⬭	⬭

I log in to Canvas for this programme regularly							
When studying, I try to determine which concepts I don't understand well							
I try to apply ideas from course readings in other class activities such as online discussions							
I usually study in a place where I can concentrate on my course work							
I make good use of my study time for this master's programme							
I find it hard to stick to a study schedule							
I have a regular place set aside for studying							
I make sure that I keep up with the required readings and assignments for this							

master's programme							
I often find that I don't spend very much time on this programme because of other activities							
I often find that I don't have enough time to review my notes or readings							
When reading, I make up questions to help focus my reading.							
If course readings are difficult to understand, I change the way I read the materials							
Before I study new course material thoroughly, I often skim it to see how it is organized							
I ask myself questions to make sure I understand the materials I have been studying.							
I try to change the way I study in order to fit							

the courses' requirements and the instructional methods used in these classes.							
I try to think through a topic and decide what I am supposed to learn from it rather than just reading it over when studying.							
When I study for this programme, I write brief summaries of the main ideas from the readings and online discussions							
When I study for this programme, I set goals for myself in order to direct my activities in each study							
I often find myself questioning things I hear or read to decide if I find them convincing							
When a theory, interpretation, or conclusion is presented in the online discussions or							

in the readings, I try to decide if there is good supporting evidence							
I treat the course material as a starting point and try to develop my own ideas about it							
I try to play around with ideas of my own related to what I am learning in this programme							
Whenever I read an assertion or conclusion about an issue, I think about possible alternatives							

Questionnaire about Canvas

13. Please describe briefly how and for what purposes Canvas is mostly used in your master's program? *

Appendix 2: Common semi-structured interview questions

1. I saw that you have used other LMS before Canvas, could you tell me a bit about other LMS?

2. So what do you usually do with those LMS?

3. How do you feel when you use other LMS compared to Canvas?

4. Overall, do you think Canvas is helpful to you? Why/ Why not?

5. Why do choose Canvas to interact with your instructors but not your classmates?/ Why don't you want to to interact with your instructors and your classmates on Canvas?

6. How do you Canvas first time? Any difficulties?

7. If you are more supported with technical supports, how would that affect your attitudes toward Canvas?

8. Recommendation for enhancing usage of Canvas

Appendix 3: Informed consent

Factors influence adult learners' attitudes towards the use of Canvas as a learning management system

I am Thu, a master student in IT and learning at the University of Gothenburg. Currently, I am working on my master thesis about the learning management system - Canvas. This survey might take you 10-15 minutes to complete. Your opinions are great treasures for the success of this thesis. Thank you a lot for your time and effort!

* Required

Informed consent to participate in a master's thesis project

My name is Thu Dang, a master student in IT and learning at the University of Gothenburg, Sweden. Currently, I am doing my master thesis with a topic named "Factors influence adult learners' attitudes towards the use of Canvas as a learning management system".

The aim of this research is to find out the attitudes of graduate students from international master's programs at the University of Gothenburg towards the use of Canvas as a learning management system (LMS) in correlation with their prior experience with online learning & LMS, their self-reported technology competency and learning strategies. The result of the study is expected to be used as a pilot study for larger-scale research and used to imply several instructional strategies for the implementation of Canvas in blended learning courses at higher education. To conduct this study, a survey is utilized.

As part of this research project, I am recording your information in the survey in order to retrieve data for the analysis phase.

The project follows the ethical and legal guidelines provided by the University of Gothenburg, Sweden. The material is stored and archived on a secure server in accordance with the regulation of data (Personuppgiftslagen, 1998:204).

All participation is voluntary and there are no consequences if you choose not to participate in the study. If you want to withdraw from the study after the recording has been made, the recording will be destroyed. All names will be anonymous in the final thesis.

Contact information
Thu Dang, principal investigator
Email: gusdangng@student.gu.se
Mobile phone: +4676 566 3172

1. Sign the consent form and let me know if you are willing to participate or not. *

   Mark only one oval.

   - ◯ Yes, I want to participate. The recording can be used in research
   - ◯ No, I do not want to participate in the study.

2. Your signature (Your full name) *

   _____