

**LAMK** Lahden ammattikorkeakoulu  
Lahti University of Applied Sciences

# MOBILE DEVICE USE IN STUDENT LEARNING PROCESS

Supporting Student Learning Process with  
Use of Mobile Devices

LAHTI UNIVERSITY OF APPLIED  
SCIENCES  
Degree programme in Business  
Information Technology  
Bachelor's Thesis  
Autumn 2017  
Jason Ali

Lahti University of Applied Sciences  
Degree Programme in Business Information Technology

ALI, JASON:

Mobile Device Use in Student  
Learning Process  
Supporting Student Learning Process  
with Use of Mobile Devices

Bachelor's Thesis in Business Information Technology

39 pages, 5 pages of appendices

Autumn 2017

ABSTRACT

---

Many students use mobile devices both in their free time and during school. Mobile devices have the potential to be used for learning purposes as well as for personal use.

The purpose of this thesis is to examine the ways in which students utilise mobile devices and the services Lahti University of Applied Sciences provide and identify potential ways in which mobile devices can be used to support the learning process of students.

The data used in this thesis was collected using surveys which were created with questions tailored to identify how Lahti UAS students use their mobile devices, what their feedback is about the services they use, with an emphasis on Reppu and their ideas for how to utilize mobile devices in the future.

The results show that some students are already using mobile devices to support their learning to an extent and also identified some potential ways to use mobile devices to further support the learning process of students.

Keywords: mobile devices, learning process, Lahti UAS, peer collaboration, Reppu, LAMK application

## CONTENTS

1	INTRODUCTION	1
2	RESEARCH APPROACH	2
2.1	Research question and objective	2
2.2	Research method and process	3
2.3	Thesis structure	5
3	LEARNING STYLES AND MOBILE LEARNING	8
3.1	Learning styles and mobile devices	8
3.2	Social media and mobile learning	9
4	RESEARCH DATA	11
4.1	Background questions	11
4.2	Main survey questions	13
5	DATA ANALYSIS AND DISCUSSION	27
5.1	Mobile device in learning	27
5.2	Using Reppu on mobile devices	30
5.3	Reliability and validity	33
6	CONCLUSION	34
6.1	Answering the research questions	34
6.2	Suggestions for further research	37
	LIST OF REFERENCES	38
	APPENDIX	40

LIST OF FIGURES

Figure 1 - Research process diagram .....5  
Figure 2 - Thesis structure diagram.....6

## LIST OF TABLES

Table 1 - Qualitative and quantitative comparison (DensCombe 1998, 174 – 176) .....	3
Table 2 - Answers to survey - Question 1.....	11
Table 3 - Answers to survey - Question 2.....	11
Table 4 - Answers to survey – Question 3.....	12
Table 5 - Answers to survey – Question 4.....	13
Table 6 - Answers to survey – Question 5.....	13
Table 7 - Answers to survey – Question 6.....	14
Table 8 - Answers to survey – Question 7.....	15
Table 9 - Answers to survey – Question 8.....	16
Table 10 - Answers to survey – Question 9.....	17
Table 11 - Answers to survey – Question 10.....	17
Table 12 - Answers to survey – Question 11.....	18
Table 13 - Answers to survey – Question 12.....	19
Table 14 - Answers to survey – Question 13.....	21
Table 15 - Answers to survey – Question 14.....	22
Table 16 - Answers to survey – Question 15.....	24
Table 17 - Answers to survey – Question 16.....	25
Table 18 - Survey question comparison - Questions 8 & 9.....	30

## KEY TERMS AND DEFINITIONS

**Mobile devices** - Smart mobile phones and small tablet computers

**Learning process** - Any activities related to school or learning

**Lahti UAS** - Lahti University of Applied Science

**LAMK** - Lahden ammattikorkeakoulu (Lahti UAS Finnish name)

**Reppu** - Service provided by Lahti UAS, where students can enroll to course areas and submit assignments.

**Moodle** - Learning platform system that Reppu is based on

**Lukkarit** - Lesson schedule system provided by Lahti UAS

**Peer collaboration** - Students working together to study or achieve goals or projects

## 1 INTRODUCTION

There are billions of people using mobile devices around the world. By the year 2018 it has been estimated that there will be over seven billion mobile devices in use with constant access to the internet. Accessing the internet is a significant feature of mobile devices today, with mobile phones no longer being just a phone but a portable multimedia device. Social media, internet services, multimedia and other applications are in constant demand by users which has therefore led the rapid improvement of mobile phones and tablets. For example, in 2013 the average download rate was nearly 1.4 Mbps which had almost tripled the average speed from 2012, which was only 520 Kbps. (Krawczyk et al. 2017, 293.)

The rapid increase in computing power, memory capacity, screen size and resolution also increases the potential of the devices. Mobile application developers may be able to take advantage of these improvements when creating new mobile applications, allowing more advanced useful applications to be utilized by mobile device users in their personal and working lives. (Krawczyk et al. 2017, 293 – 294.)

There is now potential for utilizing mobile devices for teaching and learning especially as mobile devices are very popular with young people and the current generation of students and research showing more students are owning them (Brown et al. 2015, 32). Smart phones can be used for many things including instant messaging, social media, playing games, sending emails and general communication. As such they can now be considered essential to both personal and working lives. (Gaskin et al. 2015, 181.)

The focus of this thesis is on the use of smart mobile technology by students and how it can be applied to learning. The study will examine how students utilize smart phones and tablets during their studies and how they use the tools and services provided by their university. This thesis is commissioned by the Lahti UAS eLearning Unit.

## 2 RESEARCH APPROACH

### 2.1 Research question and objective

It is possible to enhance the experience of students by integrating mobile devices into teaching methods by allowing students to study more effectively (Mills 2015, 8). Accordingly, the chosen research question is the following:

- How can smart mobile devices be utilized to support the learning process of students at Lahti University of Applied Sciences?

The aim of this research is to find out how students are currently using their smart devices during their learning, including classroom use and learning activities. In addition, the aim is to find out how they utilize the learning tools provided by Lahti University of Applied Sciences, with an emphasis on Reppu. How students feel about using these tools on mobile devices in terms of usability, reliability, relevance and personal preference will also be analysed. The research will be used to theorize ways in which the learning tools can be changed to improve the learning process of students and whether integrating smart devices into teaching methods would be beneficial or not.

The research question can be broken down into the following sub questions:

- How are mobile devices currently used in the learning process of students?
- What can be done to further support the use of mobile devices in the learning process?

The first of these will examine how mobile devices are currently used by students during their learning, and the second question will examine the



possibilities and changes that would need to take place to improve the learning processes using mobile devices.

## 2.2 Research method and process

The method used will be mostly qualitative. Qualitative research focuses more on words compared to quantitative research where the focus is on numbers in terms of what is being analysed. Qualitative research is also usually applied to smaller studies than quantitative studies. Statistics are usually more reliable in larger numbers and while this can be beneficial in both methods, qualitative research can benefit from being focused on a study with limited numbers of situations and people. (DensCombe 1998, 174 – 175.) As the research question is explorative and the answer may be subjective, examining opinions and experiences of students will likely be more useful than observing objective facts and numbers. Using one approach does not necessarily mean excluding the other (DensCombe 1998, 173). In this study quantitative methods will also be considered, for example, counting the amount of time students spend using their mobile devices for personal use compared to using them for studying. The table below shows a comparison of qualitative and quantitative methods (Table 1).

**Table 1 - Qualitative and quantitative comparison (DensCombe 1998, 174 – 176)**

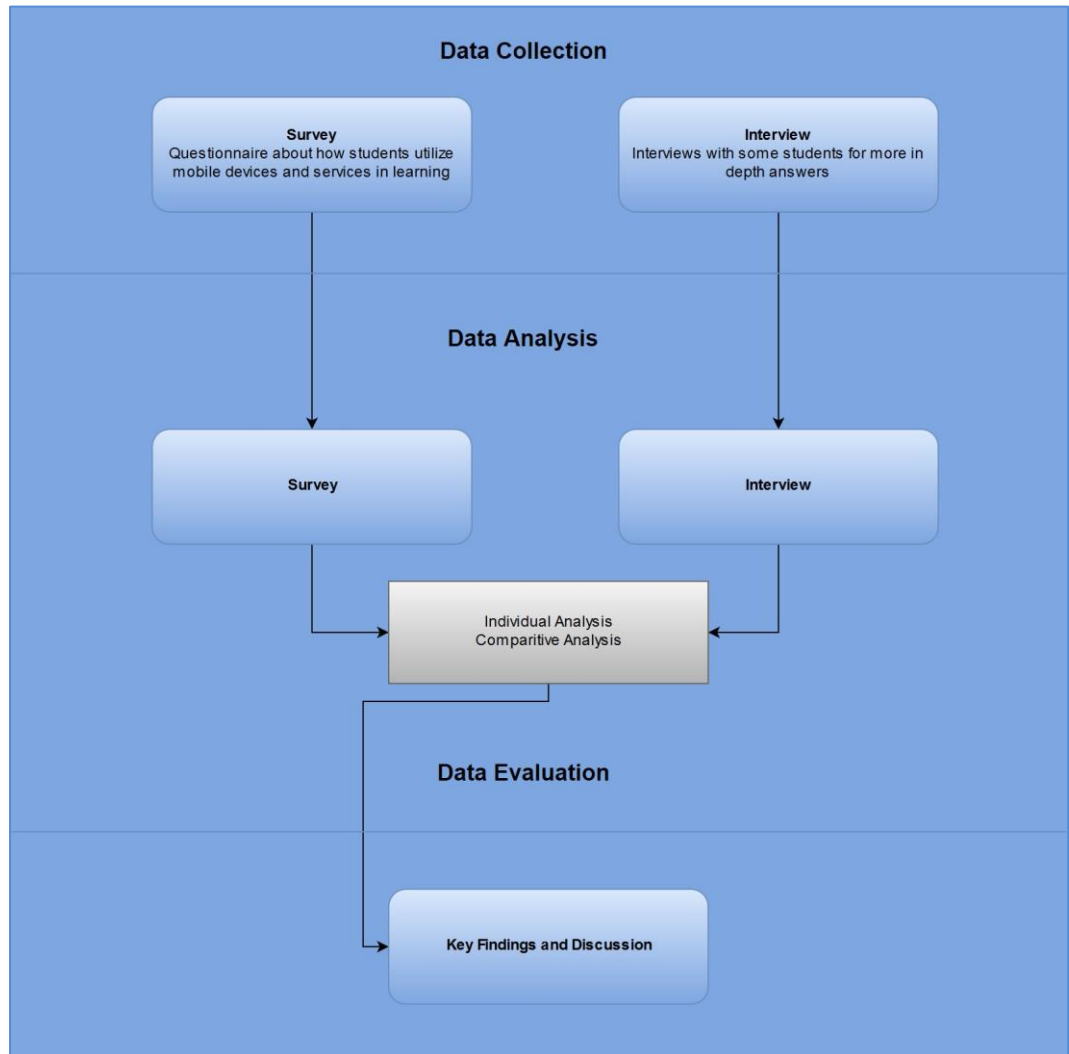
<b>Qualitative</b>	<b>Quantitative</b>
Textual	Numerical
Descriptive	Analytical
Small-scale studies	Large-scale studies
Holistic perspective	Specific focus
Researcher involvement	Researcher detachment

Emergent research	Predetermined research
-------------------	------------------------

To gather data for this research, the main method used will be surveys. These will be created with questions tailored to gather the information required to answer the research questions. The surveys will be aimed towards students, and the intention is to survey a sample of students from each faculty. It is important to gain feedback from students from every faculty as their opinions and experiences may be different; for example, IT students may be more technology orientated and utilize mobile devices more in their learning than students in other faculties. In addition to the surveys, data will also be collected by interviewing a sample of willing students to get more detailed information about personal experiences and opinions about how mobile technology is used in their learning and feedback on the learning tools provided by Lahti UAS. Data will also be gathered by interviewing willing teachers. This will allow insight into how they utilize mobile devices in their teaching methods and their experiences witnessing student mobile device use during classes.

The answers from the survey will be put into tables in Excel, and charts will be created to visualize the data. It will then be possible to find correlations and comparisons, for example between faculties. This also allows to identify popular answers, for example if many people have the same problem with a certain function on Reppu. The data will be analysed and then summarized in a way that refers back to the initial research questions.

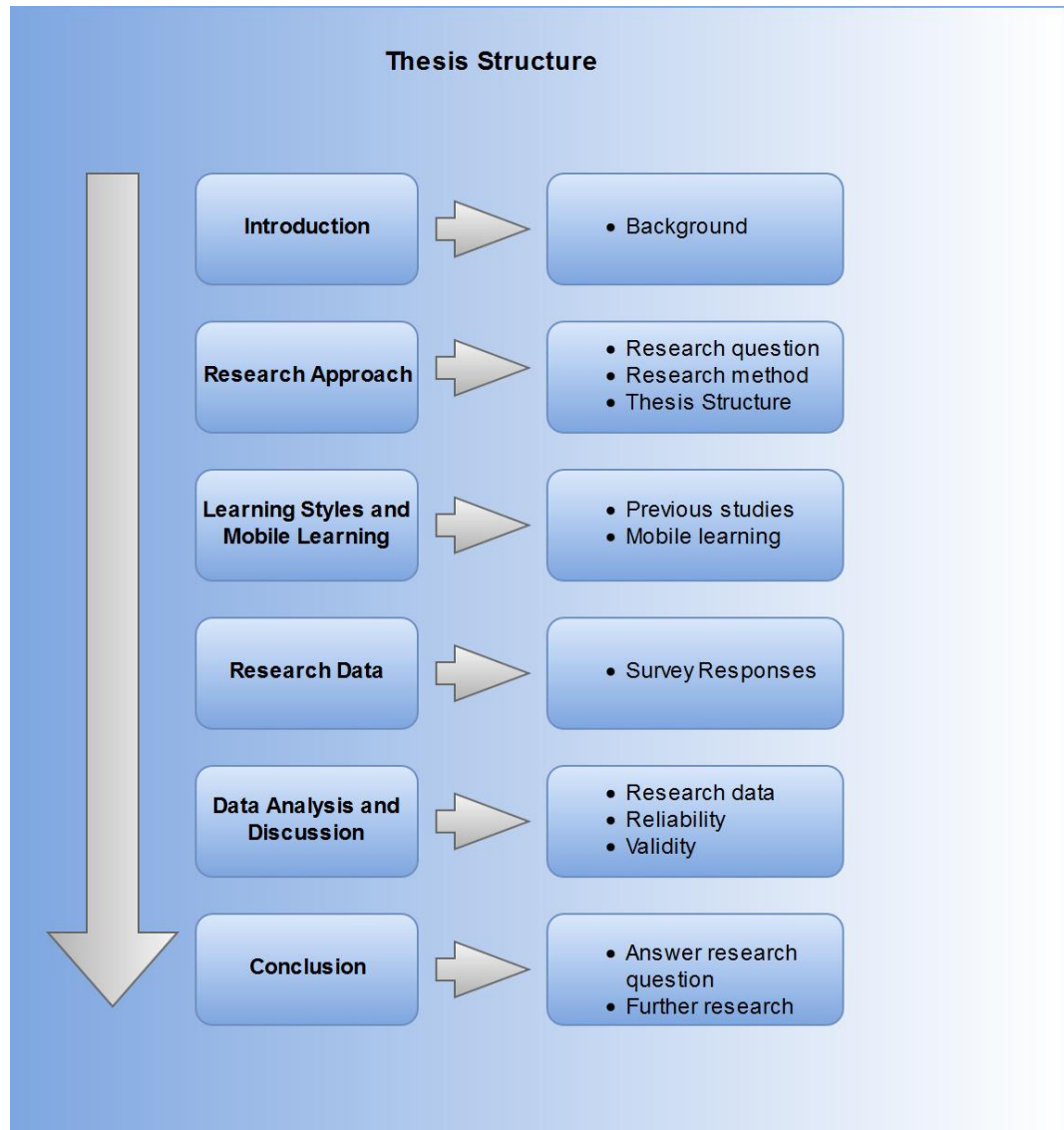
The research process is shown in the figure below (Figure 1).



**Figure 1 - Research process diagram**

### 2.3 Thesis structure

The thesis consists of six main sections. These sections are the following: Introduction, Research Approach, Learning Styles and Mobile Learning, Research Data, Data Analysis and Discussion and the Conclusion. Below is a diagram showing the structure of this thesis (Figure 2).



**Figure 2 - Thesis structure diagram**

The Introduction section introduces the thesis topic and outlines a basic background of mobile devices and their use. The next section, Research Approach, states the research question and sub-questions that motivate this study. It also contains information on the method of research used in this study and the structure of this thesis. The section Learning Styles and Mobile Learning motivates the study further by providing a background using previous studies about utilising mobile devices for learning.

The section Research Data contains the data collected in this research. It contains the survey questions and the answers collected displayed in tables. The next section Data Analysis and Discussion is where the

research data is analysed, finding trends and key points of interest to the study. This section also contains information on the reliability and validity of the research.

Finally, the Conclusion section summarises the key points discovered in data analysis and relates them to the research questions to find the answers to the study. This section also contains insight into the potential of further research.

### 3 LEARNING STYLES AND MOBILE LEARNING

It is essential to know about different learning styles and to understand what the idea of mobile learning is. Therefore, in this section of the thesis existing research will be examined to discuss and review some of the key concepts and ideas related to this thesis.

#### 3.1 Learning styles and mobile devices

Every person has their own learning style, which affects their motivation when learning new information depending on how they are being taught or studying. eLearning (electronic learning) takes students learning style into account by being designed with optional activities that students can choose. These activities help to engage and motivate students which encourages success. Applying this to mLearning (mobile learning) also allows the learning to be more flexible and convenient for the student. (Dawson et al. 2011, 7.) If mobile devices are considered in learning processes, teachers can use them to help engage students in learning and possibly improve their motivation towards the subject.

Mobile devices allow people to engage in activities and transactions in locations and situations where it never used to be possible or it was much more difficult, such as during a bus ride or even while walking. The device offers the usage of a computer but with greater portability. As the mobile device offers convenience, it also generates a dependency for the user. Because these devices have internet access, they allow the user to have access to many things including emails, instant messages and social media. (Ker et al. 2011 194.) By being able to view social media updates and messages instantly, smart phone users are more inclined to check their device frequently (Chang et al. 2013, 375). With most students owning a mobile device, it is very tempting to use them in lessons for things other than studying for example social media or instant messaging if someone else is messaging them during a lesson. This can make them distracted and less motivated to pay attention when the teacher is

speaking. If some usage is integrated into classroom activities, students may be less likely to be distracted as they are already engaged with their school work.

### 3.2 Social media and mobile learning

Students are often users of social media and comfortable using technology to communicate with their peers, with WhatsApp being one of the preferred instant messaging applications used. Research has shown however that more often students will try to solve problems themselves by searching online when they have a difficulty with their course or studies. Students were also less likely to talk to teachers, students in other courses or go to the support centre on their institution when they needed support. (Bullen et al. 2016.) Lahti University of Applied Sciences has message boards available for discussion on the course pages of Reppu, which are not always full utilised. Perhaps encouraging students to use group chats in social media, such as Facebook or instant messaging services such as WhatsApp, to discuss coursework would be beneficial to students as they can easily use them on their mobile devices and are likely already familiar with them. They may also be able to have more informal discussion as the communication channel would be unofficial and not moderated by a teacher or supervisor.

In some cases introducing teaching techniques using mobile devices has had problems. Although introduction of these devices may open up possibilities, for example being able to get a better understanding of course content from multimedia available, some students, particularly older students, find it difficult to adapt to new study habits when they are used to learning in more traditional ways. There is also a similar problem where teachers are unable to use mobile devices to their full potential in learning if they are not completely familiar with capabilities or if they utilize these devices without actually changing their teaching methods to accommodate them. (Marez et al. 2015, 14.) To fully benefit from teaching techniques that utilize mobile devices, it may be more beneficial to

introduce them to students at a younger age and ensure teachers are fully trained in using the devices which they may be unfamiliar with. This has already been taken into account in the new curriculum in basic education in Finland. In the future, this generation of students who are well acquainted to the use of mobile devices in learning may have higher expectations about utilising this technology.

To encourage students to use mobile applications that can aid their learning, the applications must be designed to provide an enjoyable experience for the student. Applications should be user-friendly, understandable, learnable and aesthetically pleasing to the user. The application should not just be a copy of the desktop alternative but be designed to be effective on a smaller screen with touch screen capability without compromising the usability available on the desktop version where possible. (Ali et al. 2014, 14.) These principles could also be applied to mobile versions of websites to ensure users get the best experience on whichever device they use.



## 4 RESEARCH DATA

The survey was conducted during the time period of 28th October 2017 to the 10th of November 2017. The survey was posted to several teachers from each faculty to distribute among their students. It was also posted on the Lahti UAS Yammer page where all students would be able to see the link in an email notification if they are subscribed. The students were selected this way to try to get as many answers as possible from a variety of faculties.

The survey questions can be found in the appendices. The answers are presented in this chapter in tables. There were 21 responses to the survey (Table 4).

### 4.1 Background questions

Table 1 - Answers to survey - Question 1

Table 2 - Answers to survey - Question 1

<b>1. Please enter gender</b>		
<b>Answer</b>	<b>Number of answers</b>	<b>Percentage of answers</b>
Male	8	38.1%
Female	12	57.1%
Other	1	4.8%

Table 3 - Answers to survey - Question 2

<b>2. Please enter your age range</b>		
<b>Answer</b>	<b>Number of answers</b>	<b>Percentage of answers</b>
18 – 21	3	14.3%

22 – 25	11	52.4%
26 – 29	4	19%
30 – 40	1	4.8%
40 – 50	1	4.8%
50+	1	4.8%

The answers given the first two questions provide a background to the student responding (Table 2 & Table 3). This information be used to find correlations or differences in the perceptions of students of certain genders and age ranges.

**Table 4 - Answers to survey – Question 3**

<b>3. Which faculty are you a part of?</b>		
<b>Answer</b>	<b>Number of answers</b>	<b>Percentage of answers</b>
Faculty of Business and Hospitality Management	12	51.7%
Faculty of Technology	7	33.3%
Institute of Design	1	4.8%
Faculty of Social and Health Care	1	4.8%

The answers given to the third question show which faculty the student is a part of (Table 4). These answers can be used to see the different perspectives from students who may be taught in different ways.

Table 5 - Answers to survey – Question 4

<b>4. Which year of your studies are you in?</b>		
<b>Answer</b>	<b>Number of answers</b>	<b>Percentage of answers</b>
First Year	2	9.5%
Second Year	8	38.3%
Third Year	6	28.6%
Fourth Year or more	5	23.8%

The fourth question asks the student which year of studies they are in (Table 5). Students may have different experiences depending on how long they have studied for. For example, first year students may not have used certain services as much as third or fourth year students.

#### 4.2 Main survey questions

Table 6 - Answers to survey – Question 5

<b>5. How do you use your mobile device for everyday studying purposes? (Please choose all that apply)</b>		
<b>Answer</b>	<b>Number of answers</b>	<b>Percentage of answers</b>
During lessons	10	47.6%
Between lessons	10	47.6%
Outside of LAMK	10	47.6%
For independent studying	9	42.9%

For group work	8	38.1%
For peer discussion	9	42.9%
I don't use my mobile device for studying purposes	3	14.3%
Other: In between lessons	1	4.8%
Other: checking deadlines + calendar	1	4.8%
Other: I take pics/videos if needed	1	4.8%

The fifth question asks the student about how they use their mobile device for studying purposes every day (Table 6). The answers show to current state of mobile device usage related to study and may show where there is room for change or improvement.

**Table 7 - Answers to survey – Question 6**

<b>6. How would you describe your mobile device usage during lessons?</b>		
<b>Answer</b>	<b>Number of answers</b>	<b>Percentage of answers</b>
I don't use my mobile device in lessons	1	4.8%
Only for school/learning purposes	2	9.5%
Mostly for school/learning	5	23.8%

purposes		
Only for non-school/learning purposes	0	0%
Mostly for non-school/learning purposes	7	33.3%
An even mixture of learning and personal use	6	28.6%

The sixth question asks the student about how they use their mobile device during lessons (Table 7). The answers show the amount in which mobile devices are used for learning compared to personal use during lessons. This could be used to show where lessons could be improved, for example if students are distracted by mobiles, whether utilising them in lessons will solve this problem or not.

**Table 8 - Answers to survey – Question 7**

<b>7. How often on average would you say you use your mobile device on any given day?</b>		
<b>Answer</b>	<b>Number of answers</b>	<b>Percentage of answers</b>
0 – 1 hours	1	4.8%
1 – 2 hours	1	4.8%
2 – 3 hours	10	47.6%
3 – 4 hours	1	4.8%
4 – 5 hours	3	14.3%

5 – 6 hours	0	0%
6 – 7 hours	1	4.8%
7+ hours	4	19%

The seventh question asks the student how often they use their mobile device daily (Table 8). The amount of time spent using mobile devices may reflect whether learning aided by the devices would be effective for them or not.

**Table 9 - Answers to survey – Question 8**

<b>8. How often do you use Reppu?</b>		
<b>Answer</b>	<b>Number of Answers</b>	<b>Percentage of answers</b>
Every day	6	28.6%
Every week	10	47.6%
A few times a month	3	14.3%
Occasionally	2	9.5%

The eighth question asks how often the student uses Reppu (Table 9). Many courses have their information and assignments available in Reppu depending on the teaching style. Using Reppu is therefore vital to some courses and unnecessary in others. This question makes it possible to see if students are making use of Reppu and perhaps whether students could get more use from it.

Table 10 - Answers to survey – Question 9

<b>9. How would you describe your Reppu usage on mobile devices compared to on computer?</b>		
<b>Answer</b>	<b>Number of answers</b>	<b>Percentage of answers</b>
Always on mobile device	0	0%
More often on mobile device	1	4.8%
Evenly used on mobile device and computer	4	19%
More often on computer	12	57.1%
Always on computer	4	19%

The ninth question asks the student to describe how often they use Reppu on mobile compared to on a computer (Table 10). The answers from this question can be used to determine whether students are making use of Reppu on their mobile device and compare to other questions they answered to try to determine why.

Table 11 - Answers to survey – Question 10

<b>10. Which mobile browser/application do you use on your mobile device to use Reppu?</b>		
<b>Answer</b>	<b>Number of answers</b>	<b>Percentage of answers</b>
Don't know / default browser	2	9.5%

Chrome	11	52.4%
Firefox	3	14.3%
Safari	3	14.3%
Moodle app	0	0%
Other: Dolphin	1	4.8%
Other: Edge	1	4.8%

The tenth question asks the student which browser or application they utilize on their mobile device to use Reppu (Table 11). It is important to identify which browser or application that is used as any issues that occur may be isolated to certain applications. Students who have bad experiences with Reppu on mobile may find that they could have a better experience using a different browser or application.

**Table 12 - Answers to survey – Question 11**

<b>11. Which features do you use on Reppu on your mobile device? (Please choose all that apply)</b>		
<b>Answer</b>	<b>Number of answers</b>	<b>Percentage of answers</b>
Looking at course information/materials	18	85.7%
Handing in assignments	3	14.3%
Discussion boards	4	19%
Links for students	7	33.3%



Quizzes	1	4.8%
Other: I use laptop for this	1	4.8%

The eleventh question asks which Reppu features are used by students on their mobile devices (Table 12). The answers to this question will identify the features that students use or do not use on their mobile devices. This will show how students are using Reppu on their mobile devices and may identify areas that could be changed or improved if possible.

**Table 13 - Answers to survey – Question 12**

<b>12. Please read the following statements about using Reppu on mobile devices and choose the extent you agree or disagree with them.</b>		
<b>Answer</b>	<b>Number of Answers</b>	<b>Percentage of Answers</b>
<b>Reppu is fully functional on mobile devices</b>		
Strongly agree	2	9.5%
Slightly agree	9	42.9%
Unsure/don't know	4	19%
Slightly disagree	4	19%
Strongly disagree	2	9.5%
<b>I am able to find and enrol to course areas without difficulty on my mobile device</b>		
Strongly agree	7	33.3%

Slightly agree	6	28.6%
Unsure/don't know	2	9.5%
Slightly disagree	5	23.8%
Strongly disagree	1	4.8%
<b>I can utilize discussion boards without difficulty on my mobile device</b>		
Strongly agree	2	9.5%
Slightly agree	5	23.8%
Unsure/don't know	9	42.9%
Slightly disagree	4	19%
Strongly disagree	1	4.8%
<b>I am able to search for and find information in Reppu on my mobile device</b>		
Strongly agree	4	19%
Slightly agree	10	47.6%
Unsure/don't know	3	14.3%
Slightly disagree	1	4.8%
Strongly disagree	3	14.3%
<b>I can easily find and change the Reppu language options on my mobile device</b>		
Strongly agree	2	9.5%
Slightly agree	2	9.5%
Unsure/don't know	16	76.2%

Slightly disagree	1	4.8%
Strongly disagree	0	0%
<b>Reppu is visually appealing on my mobile device</b>		
Strongly agree	1	4.8%
Slightly agree	7	33.3%
Unsure/don't know	4	19%
Slightly disagree	7	33.3%
Strongly disagree	2	9.5%

The twelfth question asks students to respond to six statements that are about using Reppu on mobile devices (Table 13). The answers to this question can be used to examine how well students are able to use Reppu and how well it works for them. The answers can be compared to the answers from other questions such as their faculty to try to identify any correlation between them.

Table 14 - Answers to survey – Question 13

<b>13. Please describe any aspects or features of Reppu that are unappealing or difficult to use on your mobile device or any improvements/changes you would like to see. (You may also answer this question in Finnish if you prefer)</b>
Its a scaled down version of desktop pretty much
There should be a feature to hide content I don't need regularly
Choosing a course from my enrolled courses is slightly difficult/annoying when

using Reppu on my phone.
I prefer laptop. Iphone screen is too small for reppu. It makes you crazy.
None expect file uploading. It works on PC so easily.
The page seems zoomed so when you for example open the "my courses" submenu you can only see halv of the textes.
Liian paljon tavaraa allekkain, parempi olisi enemmän avautuvia valikkoja jotta ei joudu rullailla koko ajan
I haven't used Reppu enough on my mobile device to have an opinion on this matter.
It works as good as I need.

The thirteenth question asks the student for any aspect or feature of Reppu that they find unappealing or difficult to use (Table 14). These answers can be used to identify any specific issues students have with using Reppu on their mobile device. Although Lahti UAS are limited with what changes they can make to Reppu as it is based on Moodle, common issues may be helpful when considering applications they have more control over.

Table 15 - Answers to survey – Question 14

<b>14. What other tools do you use on your mobile device for learning purposes? (Please choose all that apply)</b>		
<b>Answer</b>	<b>Number of answers</b>	<b>Percentage of answers</b>
Kyvyt.fi ePortfolio service	0	0%

OneDrive	7	33.3%
OneNote	0	0%
Outlook	12	57.1%
Word	6	28.6%
Excel	5	23.8%
Powerpoint	5	23.8
Teams	0	0%
Sway	0	0%
Respa	3	14.3%
Lukkarit (schedules)	18	85.7%
Yammer	10	47.6%
Google Drive	6	28.6%
Facebook	10	47.6%
Youtube	8	38.1%
Skype	1	4.8%
Skype for business	1	4.8%
Dropbox	1	4.8%
WhatsApp	16	76.2%
Other: Duolingo	1	4.8%
Other: LAMK App	1	4.8%

Other: Telegram (better version of Whatsapp)	1	4.8%
Other: Google	1	4.8%

The fourteenth question asks students which other tools they utilize on their mobile devices in the learning process (Table 15). The answers to this question can be used to identify which third party applications are popular among students and what kind of tools they are. For example, it may be useful to identify which communication tools students are using to collaborate with other students.

Table 16 - Answers to survey – Question 15

<b>15. How have teachers utilized your mobile devices during lessons? (Please choose all that apply)</b>		
<b>Answer</b>	<b>Number of answers</b>	<b>Percentage of answers</b>
Documenting learning by writing	0	0%
Taking pictures	6	28.6%
Making videos	5	23.8%
Doing assignments	5	23.8%
Searching for information	9	42.9%
Group work	5	23.8%
Peer collaboration	3	14.3%
Independent work	2	9.5%

To work with partners such as company representatives (other than representatives of LAMK)	0	0%
Workplace learning	0	0%
The devices of students have not been utilized by teachers	4	19%
Other: They haven't	1	4.8%
Kahoot	1	4.8%

The fifteenth asks the students how teachers have made use of the student's mobile devices during lessons if at all (Table 16). The answers from this question may determine if teachers are already considering mobile devices in their teaching methods or discover areas where mobile devices could be considered more often.

Table 17 - Answers to survey – Question 16

<p><b>Please write any suggestions or ideas that you have about how mobile devices can be utilized more effectively for studying (You may also answer this question in Finnish if you prefer)</b></p>
<p>In my opinion people should have laptops or tablets. In my class people mostly use their phones for facebook or instagram. Phones are also used during presentations and it is clear that people don't use them for learning. Tablet/laptop screens are too big to hide so it is not so easy to use them to something unnecessary.</p>

WinhaWille is bad for mobile users, but all other works fine for me.
Itse käytän mieluummin joka tapauksessa konetta mutta yhteyden ylläpitoon kännykkää. Olisi tärkeää, että esimerkiksi kaikki muutokset lukkareihin jne päivitetään myös LAMK sovellukseen
An app to gamify studies could be used. There actually are apps for this purpose, but I'm not sure whether or not they are used in our school.
reppu is a clusterfuck
I prefer my desktop. I only use my mobile devices occasionally.

The final question asks students for their suggestions or ideas about how to use mobile devices more effectively for studying (Table 17). The information gained from the students perspective could prove useful in identify potential ways to utilize mobile devices more effectively in the studying process.



## 5 DATA ANALYSIS AND DISCUSSION

In this section, the data analysis will be split into mobile device use of students in learning and a part specifically about Reppu. There will also be a part about the reliability and validity of the data.

### 5.1 Mobile device in learning

The answers from the survey have provided some insight into how mobile devices are being utilized by students at Lahti UAS. Of the twenty-one students that responded, only one said that they did not use their mobile device during lessons (Table 7). Almost half of the students said they used their mobile devices during school every day (Table 6). This suggests that most students are using their mobile devices at school in lessons, if not every lesson. When students were asked how they used their mobile devices during lessons, none of them answered that they only use their mobile device for non-school related activities and five people used theirs mostly for school or learning related activities which suggests most students are at least using their mobile devices to aid their learning in some way. However, only two people said that they used their device for only school related activities with six people saying they used their device an even amount for learning and personal activities. Also a third of students said they used their device in lessons mostly for personal and non-learning related activities which implies that although students are using their devices for learning reasons they are also being somewhat distracted by them during lessons (Table 6.)

Three students stated that they do not use their mobile devices for studying (Table 6). However, all three also answered question six by saying that they used their device in lessons mostly for non-school purposes rather than only non-school purposes, which means that they likely actually do use their mobile devices to some small extent during lessons to aid their learning even if they did not consciously admit it in question five (Table 7). It is also possible that they did not want to admit

that they only used their mobile devices for non-school related tasks. They might not want to look like bad students despite the fact that the survey answers were anonymous.

Nine students said that they use their mobile device for peer discussion with the majority of these also using WhatsApp. This suggests that students may be using WhatsApp for discussion with their peers. Sixteen students said they used WhatsApp for learning purposes which means WhatsApp may be a useful way for students to stay in contact outside of lessons and discuss what they have learned. This could be a good way to use mobile devices to aid learning if teachers encourage students to discuss with each other using WhatsApp or similar applications. This application can also be used to share files, which could be useful for group work.

When asked about what other tools they use, students responded that they use Facebook and WhatsApp on their mobile devices for learning purposes which suggests they communicate with their peers during their learning process (Table 15). Being able to communicate easily with other students can be useful to their education as some students may not feel comfortable talking to teachers about their problems. Having these applications on their mobile devices would also likely get a faster response from other students rather than sending emails. However, Outlook was also a popular choice with twelve students saying they also use it on their mobile devices (Table 15). Email is usually the main point of contact between a student and teacher outside of lessons so it is important for students to be able to access their email account regularly or receive notifications when they receive them. Despite notifications being useful, they can be annoying if the student receives a lot of emails and receives a notification for each one.

The most popular tool students said that they also used on their mobile was Lukkit with eighteen students selecting it (Table 15.) Being able to check schedules often is important to students in case classes are

cancelled or the rooms they take place are changed. Therefore, being able to check schedules easily on their mobile devices is very useful to students. Schedules are now easily viewable in the LAMK application; however, only one student who responded said that they used the LAMK application. At the time of this research, the LAMK application has only recently been released. Hence not every student will have used it or maybe even be aware of it yet.

Students were asked how teachers are currently considering the students mobile devices in lessons and how they utilised them. The most common usage mentioned was searching for information, with nine people selecting that choice. (Table 16). Having a mobile device at hand to search for information from search engines is very convenient for students during lessons if they want to clarify something without having to ask the teacher, which some students may avoid doing due to embarrassment. Having students use their mobile devices to search for their own information allows them to be active participants rather than the teacher just presenting information at the front of the classroom. Some students also said that they took pictures or made videos with their mobile devices for classes which is a different approach to learning and adds some variety to classroom activities which may be more interesting to some students. Group work and peer collaboration were also mentioned by a few students which suggests some teachers are already making use of the instant communication available on mobile devices to students. However, five students said that their teachers have not utilised mobile devices in their lessons which means there could be potential to change and encourage relevant use of mobile devices in the classroom. Kahoot was also mentioned by one student, which is another useful tool that enables the class to partake in interactive quizzes that can be a more fun alternative to traditional written quizzes that also shows an immediate difference in answers visually.

Students were asked for their suggestions on ways which mobile devices could be used more effectively for studying. Some students felt laptops

and computers were preferable to mobile phones during lessons with one suggesting having a bigger screen makes students less likely to stray onto non-school related activities if they think the teacher can see what they are doing. This suggests that although using mobile devices can be utilized in class that some students will still prefer the functionality available in a laptop or computer. Another student suggested making an application to gamify studies meaning that studying could be more engaging and fun to students who might get bored or overwhelmed with studying. One student mentioned schedules being updated so that Lukkarit matches the LAMK application. (Table 17.) If students start utilizing the LAMK application and the schedules are reliable and up to date, it would be a very reliable resource for students to have on the move.

## 5.2 Using Reppu on mobile devices

**Table 18 - Survey question comparison - Questions 8 & 9**

<b>How often students use Reppu comparison</b>				
	<b>All Reppu usage</b>			
<b>Reppu on Mobile Devices</b>	Every day	Every week	A few times a month	Occasionally
Always on Mobile Device	0	0	0	0
More often on Mobile Device	0	1	0	0
Even Use	1	3	0	0
More often on Computer	5	4	2	1

Always on Computer	0	2	1	1
--------------------	---	---	---	---

The table above shows a comparison of how often students use Reppu compared to their usage of Reppu on mobile devices (Table 18). While no students said they used Reppu exclusively on mobile devices and only one student used Reppu on mobile more often than computer, most of the students questioned at least used Reppu on mobile to some extent. Those who used Reppu less frequently appeared less likely to use Reppu on a mobile device. This suggests those using Reppu on mobile devices are more often doing it when it is not convenient to use a computer and those that are using Reppu more often will more likely need to use their mobile devices at least some of the time.

Reppu is most often used on mobile devices by students to view course information and materials, with eighteen students out of twenty-one stating that they did (Table 12). Students also use links for students on their mobile device, which can be a gateway to other sites such as the school email and schedule sites. Only a few people use their mobile devices to hand in assignments or use discussion boards. Most written assignments are likely completed on computers which suggests it would be more convenient to submit them to Reppu on their computer rather than sending the file to their mobile device which is an extra step in the process regardless of how difficult or easy it is to submit files on the mobile version of Reppu.

When asked whether Reppu was fully functional on their mobile devices, over half agreed to some extent with nine people slightly agreeing and only two strongly agreeing (Table 13). Six people disagreed with two of those strongly disagreeing. Most of those that agreed it was fully functional also used the Chrome browser while of those who disagreed more used Firefox and Safari. This suggests at the time of this research Chrome is better suited to using Reppu than Firefox or Safari.

Seven people strongly agreed that they could find course areas and enrol to them without difficulty on mobile devices while six slightly agreed. Six people disagreed with only one of those strongly disagreeing. Over half the students responded that they agreed they could also search for and find information on Reppu which suggests for the most part Reppu is not too difficult to navigate on a mobile device. (Table 13.)

Seven students agreed that they could utilize the discussion boards on Reppu on a mobile device with two strongly agreeing, whereas five people disagreed with one strongly disagreeing. Nine students answered however that they were unsure/did not know with regard to discussion boards which suggests that they are not utilized by these students. (Table 13.) Message boards on Reppu can be a good use of peer discussion as everyone who is enrolled to the course can view them.

Most people responded that they did not know or were unsure about Reppu language options on mobile devices which suggests they have not really had to use the options more than the initial time (Table 13). If Reppu keeps the language consistent from user setting when they log in, then it should not be a problem for students.

There were varied responses to whether students found Reppu visually appealing, which possibly means visuals are down to personal preference. However, when asked to describe in more detail any issues that they have with Reppu on mobile device visuals seem to be an issue, with one student saying that the page makes it difficult to view content at times and another saying they prefer using a laptop as the mobile screen is too small to use Reppu effectively. One respondent said that the mobile version of Reppu is just a scaled down version of the desktop version suggesting that Reppu is not optimized for mobile users. It is important to note however that none of the students responding used the Moodle application for their mobile devices. This application is more optimized for mobile use than the browser alternative and had they used it their answers may have been different. One respondent said they would like to hide content they

do not need to see often. Another student implied that Reppu is cluttered with information. This suggests that there is sometimes too much information to navigate through which can be especially difficult on mobile devices.

### 5.3 Reliability and validity

The findings of this study may be affected by the limitations of the research. The survey was posted to the All Company section of the Lahti UAS Yammer site. The All Company section has 5136 members, including staff. However, the survey had a poor response rate with only twenty one students responding. Since the sample size is so small, it is possible that the answers are isolated or do not reflect the opinions or experiences of the rest of the students. Due to the poor response rate some planned comparisons were unable to be completed, as the majority of answers were from only two faculties, this study was unable to discover trends or correlations between faculties. It is also possible that some students may not have answered truthfully due to the nature of some of the questions, for example not wanting to admit that they used their mobile device only for non-learning related activities during lessons despite the survey answers being taken anonymously. As the survey answers were anonymously given, there is no way to confirm the accuracy of the responses.

The two questions on the survey that required written answers were in some cases ignored or simply answered with a dash. This meant that for these questions there were less legitimate answers than there were students who responded. With an already small sample size this limited the information gained from the responses. The original intention of this study was also to use interviews to get more detailed personal experiences and opinions. Due to time restraints and lack of interest however this was not possible and therefore limited the information available from the research.

## 6 CONCLUSION

Despite the limitations on the study, there were a variety of answers given to the survey. In this research, there were trends found that were able to answer the research question and give some insight into the potential of using mobile devices in the learning process of students.

*How can smart mobile devices be utilized to support the learning process of students at Lahti University of Applied Sciences?*

This is the main research question. There are several key findings from the research that can be used to answer the research questions. In this section the findings will be split to answer the two sub questions to summarise the answers to the main research question.

### 6.1 Answering the research questions

*How are mobile devices currently used in the learning process of students at Lahti University of Applied Sciences?*

The answers to the first sub-question observes the current state of the situation and reveal how mobile devices are currently utilized in the learning process at Lahti University of Applied Sciences.

At Lahti UAS, mobile devices are currently being used to an extent to support the learning process of students. Over half of students are using their mobile devices during lessons with most of them using their mobile devices for learning purposes to some extent however a third of those admitted to using their device for mostly non-school activities. Some students are using applications such as WhatsApp and Facebook to communicate with other students to discuss their studies and collaborate on projects. This allows them almost instant communication if they have their mobile devices available. Students are utilizing their mobile devices to check their schedules but are mostly appear not to be using the recently released LAMK application which has schedules built into it. Many



students are also using their mobile devices to check their school email account. Sometimes classes may be cancelled or rescheduled to another time or class at short notice and this may not be reflected in the schedule but students may be notified by email so it is useful for students to be able to check their email regularly or receive notifications on their mobile device. Students can also add their mobile number to their Reppu profile which would enable teachers to use the SMS tool in Reppu to send a message to students' mobile phones to notify them.

Reppu is functional on mobile devices for the most part but less convenient than using the desktop alternative. Students are mostly able to enrol to course areas and look at course information without great difficulty. The main issues with Reppu on mobile devices are that Reppu has a lot of content that is difficult to navigate on a smaller screen as the mobile version appears to be a scaled down version of the desktop version as well as the content being difficult to navigate or view all at once in some instances. Additionally submitting assignments to Reppu on mobile devices is considered more difficult by students than on the desktop version. More than half of students preferred to use Reppu on their laptop or computer yet none of the students surveyed in this research used the Moodle application, which is more optimized for mobile devices than the browser versions, to utilize Reppu on their mobile devices.

Some teachers are utilizing mobile devices to an extent in their lessons. Students have been using their mobile devices to search for information, do group work, take pictures and make videos during their studies. Kahoot has been mentioned by students, which is an interactive competitive quiz teachers can use to engage with students. However, almost a quarter of students said that teachers have not considered their mobile devices in lessons.

*What can be done to further support the use of mobile devices in the learning process?*

The answers to the second sub-question display the potential for improving the learning process for students.

Many students are already using their mobile devices during lessons. Therefore, they should be encouraged to use them for learning purposes more than personal use. It is impossible for teachers to control what their students do yet it could be beneficial to integrate mobile devices into lesson plans. Using quiz applications like Kahoot or having information available to students on their mobile devices in the form of pdfs for example may stop students being distracted by their mobile device as its use will support their learning in the lesson. Other activities such as taking photos or making videos are also useful as it allows the students to learn in different ways that they may find more interesting.

Peer discussion should be encouraged in students. Applications such as WhatsApp and Facebook can be used by students to collaborate on projects and may also help students to make new friends. The use of discussion boards on Reppu could be encouraged by teachers as all students would benefit from peer discussion on there as all enrolled students can view the message boards of a course. However, some students may be discouraged by teachers being able to view their questions and prefer private messaging with other students available in the mentioned third party applications. Course or project team group chats could be set up so that students can discuss their courses in more informal and relaxed way.

Students should be made of and encouraged to use the Moodle application the view Reppu as it may solve a lot of the issues students have using Reppu in browsers on their mobile devices. There should also be some level of consistency in the way information and assignments are

laid out on course pages on Reppu. This would make it easier for students to navigate and find the information they need.

It could also be possible to create an application that helps gamify studies as suggested by one of the students surveyed. This could be used as a project for students to collaborate on and if successful could make learning become a more fun experiences and less monotonous.

Students should also be encouraged to utilize the recently released LAMK application. It would be useful if the LAMK application could be connected to Lukkarit so that any changes to the schedule there are shown in the application or notifies users. If teachers need to change the schedule for whatever reason it would be more convenient if they had a method to change the schedule which notified all the enrolled students on their mobile devices. This would save the teacher from writing an email and students from needing to persistently check their school email account.

## 6.2 Suggestions for further research

If further research were to take place, it would be more useful to get a larger sample size for the survey so as to compare the different faculties and year groups. It would also be useful to get some interviews to gain the personal opinions and experiences of students and teachers at the school. It could also be helpful to extent to research to other universities of applied sciences throughout Finland and compare the results to answer the research question on a broader scale.

## LIST OF REFERENCES

Ali, A. & Alrasheedi, M. & Capretz, L. & Ouda, A. 2015. A study of the interface usability issues of mobile learning applications for smart phones from the users perspective. *International Journal on Integrating Technology and Education* Vol.3, No.4 [accessed 17 September 2017]

Available at:

<https://masto.finna.fi/PrimoRecord/pci.arxiv1501.01875>

Brown, D. & Ferguson, F. & Grant, M. & Jones, L. & Sweeney, J. & Tamim, S. 2015. Teaching and Learning with Mobile Computing Devices: Case Study in K-12 Classrooms USA. *TechTrends* vol.54 [Accessed 15 October 2017] Available at:

<https://link.springer.com/article/10.1007%2Fs11528-015-0869->

Bullen, M. & Gallardo-Echenique, E. & Marques-Molias, L. 2016 Student communication and study habits of first-year university students in the digital era. *Canadian Journal of Learning and Technology* [accessed 18 September 2017] Available at:

<http://www.cjlt.ca/index.php/cjlt/article/view/27454/20206>

Chang, C. & Lee, Y. & Lin, Y. & Cheng, Z. 2013 The dark side of smart phone usage: Psychological traits, compulsive behaviour and technostress. *Computers in Human Behavior* vol.31 [accessed 17 September 2017] Available at:

<http://www.sciencedirect.com/science/article/pii/S074756321300397X>

Dawson, H. & Edel-Malizia, S. & Mockus, L. & Shaffer, D. & Sung An, J. & Swaggerty, A. 2011. The Impact of Mobile Access on Motivation: Distance Education Student Perceptions. Sloan C International Conference for Online Learning [Accessed 17 September 2017]. Available at:

[https://www.researchgate.net/publication/281554486\\_The\\_Impact\\_of\\_Mobile\\_Access\\_on\\_Motivation\\_Distance\\_Education\\_Student\\_Perceptions](https://www.researchgate.net/publication/281554486_The_Impact_of_Mobile_Access_on_Motivation_Distance_Education_Student_Perceptions)

Denscombe, M. 1998. *The good research guide for small-scale social research projects*. Buckingham: Open University Press

Gaskin, J. & Wang, H. & Wang, J. & Wang, L. 2015 The role of stress and motivation in problematic smartphone use among college students.

Computers in Human Behavior vol.53 [Accessed 17 September 2017]

Available at:

<http://www.sciencedirect.com/science/article/pii/S0747563215300169>

Ker, G. & Lim, S. & Low, C. & Patanmacia, T. & Ting, D. 2011.

Dependency on smart phone and the impact on purchase behaviour.

Emerald Group Publishing Limited [accessed 17 September 2017]

Available at:

<http://www.emeraldinsight.com/doi/abs/10.1108/17473611111163250>

Krawczyk, H. & Nykiel, M. 2017. Mobile devices and computing cloud resources allocation for interactive applications. Archives of Control Sciences vol.27 [accessed 19 November 2017] Available at:

<https://www.degruyter.com/downloadpdf/j/acsc.2017.27.issue-2/acsc-2017-0019/acsc-2017-0019.pdf>

Marez, L. & Montrieux, H. & Schellens, T. & Vanderlinde, R. 2015.

Teaching and learning with Mobile Technology: A Qualitative Explorative Study about the Introduction of Tablet Devices in Secondary Education.

PLoS ONE [Accessed 18 September 2017] Available at:

<http://europepmc.org/backend/ptpmcrender.fcgi?accid=PMC4671718&blobtype=pdf>

Mills, H. 2015. Use of mobile devices for e-learning in geomatics. The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences [Accessed 15 October 2017] Available at:

<https://www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XL-6-W1/5/2015/isprsarchives-XL-6-W1-5-2015.pdf>

## APPENDIX

### APPENDIX 1 Survey Questions

1. Please enter gender

- Male
- Female
- Other

2. Please enter your age range

- 18 – 21
- 22 – 25
- 26 – 29
- 30 – 40
- 40 – 50
- 50+

3. Which faculty are you a part of?

- Faculty of Business and Hospitality Management
- Faculty of Technology
- Institute of Design
- Faculty of Social and Health Care

4. Which year of your studies are you in?

- First Year
- Second Year
- Third Year
- Fourth Year or more

5. How do you use your mobile device for everyday studying purposes?

(Please choose all that apply)

- During lessons

- Between lessons
- Outside of LAMK
- For independent studying
- For group work
- For peer discussion
- I don't use my mobile device for studying purposes
- Other

6. How would you describe your mobile device usage during lessons?

- I don't use my mobile device in lessons
- Only for school/learning purposes
- Mostly for school/learning purposes
- Only for non-school/learning purposes
- Mostly for non-school/learning purposes
- An even mixture of learning and personal use

7. How often on average would you say you use your mobile device on any given day?

- 0 – 1 hours
- 1 – 2 hours
- 2 – 3 hours
- 3 – 4 hours
- 4 – 5 hours
- 5 – 6 hours
- 6 – 7 hours
- 7+ hours

8. How often do you use Reppu?

- Every day
- Every week
- A few times a month
- Occasionally

9. How would you describe your Reppu usage on mobile devices compared to on computer?

- Always on mobile device
- More often on mobile device
- Evenly used on mobile device and computer
- More often on computer
- Always on computer

10. Which mobile browser/application do you use on your mobile device to use Reppu?

- Don't know / default browser
- Chrome
- Firefox
- Safari
- Moodle app
- Other

11. Which features do you use on Reppu on your mobile device? (Please choose all that apply)

- Looking at course information/materials
- Handing in assignments
- Discussion boards
- Links for students
- Quizzes
- Other

12. Please read the following statements about using Reppu on mobile devices and choose the extent you agree or disagree with them.

- Reppu is fully functional on mobile devices
- I am able to find and enrol to course areas without difficulty on my mobile device



- I can utilize discussion boards without difficulty on my mobile device
- I am able to search for and find information in Reppu on my mobile device
- I can easily find and change the Reppu language options on my mobile device
- Reppu is visually appealing on my mobile device
  - Strongly agree
  - Slightly agree
  - Unsure/don't know
  - Slightly disagree
  - Strongly disagree

13. Please describe any aspects or features of Reppu that are unappealing or difficult to use on your mobile device or any improvements/changes you would like to see. (You may also answer this question in Finnish if you prefer)

14. What other tools do you use on your mobile device for learning purposes? (Please choose all that apply)

- Kyvyt.fi ePortfolio service
- OneDrive
- OneNote
- Outlook
- Word
- Excel
- Powerpoint
- Teams
- Sway
- Respa
- Lukkarit (schedules)
- Yammer
- Google Drive
- Facebook

- Youtube
- Skype
- Skype for business
- Dropbox
- WhatsApp
- Other

15. How have teachers utilized your mobile devices during lessons?

(Please choose all that apply)

- Documenting learning by writing
- Taking pictures
- Making videos
- Doing assignments
- Searching for information
- Group work
- Peer collaboration
- Independent work
- To work with partners such as company representatives (other than representatives of LAMK)
- Workplace learning
- The devices of students have not been utilized by teachers
- Other

16. Please write any suggestions or ideas that you have about how mobile devices can be utilized more effectively for studying (You may also answer this question in Finnish if you prefer)