



# **Co-creation and development of the ideal smart educational workspace platform**

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## Description

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Description  <p>The research mainly aimed to get the 'full picture' of how the ideal workspace should look like based on UCD approaches which required a deeper understanding of end-users: as in the current situation, UCD approaches were not used to integrate students in the process of development. The study has been conducted in JAMK university of Applied Sciences through a survey sent to JAMK population who accepted participating in research studies. A data set of 137 responds was the result of data collection period. The tasks included generating a survey based on keywords and information needed to be known from answers, as well as sending the survey in electronic form, followed by data analyses through softwares.</p> <p>The research generated qualitative and quantitative data before analysis. Only one method was used but it included two kinds of data as mentioned. After analyzing the data, the results could reflect the ideal workspace based on student' point of view. The features were clearly specified and the common errors and mistakes were determined. The UCD approach helped in determining the errors and mistakes from the end-users point of view which now can be avoided in technical development part.</p> <p>The data generated and analyzed could be used in creating the first version of the prototype of the ideal application for JAMK students.</p> <p>The conclusion expressed that further development can be done to the research topic while considering avoiding the limitations by using different methodologies. A recommendation is to use conduct same research in different institutions in order to be able to exchange information for development purposes.</p>		
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# Key Concepts and Definitions

## Names

- JAMK: A shortened name of JAMK university of Applied Sciences.
- OPTIMA: One of JAMK available platforms for students. The platform is a tool used to upload and view materials, upload assignments, check news and announcements, and discuss issues related to courses.
- INTRA: the student intranet of JAMK where there are many services offered such as restaurant menu, information and contact details, URLs to other services available either outsource or insource.
- Elmo: A platform used as a calendar for students as well as some other services such as grade view.
- JaNet: Library website where loans can be made, extended, as well as reservation, editing library accounts, and setting, and searching for books.
- ASIO (used in the results but not conducted in the research): the Official platform in JAMK for enrolling in courses, enrolling as a present/absent student, and some other administrative issues.
- MOT dictionaries: Dictionary service available for JAMK students free of charge (outsources/hired service).

## Concepts

- UCD: User Centric Design or User-Centered Design

# 1 Introduction

*“Technology makes the world a new place” –Shoshanna Zuboff–*

## 1.1 Research Background

Technology has been involved in many parts of our life. It has been changing the ways of education and work. New technologies are offering more tools to get jobs completed within a shorter framework while using less effort.

Technology is also being involved in education since the revolution of new technologies. Many educational institutes are trying to use new electronic tools in order to offer their students a better support and make the job easier to do. The ways used can differ from a place to another and depend on many factors such as available resources, country, and needs. JAMK University of Applied Sciences (JAMK) for examples has many services offered for students during their study period and for all fields. All services are explained and mentioned during orientation week, courses, and during the study period. In addition to the available assistance through helpdesk and its website.

The issues going on with many platforms available for students are that they are not complete yet and they lack many important features (based on many students' opinions). This would make it important to research, study, co-create, and design an ideal platform for students in cooperation with end-users. The author of the research is a student in JAMK who has been using the available online services and the source of the main idea comes from the experience of being an end-user combined with the studies related to User Centric Design (UCD).

The research is using UCD approach which is cooperating with end-users in the creation and development process. The research had the main objective of co-creation with students of the ideal platform for education.

The thesis will be collecting qualitative data mainly for reporting purposes (students reporting and expressing their opinions and thoughts freely) and quantitative data (mainly for statistical reasons. Grading the existing services).

For quality assurance, JAMK will be the field of the research and the research will target the students in JAMK. Which means the base of the research are existing services and platforms available for JAMK students. The research should be able to develop the existing services and platforms in order to have the ideal platform for students made through UCD approach as an outcome.

## 1.2 Research Problem, Research Questions, Objectives

In the current time, many educational institutes include technologies in some learning processes. It depends on factors such as country, institution, available resources. It is possible that a certain university, for example, have already a wide variety of available services in their platform in use for students, but it cannot be considered 'ideal' yet due to existence of many errors, difficulties, or missing features as it was not created with UCD approach which makes it lack of end-users' involvement in creation, resulting errors and mistakes. As the author is taking JAMK as an example, the situation there tends to meet the last problem mentioned in using technologies for education. There are currently several platforms and services available to students to improve the learning process. ASIO is used for application-related issues, ELMO and INTRA are used for getting a variety of information related to school and studies, and OPTIMA is the official workspace for students where they can submit an assignment, get materials, and read announcements related to specific courses. In addition to all, there are some external platforms available depending on the need such as NEO, MOT dictionaries...etc. All of these services and platforms are not combined under 'one roof' and lacks the UCD approach, keeping end-users (also students) outside the process of creation. As a result, students' needs and wants are not really known by the IT and administration departments. The research aim is to come with proper analysis and cooperate with end-users on how the ideal smart workspace should look like, what features it should have, and what it

should include. The information will be collected through the research and the outcome will be analyzed. Afterward, the results will be used to develop the first prototype of the ideal smart workspace app for JAMK University of applied sciences, which will be shown in the appendices.

In this research, end-users (students) will be involved as part of the process of co-creation. Students will answer a survey where they can take part of the process by sharing all information and data related. Data can be error reporting, missing features, experiences.

Research questions and objectives are as following:-

<b>Research Questions</b>	<b>Research Objectives</b>
<p>How do students see the current situation of technology integration in education?</p> <ul style="list-style-type: none"> <li>- How important is it?</li> <li>- What makes it important/not important?</li> </ul>	<p>Determine how students see technology integration for educational purposes.</p>
<p>How would the ideal electronic tool/platform look like based on students' point-of-view?</p>	<p>Involve students in creating the ideal tool according to their needs and wants in order to develop the concept using UCD approach</p>

**Table 1.** *Research Questions and Objectives*

## 2 Literature review

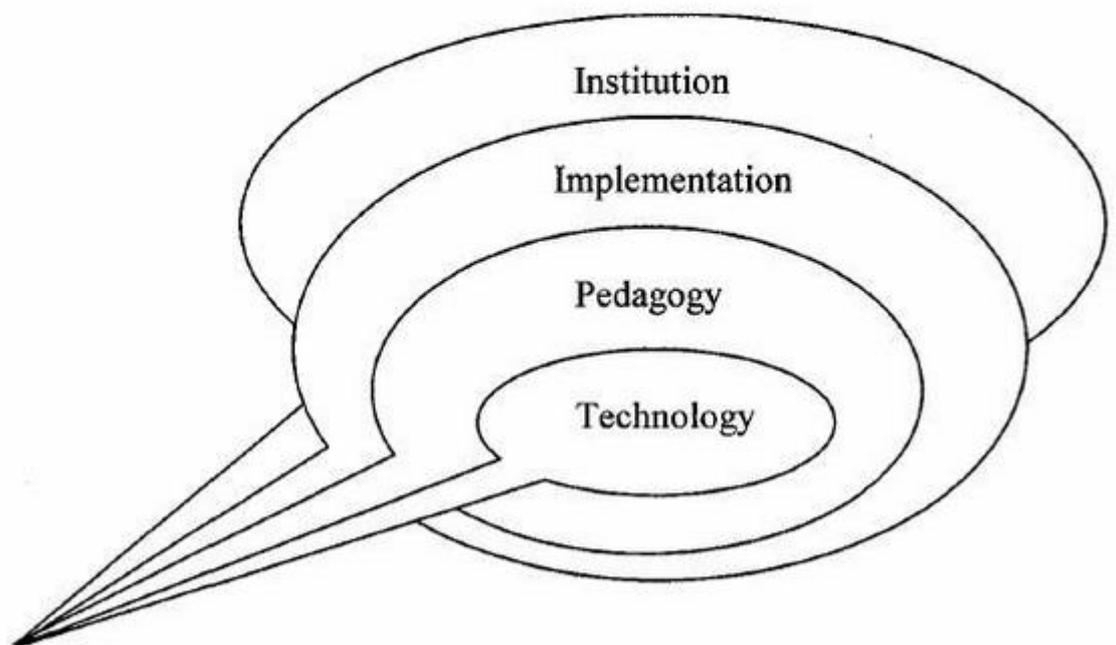
### 2.1 A previous study

Technology integration in education has been influencing since the beginning of the technology revolution as technology is always changing our current world and the way things are happening including teaching, learning, and other educational processes. This is due to the fact that technology integration has been effective and beneficial for students and educational institutions. About 50% of higher education institutions engage technology in online learning forms as academics and professionals believe that using online workspaces can offer various amounts of benefits for both of teachers and students. (Education Benefits of Online Learning 1998, 1.) And According to a group of researchers at Cornell University, The web provides students with new opportunities for students to increase learning through new revolutionized platforms for exchanging knowledge, sharing information, and learning. Technology integration in education can be defined in many forms, the simple definition of technology integration in education is the introduction of information technology systems to the classroom to enhance classroom curricula (Christensen 1997, 5-8.)

Technology integration in education has a generally positive perspective according to a study held by Collis and Moonen as the world is facing a lot of rapid developments in study life. Information and communication technologies are providing the world with huge impacts on our learning and teaching processes while sometimes, taking away the traditional techniques used in schools and educational institutes. There has been suggestions and arguments related to the involvement of technology in the education process, saying that technology can smoothen the process of learning for students and teaching for teachers by offering new solutions and replacements to the difficult traditional techniques. Arguments include the discussions regarding problems related to both of the new smart techniques as well as the traditional ways. Keeping the question 'Should we keep involving technology in education?' raised (Tsang, Kwan, & fox 2007, 3.). Arguments from both sides

try to support whether to do it or not to do it. Which reflects the fact that a proper study is needed to answer the question, show advantages and disadvantages, and explain the theory behind it.

Collis and Moonen (developers of the institutional model of flexible learning in 2001) argue that flexible learning through technology can be successful in the case of its existence of the four success factors of the concept itself. These factors include clear study and understanding to the strategy of flexible learning within the institute. In addition to proper integration and implementation of flexible learning. In other words, Flexible learning would need a professional development strategy (ibid 2.)



**Figure 1.** *Four components of flexible learning in higher education (Collis & Moonen 2001).*

One example study tried to outline the role of ICT in supporting education processes within one faculty. There were some reluctances from the staff that rarely used ICT. The study was done in cooperation with 25 people within an institute. Most of them are staff (teachers). The study concluded the views and

opinions of 25 staff and students about the mentioned topic (ibid 3.) “this study explored staff and student understandings of and attitudes towards:

The Institutional/Faculty Perspective - the challenges in education and the role of ICT challenges key imperatives and in helping to meet the challenges.

The Implementation Perspective - the strengths and weaknesses of ICT within the Faculty/University; how ICT could help enhance Faculty practices; the degree of importance of embedding ICT and other generic attributes into the curriculum.

The Pedagogic Perspective - ICT applications used by the participants; changes brought about by ICT in: a) curriculum goals; b) teacher/student roles; c) assessment practices; d) educational materials; e) learning outcome; f) connectedness; and ways ICT might foster quality of learning and stimulate innovative pedagogical practice.

The Technology Perspective - the strengths and weaknesses existing technology support; ICT skills of teachers and students” (ibid 3.)

The sum up line was positive towards the use of ICT for better education processes within the faculty under the perspectives on Colls and Moonen (Figure 1 above). The conclusion result for each perspective in the figured is as below:-

“Institutional perspective: There is a need for a proper development strategy and plan with a clear vision to implement technology integration within the faculty in cooperation with the university. The staff should be cooperative with one direction and be aware of the changes that will occur due to the new strategy” (ibid 8.)

“Implementation perspective: the proposal needed to ensure a proper sufficient use of technology should be monitored all the time by the faculty with benchmarks and scales to provide the best outcome and make changes whenever needed” (ibid 8).

“Pedagogical perspective: The faculty would benefit from providing technology to the people within the faculty (students and staff) as part of their development strategy. ICT would be beneficial for training and academic purposes. The whole community within the faculty should cooperate to have good practices in using the technologies available and support innovative practice ideas” (ibid 8.)

“Technological perspective: the lack of technical support is currently existing. This is due to the limited resources. There should be more cooperation to establish help team that provides technical support to the faculty. This could be a prototype tested in one faculty that could, for example, exist in other faculties in the university later” (ibid 9.)

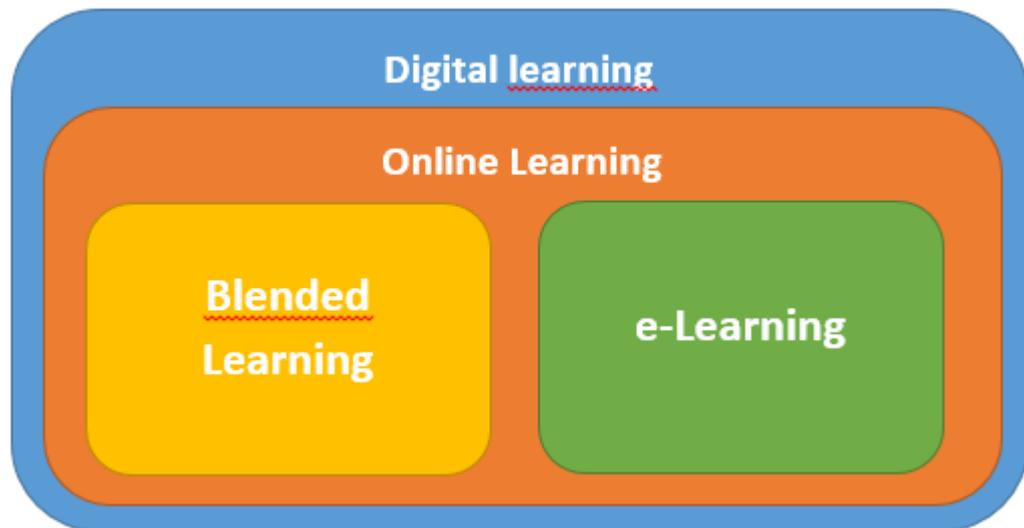
## 2.2 Technology Integration in Education

Technology integration in education has a variety of benefits for students that are proven to improve learning process which is mentioned below.

Technology improves student results on exams and tests as well as the overall GPA. Studies in some schools have been held and the technology integration showed improvements up to 15% in scores, in addition, Technology improves students' quality of work and outcome which will lead to better GPAs. Better learning happening through technology integration includes better attitudes towards learning which increases the motivation of students. The technology integration also helps students with special needs the same way it helps normal students as technology offers many learning techniques such as individualized learning and cooperative learning in groups. It also offers more supporting resources and materials that help both of at-risk students and normal students (Saba 2009, 3-6 )

Technology integration in education, which is also known as ‘digital learning’, can be a wide concept and there are many ways to take it into action. In order to understand and study the concept, definitions are needed for the three related concepts involved (or sub-concepts) which make possible ways: E-learning, Online Learning, Blended Learning, and Mobile Learning. All of these

sub-concepts are part of digital learning. The mentioned sub-concepts can seem to be similar, however, these sub-concepts differ at some point even in the main concept is the same. The figure below shows the big image, main concepts, and their sub-concepts.



**Figure 2.** Digital learning related concepts and sub-concepts. (Broder 2014).

### Digital learning

It is basically the main concept which has been mentioned above as ‘technology integration in education’ and it includes every sub-concept below

### E-learning

E-learning as a concept has a lot of difficult and complex experiences depends on the level of understanding or the background of the research. The simplest definition of e-learning is: “the use of electronic technologies to create learning experience” (Horton 2012, 1.) the definition is kind of general and open which allows some innovation in how to use the different electronic technologies to create the learning experience. The other synonyms which can be used for e-learning are electronic learning, computer-based learning.

E-learning can be truly effective or truly ineffective. Thus, it needs proper use and design to get the advantages out of it.

E-learning also has a variety of forms. These forms are standalone courses, Learning games, and simulations, Mobile learning, Social learning, Virtual-classroom courses.

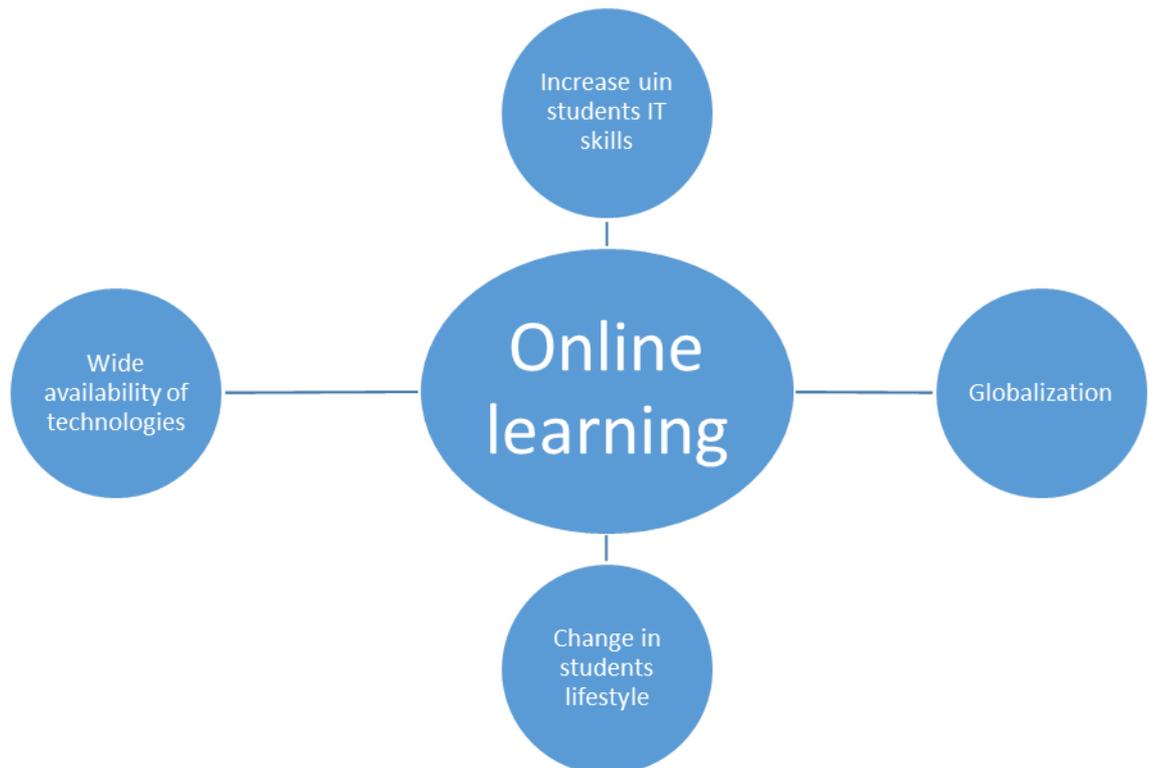
The mentioned definitions and features make a great importance on the quality of e-learning design and development in order to gain an efficient learning experience as aimed. Designing step is the stage to define the needs and the goals in order to create everything else accordingly. Good design of e-learning will prevent future errors and mistakes. At the end, the main goal is to achieve the goals planned through e-learning. Analyzing abilities of learners is also important as learners can vary from each other on certain points such as social skills, talents, communication skills, and preferences (ibid 2-37.)

In few words, the main stages of taking e-learning into action are as following:-

- a. Design stage, which includes:
  - b. defining needs and abilities
  - c. defining goals and objectives
  - d. analyzing the gatherings from the previous points
2. plan methodology and techniques
3. Development stage
4. further development
5. changes according to real life example and confirming what works the best
  - a. fixing errors

### 2.2.1 Online Learning

Online learning is being driven by some other factors affecting our daily life. These reasons are economic, political, and social. For example, the use of the internet is increasing in the whole worlds including developing countries. The usage of the internet also affected the channels of communication. Mobiles and emails are nowadays the major forms of communication in the world. All these changes go back to the same cause which is the internet (Bach, Haynes, & Smith 2007, 6.) 'Bill gates' has mentioned that the changes happening in technology such as the development of mobiles, tablets, and PDAs will transform learning processes for young people (ibid 15). Some of the transformations has already started. Spending resources, for example, is being taken away from printing books and materials and used in developing the online systems and tools used for online learning. The figure bellows shows the drives of online learning allowing the transformations to happen:-



**Figure 3.** Drives to online learning (ibid 30).

Online learning offers students many advantages. These advantages could be cost efficiency, easy access, and self-driven learning (Norman 2016). However, it lacks the advantages of actual learning in physical learning environments such as human interaction which can be extremely important for students (Armstrong 2017).

### 2.2.2 Mobile learning

Mobile learning as a concept offers people easy access to learning and education anytime and anywhere. However, it has two different types which are a bit different when discussing the way mobile learning goes

Learning as a mobile individual: Mobile learning technologies allow mobile individuals to learn through different established forms such as classrooms or virtual classrooms.

Real mobile learning: actual learning experience from the atmosphere and the surroundings which do not include learning from mobile devices. In other words, it is the process of learning from real word.

Thus, the first type of mobile learning is most likely to involve more technologies that the second one as it tends to be more virtual sometimes depends on the technique used. Mobile learners can take the chance to learn even when learning does not seem to be possible if they are ready with a few objects and motivation. For example, learning while traveling might seem not possible in normal cases. However, Mobile learner with a smart device and an internet connection may be able to get access to established learning environments virtually and use the time of traveling in learning. This can apply to any found time when learning can occur through available objects and technologies. Apart from the good use of the time, mobile learning can reduce the costs of infrastructure in learning environments such as costs of physical classroom and materials. A learner may be able to adapt mobile learning concept in the learning process due to the availability of good tools that are almost the same as the physical ones such as online meeting tools, networks for discussions, online tests, and virtual classrooms.

Some arguments believe that Mobile learning offers extended flexibility in learning process in case few techniques are adapted

Making online attendance unrequired. But instead, create recordings on the meetings that are available online too.

Establish discussions that are available over many days instead of hours.

Integrate social media as it is an easy access to students.

Maintaining contact with learners via support service and communication channels.

Mobile learning techniques, however, still requires effort to keep it maintained while offering flexibility and productivity. The main objectives of mobile learning are to offer flexibility to students as well as to use the time wisely. Anything that can redirect the objectives away from the main two goals mentioned can be risky.

### 2.2.3 Blended Learning

Blended learning is a definition that has been used recently in educational institutions (mainly higher education) though it is not obvious. "Blended learning is the thoughtful fusion of face-to-face and online learning experience." the main reason behind the combination of face-to-face learning and online learning experiences is to get the strength of both and avoid the disadvantages to creating a new innovative learning experience for students. The concept mentioned here tends to be straightforward and direct. However, the application process of blended learning is quite challenging. The main assumptions behind applying blended learning can be as following:-

Integrate online learning and face-to-face learning in order to create a new learning experience.

Optimize the courses to the way it works the best with emphasizing on students' engagement.

Restructuring the course and replacing contact ours in an actual classroom.

Blended learning can be the approach of integrating different techniques in one course in order to maximize learning. Labs and experiments and traditional classes can all be in the process of the contact hours while also adding online learning top the process can be beneficial.

Regardless of the mentioned advantages of blended learning, it should be approached with carefulness. It needs to be well-planned as well as monitored during the process. Requirements are to be decided for each course to find out if blended learning would work for this particular course or not. Blended learning is can also make online learning more acceptable to the learner which kind of depends on how many hours are to be spent in the classroom and how many hours should go for the online learning. These decisions are to be made by supervisors and educators to guarantee learning process smoothness as well as a good teaching process (Garrosin 2008, 1 – 9.)

Blended learning as a technique is not new. It is about combining existing techniques that already existed with the new online learning method in order to create an innovative process for more benefits (ibid 10.)

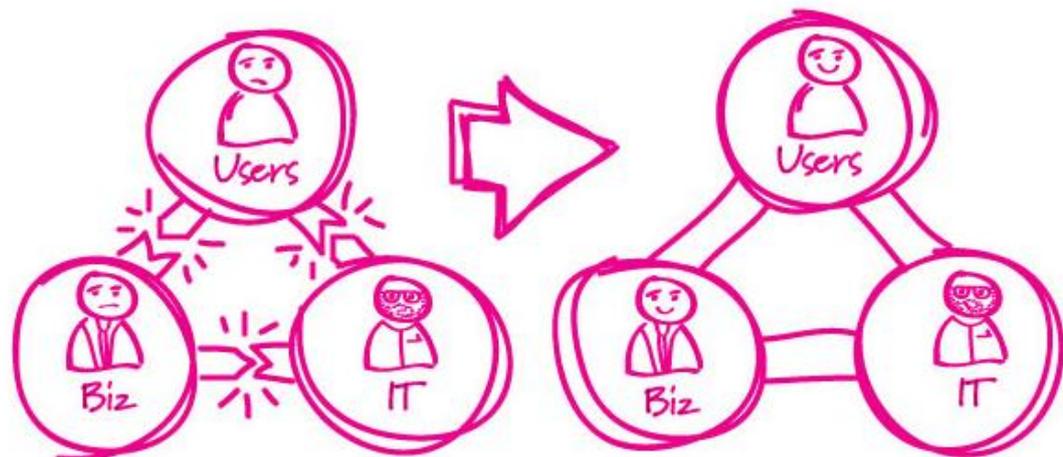
## 2.3 Co-creation with end-users

Co-creation with end users is another name for the concept 'User Centered Design (UCD)' which reflects the idea that the service or the product is being developed and designed in a bigger group that just the idea generator. It happens together with end users normally who are the ones that will use the product in the future. Since the field is being developed, there has been a confusion of the two related but different concepts 'Co-creation' and 'Co-design' (Sandars, & Strappers 2008, 1 and 3.)

Co-creation: it the process of using the creativity of a group that collaborates together in the whole process or creation and design.

Co-design: it refers to the process when the experts in designing the service or the product collaborate with other people, normally not trained in designing but so valuable in the process (such as end users) in designing development process.

User-centered design has one clear objective in case it is needed to be implemented in the designing process. User centered design aims to connect and involve the business mind, the technical mind, and the users altogether in the process of designing and developing the concept to make it into reality. The above-mentioned parties talk in different languages. The technical minds think in terms of technical issues such as coding and programming. The business minds think about the business value, Users think in terms of benefits they will get from the product/service and the problems solved by using it. Designers are mostly thinking about the user experience provided and visuals and other designing related matters. Within such situation where everyone thinks differently, USC concept comes and solves the problem by connecting all of the stakeholders creating one big group involved in designing with ideas coming from different perspectives.



**Figure 4.** The Design Circle with UCD and without UCD. (ibid, 3).

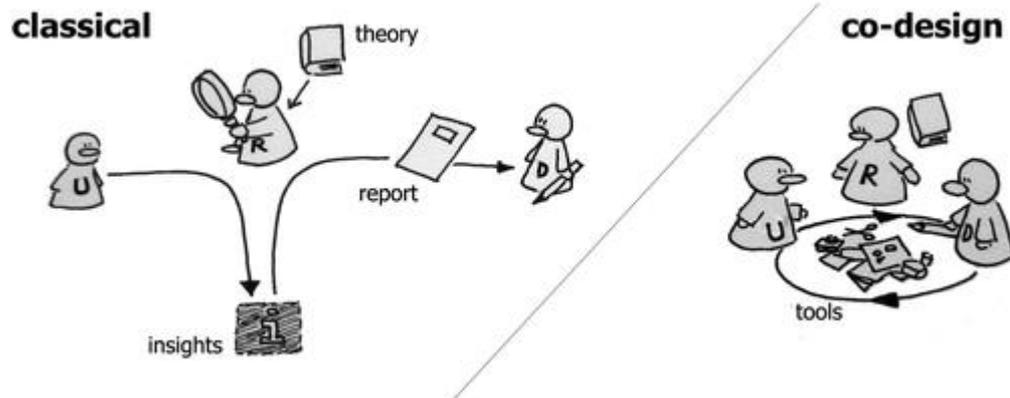
The difference between UCD and the normal designing process is all about who is involved. UCD offers a various amount of different perspectives and ideas coming from different type of stakeholders, which is not offered by

implementing the typical design process. UCD offers many advantages which are:-

- A better understanding of problems through the opinions and ideas shared from different perspectives.
- Allows rapid testing and validation of story concepts before the time-consuming coding through the involvement of end users and other parties.
- Provides usability by stealth.
- Engaging end-users in the process of creation, designing, and development
- Faster improvements and developments.
- Lower risks
- Avoid common mistakes such as poor project management, unrealistic goals, and use of immature or unnecessary technology. In addition, creative solutions will be provided to the problems existing

The product or the service will require less redesigning and it will integrate into the market faster (Abrams, Maloney-Krichmar, & Preece, 2004, 11.)

In addition to what has mentioned above, UCD provides the real understanding of User-experience (UX) (McNeill 2013). It also provides better time management by limiting the unnecessary processes of reporting for example. As all groups are collaborating together in the process of designing as shown in the figure below:



**Figure 5.** Classical design vs. Co-design (*ibid*).

However, there are some disadvantages of UCD such as higher costs due to the need of more people's involvement such as design team members, or difficulty to translate some data into tangible knowledge.

## 2.4 Online platforms and workspaces

Collaboration while working is becoming a necessity as the world is developing and different ideas from different perspectives are needed. With the rapid development in ICT, collaboration can take place in virtual forms. Online workspaces are the new innovative forms to collaborate for educational purposes. Online workspaces are being used in educational institutions for a better learning process for students in addition to monitoring it (Wang 2010, 1-2.) The use of online workspaces is increasing by the time either for educational purposes or in business life. This is due to the benefits of taking workspaces to the online form. The benefits can be:

Easier access to data due to the elimination of the geographical barriers.

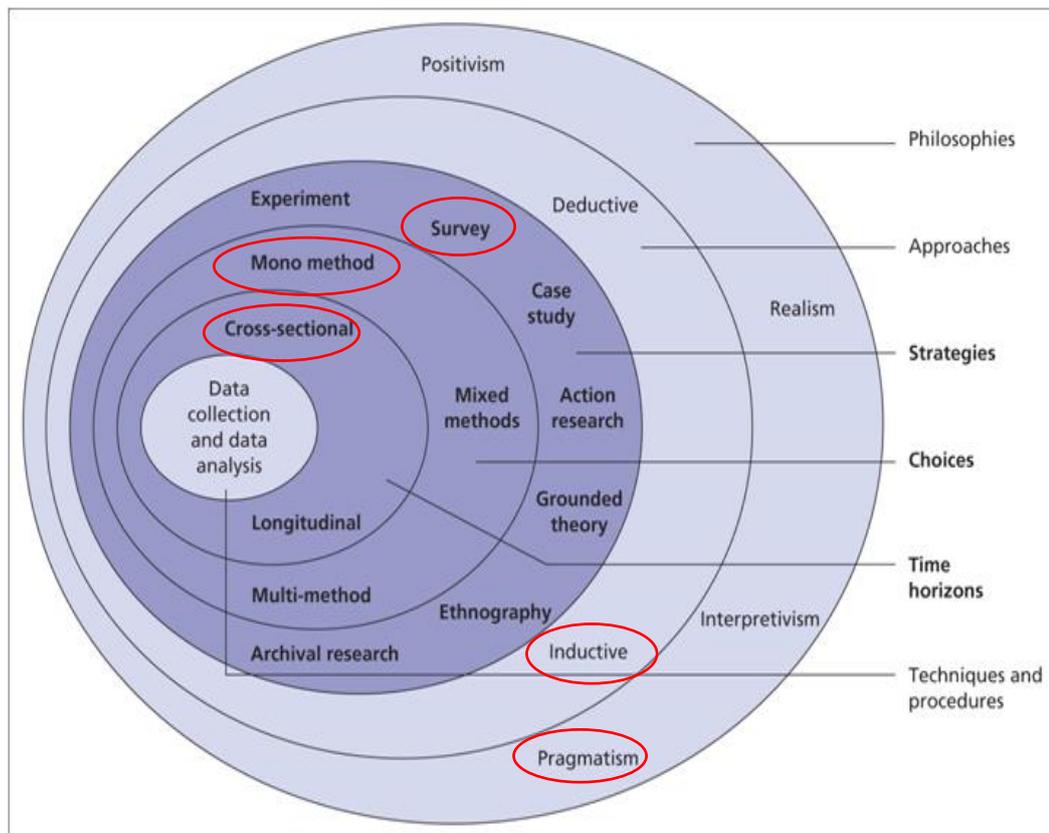
Higher quality of outcome (work) due to the easier access to data, knowledge, and working environment. In addition, the availability of various amount of tools works for the quality outcome.

Cost saving: Due to the use of cloud service and elimination of physical spaces, online workspaces are effective and cost-efficient too.

Data safety and knowledge sharing: Both advantages are the result of cloud service which secures the data online and makes it available and easy to access by everyone or the involved users (depends on privacy settings).

Eco-Friendly: Based on the fact that it limits the paper user and carbon footprint reduction, limits the emission due to limiting the need of actual travels (Wolf 2015.)

### 3 Methodology



**Figure 1.** *Research Onion (Saunders, Lewis, & Thornhill 2009, 138)*

As other researches, the thesis has followed a certain philosophy, approach, and strategy. Which are described below:-

**PHILOSOPHY:** Pragmatism. Which argues that it is possible to work with both positivism and interpretivism. Pragmatism researcher's view of nature is external and multiple, chosen according to research questions in order to answer them. Researcher in this philosophy is normally subjective and objective at once.

**APPROACH:** Inductive approach. The research is inductive due to the reason of non-existence of theories covering the same exact topic. However, there are some theories that are similar but not close enough to be counted as part of the main topic of this thesis. A good amount of researches can give a great picture of similar keywords but still not give the picture of this exact research.

The data were generated and analyzed to produce a theory. The research is exploratory due to the same reasons mentioned.

**STRATEGY:** Survey through a questionnaire. The survey contains both of qualitative and quantitative questions. Qualitative questions allow respondents to the survey to express their experiences, feelings, opinions, knowledge, and thoughts freely concerning the topic of the survey (contextual data). While quantitative data are straightforward, works well for ratings, and to offer the “big picture”.

**CHOICE:** Mono method. Only one strategy was used in the research.

**TIME HORIZON:** Cross-sectional. The research took a place only in a certain period of time and the data were collected just once within this period of time. However, the research can be held again or continued for an extended period of time if needed or decided by the author and JAMK which can change the time horizon to ‘Longitudinal’. At the current stage, nothing related to that is discussed which means the research is only cross-sectional.

**DATA COLLECTION:** As mentioned above, the data were collected through a survey sent to JAMK student population that gave permission to be sent surveys and the process was held was once over one period of time (Approximately two weeks in the second half of March 2017). 137 answers to the survey were given as a result of the data collection period. ‘Google Forms’ was used as a platform to create, share, and collect answers due to the effectivity of the platform. The platform was working efficiently during the whole period and no problems occurred and data are saved and stored as part of cloud storage. This platforms also helps partly in analyzing and structuring data (mainly for the quantitative part of the survey).

**Data Analysis:** After data collection, analysis process started. Some question were quantitative which means that the data is analyzed and structured already by the platform ‘Google Forms’ This related to 5 questions in the survey. The rest of questions are qualitative questions and cannot be

analyzed and structured automatically without using analyzing tools. Analyzing the qualitative part of the survey was done by 'NVIVO' and 'Microsoft Excel'.

JAMK as an educational institution was used as a place to take the research in, as JAMK currently offers platforms available for the student. Using current existing services to generate data then create information would help in the recreation of the ideal educational platform and also help to have a better big image. Understanding the survey would also be an easier job to do as it is being held based on an existing service.

### 3.1 The Survey

The survey had both if qualitative and quantitative questions. However, most of the questions were qualitative and the survey was aiming to generate answers with explanations for quality data. The survey was created to fulfill the concept of co-creation with end-users while aiming to generate data answering the following questions:-

How does end-users see the current online services offered in JAMK?

What kind of experiences have they with the current services?

What do the end users want to have? And what is unnecessary for them?

How do end-users use JAMK online services?

The questions are explained in details below:-

- Question 1 (Quantitative): Please rate your current satisfaction with the current online services offered by JAMK (Intra, Elmo, Optima, Janet).

Keyword(s): UCD (User-satisfaction). Answering the question: How does end-users see the current online services offered in JAMK? Reason of selection: To understand satisfaction rate of the currently existing online services at JAMK.

- Question 2(Quantitative): Which services do you use on daily basis? (Pick one or more).

Keyword(s): UCD (User-Experience). Answering the question: How do end-users use JAMK online services? Reason of selection: to understand frequency of usage of the online services and platforms at JAMK which can help in understanding the importance or further improvements and development.

- Question 3(Quantitative): Which service(s) are you satisfied with the most?

Keyword(s): UCD (User-satisfaction). Answering the question: What kind of experiences they have with the current services? Reason of selection: to understand the features that are important but existing already and the platforms that are functioning properly and fulfilling some/all of end-users' needs.

- Question 4 (Quantitative): Which JAMK service(s) are NOT satisfying and why?

Keyword(s): UCD (User-satisfaction, User Experience). Answering the question: What kind of experiences they have with the current services? Reason of selection: to understand the errors and the unnecessary features that have no tangible use.

- Question 5 (Qualitative): What are the current difficulties you are facing while using any of JAMK online services? (Errors, Features missing...etc).

Keyword(s): UCD (User Integration). Answering the questions: What kind of experiences they have with the current services? And, What kind of experiences they have with the current services?. Reason of selection: to understand the user-experience of the current existing services and possibilities to improve it.

- Question 6 (Qualitative): If you were the manager of IT department at JAMK, What would you develop, Improve, fix, or add to the services?

Keyword(s): Co-creation, UCD. Answering the question: What do the end users want to have? And what is unnecessary for them? Reason of selection: Scenario question, to gather information related to users' needs and wants in order to develop and create services and features.

- Question 7 (Quantitative): How would you rate the importance of having new online technologies available for educational purposes?

Keyword(s): Digital Learning, Co-creation. Answering the question: How do end-users use JAMK online services? Reason of selection: To understand the importance of digital tools in students point of view and understand the importance of using extra resources in developing and improving the tools.

- Question 8 (Qualitative): How does integrate new technologies (example: online workspace) in education helps you in your learning process?

Keyword(s): Digital Learning, Co-creation. Answering the question: How do end-users use JAMK online services? Reason of selection: To understand the importance of digital tools in students point of view and understand the importance of using extra resources in developing and improving the tools in addition to understanding the methodology which can help in fulfilling end-users needs.

- Question 9 (Qualitative): Your opinion matters a lot. You can share your comments/thoughts/suggestions or whatever you would like to share about JAMK online services. (Skip if there is nothing to add).

Keyword(s): User-integration, UCD. Answering the questions: How do end-users use JAMK online services? And, What do the end users want to have? And what is unnecessary for them? Reason of selection: Open question were end-users feel free to share all ideas, needs, and wants, for a better understanding.

- Question 10 (Quantitative): Select the features you would consider 'So important' to have in the app.

Keyword(s): UCD, Digital Learning. Answering the questions: What do the end users want to have? And what is unnecessary for them? Reason of selection: To understand the importance of certain features and services to students (end users).

- Question 11 (Qualitative): Please write your thoughts and suggestions here. What other features/services would you like to have in the new app? (Anything that can be important or matters for you).

Keyword(s): UCD, Digital Learning. Answering the questions: What do the end users want to have? And what is unnecessary for them? Reason of selection: To gather data related to users in order to keep the cycle of the UDC cooperation connected. This can help in creating a better outcome

Demographic data such as gender, age, nationality, will not add any additional value to the research as the survey was targeting specifically JAMK students who are currently studying and have used JAMK online services on the available platform. Thus, the survey had no questions aiming to collect any demographic data at all. The reason behind the use of more than one question for the same keywords is to get more valuable data from different perspectives on how the ideal educational platform should look like.

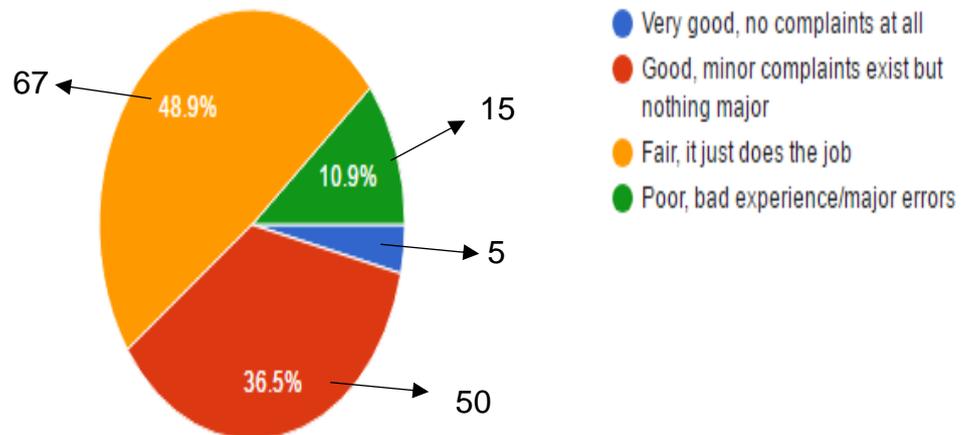
## 4 Results and Analysis

This section shows study result as well as analyses and shows the actionable tangible information as an outcome from the data set.

### 4.1 Quantitative part

Please rate your current satisfaction on the current online services offered by JAMK (Intra, elmo, Optima, Janet).

(137 responses)

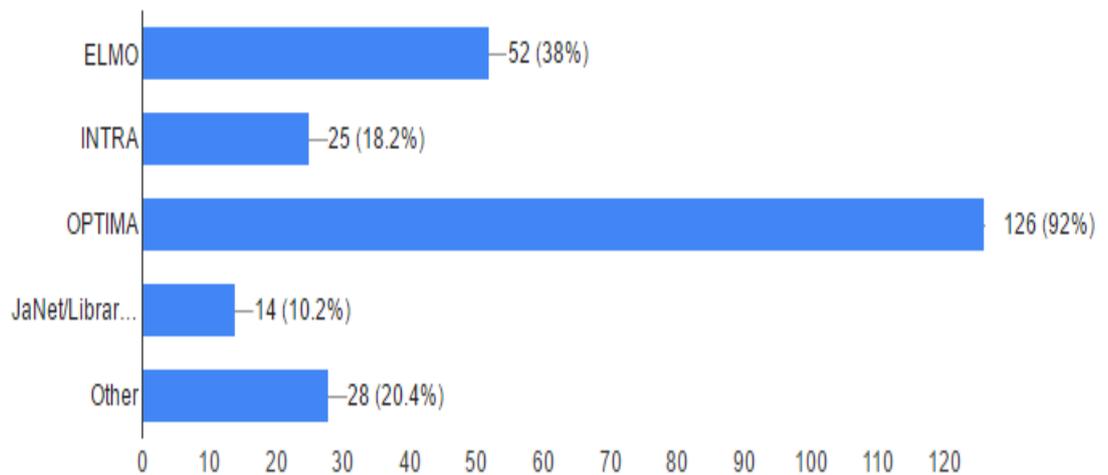


**Figure 6.** Overall Satisfaction of the current services and platforms.

The general satisfaction rate seems to be not high enough to not consider major changes in the systems. Very low number of people is really satisfied with the currently offered platforms and has no complaints at all. The largest amount of people answered that it does the job which does not mean that no major errors exist and a considerable amount of people mentioned that they had bad experiences with the offered services.

Result: Satisfaction rate must be improved by improving the platforms, consider needs and wants in creating the new versions, and fix the major/bothering errors. Recreation is needed in cooperation with end-users.

Which services do you use on daily basis? (Pick one or more). (137 responses)



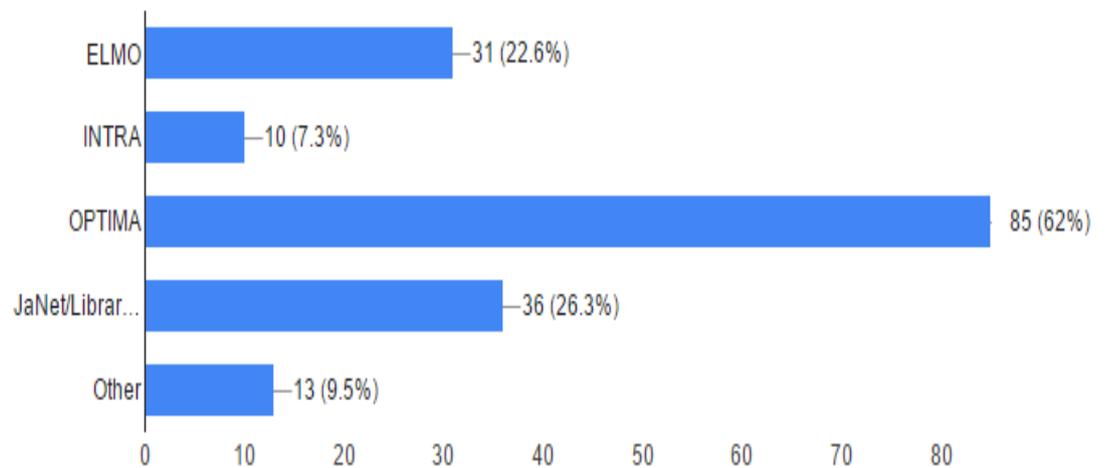
**Figure 7.** The frequency of used of JAMK online platforms based on 137 answers.

As seen in the chart, JAMK platforms are in use by many students in the university. The most used service is OPTIMA where the course materials and workspaces are. The answers show the importance of Optima to students which means the platform should be monitored, maintained, and updated/developed whenever needed to guarantee user satisfaction and easier processes for students through the platform. Elmo (where the calendar, grades are) was the second most used platform. Other services used daily were Asio and some other external services (Office365, Outlook mailbox).

Result: It is extremely important to maintain easily accessible and error-free Elmo and Optima due to the high importance of services offered there to students. Students are using study materials and workspaces platform as well

as calendar and grades platform on daily basis. It is important to provide and assure quality of these services.

Which service(s) are you satisfied with the most? (137 responses)



**Figure 8.** Satisfaction rates of JAMK online platforms based on 137 answers.

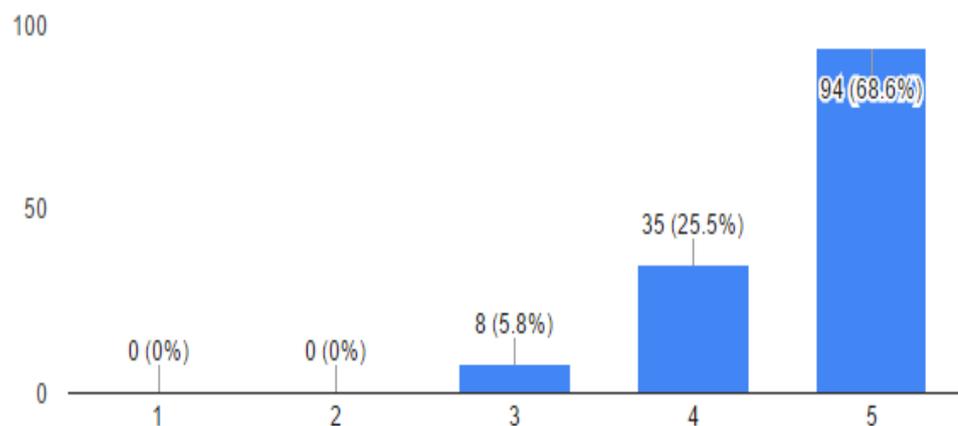
The satisfaction rate of some certain services apparently fulfills some students' needs. It doesn't deny that there could be some errors (major or minor) mentioned for each of them in next questions. However, this questions reflects which platforms fulfill some needs and which ones work in a good way. Apparently, Optima has the highest satisfaction rate comparing to other platforms, followed by JaNet then Elmo. 'Other' answers do exist and they belong to external services like Office 365. Even though Office might have one of the lowest rates in the question. It is part of 'other' answers which shows that it was remembered by people when asked about most satisfying services and it has a big portion of 'Other' answers.

5 'other respondents mentioned that are not satisfied with any of JAMK services

Result: Intra is apparently the least satisfying service. It would be a wise to consider recreating and developing it first to improve the rate, followed by other services from the lowest satisfaction rate service/most important changes/major errors, Ending in the highest satisfaction rate/least important changes/minor errors. Students need an easy and clear intranet to use.

How would you rate the importance of having new online technologies available for educational purposes?

(137 responses)



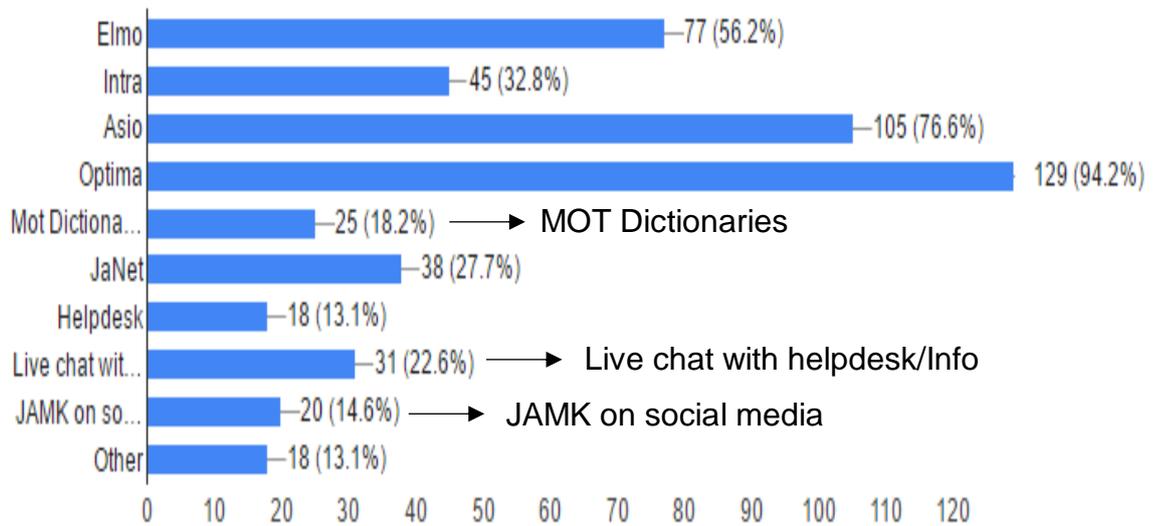
**Figure 9.** The importance of developing new technologies that meet students current needs and wants (based on students point of view).

The question as described in methodology section aims to determine the importance of investing energy and resources from students' point of view. According to the introductory study. It was shown that students' opinions differ from staff and teachers' opinions. And even within the same group, it differs based on technology involvement in respondent's lifestyle. To avoid any possible confusions or misinformation and misunderstanding, the author

decided to find out the importance of involving new online technologies for educational purposes from students' perspectives.

Apparently, the result showed that it is extremely important to invest and out more resources in creating and developing new online technologies for students to use during their educational path. There were no answers on the negative side at all (1-2) and the highest portion of answers went to the extreme importance.

Select the features you would consider 'So important' to have in the app.  
(137 responses)



**Figure 10.** Importance services demanded by students in JAMK.

This question is related to the creation of the All-in-one app that was in-demand by students (shown in the qualitative part below). The importance can be categorized into 3 categories:-

**Category Service** (Importance within category from left to right)

Category 1: Optima – Asio – Elmo  
High

<i>importance, High need</i>	
<i>Category 2 Medium and considerable importance, Low need</i>	Intra – JaNet – Live chat with helpdesk/Info
<i>Category 3: Low demand but could be useful (Extra possible features), Could be considered as ‘wants’</i>	MOT Dictionaries – JAMK on social media – Helpdesk  ‘Other’ responses: Mailbox, New separate calendar, Restaurant menu, Notification system, Chat with teachers, Contact form

**Table 2.** *Categories of important features based on end-users' answers*

The students are highly demanding workspace platform, course materials resource and a calendar as main features and services they need in the all-in-one app. Lower but important demands go for intranet in the application, library services, and live help service. Other features placed in category 3 can be useful and serve students as well as improve satisfaction.

## 4.2 Qualitative Data

Qualitative data needed to be analyzed before having tangible data to work on. Participants had to answer few qualitative data questions in free format which could provide many suggestions, needs, wants, and error reports from student's point of view.

All questions tried to get specific information from students who decided to respond the survey. The question was categorized in three different categories

	Questions	Description
Category 1: Unsatisfaction Rate+reasons, Current Difficulties	<ul style="list-style-type: none"> <li>- What are the current difficulties you are facing while using any of JAMK online services? (Errors, Features missing...etc).</li> <li>- Which JAMK service(s) are NOT satisfying and why?</li> </ul>	The questions aimed to collect data from student's point of view regarding difficulties they face currently while using JAMK services and their unsatisfaction reasons.
Category 2: Reasons to integrate new technologies. (Technology integration in education features)	How does integrating new technologies (example: online workspace) in education helps you in your learning process?	The questions aimed to determine the importance of integrating new technologies in education from students' point of view.
Category 3: Suggestions	<ul style="list-style-type: none"> <li>- If you were the manager of IT department at JAMK, What would you develop, Improve, fix, or add to the services?</li> <li>- Your opinion matters a lot. You can share your comments/thoughts/suggestions</li> </ul>	The questions aimed to collect suggestions from student to prototype the ideal educational

	<p>or whatever you would like to share about JAMK online services. (Skip if there is nothing to add).</p> <ul style="list-style-type: none"> <li>- Please write your thoughts and suggestions here. What other features/services would you like to have in the new app? (Anything that can be important or matters for you).</li> </ul>	platforms (UCD approach).
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**Table 3.** Categories of qualitative questions.

It was not expected that all answers of qualitative part will round around the same issues and suggestions. Apparently, most students have similar usage methods of the services and most of them are reporting similar issues all over again and also suggest similar suggestions and features.

#### 4.2.1 Category 1

X number of respondents	Out of	Percentage	Complained About	(Description)
28	137	20,44%	Messiness	Information is not easy to find or sometimes do not seem to be in the right place. Different information in different resources
13	137	9,49%	Too many services	Too many services available in JAMK causing for example confusion and long login process.
15	137	10,95%	Long loading time	Pages/platforms take too long to

				load or sometimes crash.
13	137	9,49%	Calendar errors	The calendar is not functioning well. Different info in different calendars or it just does not work as expected.
10	137	7,30%	Mobile incompatibility	Services do not function properly on smartphones and there is no app available.
24	137	17,52%	General errors and bugs	General errors and bugs causing service crashes and difficulties.
4	137	2,92%	Lack of proper visualizations	Visualizations are not attractive enough for students

**Table 4.** General dissatisfaction reasons.

The figure above shows the reasons if dissatisfaction (generally).

Respondents reported the reason of their dissatisfaction while using JAMK online services in general.

X number of respondents	Out of	Percentages	Are NOT satisfied with	Because of
60	137	43,80%	Elmo	Bad user experience due to poor timetable (Mainly), Followed by slowness, bugs, and no good value to many students.
42	137	30,66%	Optima	Mainly smartphone incompatibility and logs. Followed by improper usage by teachers and a slightly poor interface.

30	137	21,90%	Intra	Unsatisfying user-experience due to slowness, bugs, bad visualization, difficulty to reach aimed info, and lack of updates.
11	137	8,03%	Janet	Lack of user-friendliness.

**Table 5.** Results after data analysis. Unsatisfaction Rate and reasons for each specific service

The figure above explains the results after analyzing the data and determining unsatisfaction rate with reasons of unsatisfaction for each platform specifically.

#### 4.2.2 Category 2

X number of respondents	Out of	Percentage	Like new technologies in learning process because	(Description)
3	137	2,19%	It helps in collaborative learning	Respondents support technology integration in education as it helps them in group work and it activates collaborative learning.
49	137	35,77%	It provides flexible learning experience	Respondents believe that technology offers a lot of flexibility for them as well as proper tools for learning regardless of their current place.
34	137	24,82%	It is easy to use	Technology makes learning easier and it offers easy-to-use tools to keep the learning process going on without being in school.

21	137	15,33%	It helps in time management	Using technology for learning saves a lot of time which increases productivity according to respondents
2	137	1,46%	It is eco-friendly	Technology activates eco-friendliness. Students will not need to use a lot of paper and resources for learning.
27	137	19,71%	It improves their learning experience	Respondents believe that technology improves their learning experiences.

**Table 6.** *Students' opinions on how integrating new technologies in education help them in their learning experience.*

Students' opinions on new technologies integration in education were almost all positive. The figure above shows the result of the second category question after analysis, which determines how students actually feel about using technology for learning purposes and why do they like to use it.

### 4.2.3 Category 3

Percentage	asked for/suggested	(Description of the request)
31,39%	All in one app	These respondents requested all in one platform and app that includes all the services a student needs in their day-to-day university life.
20,44%	Simple Services	The respondents requested simple services without too much information or complexity so they can find the requested info or reach the desired service easily.
13,14%	Mobile Compatibility	The respondents of this node requested better mobile incompatibility so they can use the service on their smart devices.

5,11%	More features	These respondents requested additional possible features such as chat service with teachers, student restaurants' menus, Mailbox).
2,92%	Visualizations	Respondents requested better visualization to improve user-friendliness and user-experience.
5,11%	Proper Calendar	Respondents for this node requested MAINLY a new well-functioning calendar.

**Table 7.** *The ideal student platform based on students' point-of-view*

This category had 3 qualitative questions as mentioned in table 3. The first question aimed to collect data based on existing JAMK services by placing the respondents in a scenario where they can fix and improve whatever they pick. The second question aimed to collect additional data based on the existing services too by giving the respondent a chance to report needs, wants, errors, and suggestions freely. The third question had the same aim but it was asked in the end after offering possible features a student might want to have in an app for students. The three questions were enough to collect data and have a clear image of the ideal platform for students based on their opinions (after analyzing). The features are as mentioned in figure 15 above and will be described below:-

- All in one app. The students requested combination of all the services they use under 'one roof'.
- Simplicity was highly demanded to avoid confusions and difficulties reaching the information.
- Students want to be able to use the platform easily on their smartphones.
- Students requested add-ons such as restaurant menu, mailbox, and chat service.
- Some respondents demanded clear and well-designed visualizations.
- A few respondents emphasized of importance of having a proper calendar again in this questions.

## 4.3 General Analysis and results

The whole data set (qualitative and quantitative) can make a logical information and provide with tangible knowledge that can be used by educational institutions especially JAMK which was the place where the research was conducted. Providing ideal platform for students based on UCD approach (mainly considering end-user opinions and thoughts) is considered to be highly important according to the survey conducted (0 respondents said that it is not important, All respondents believed that it is important to highly important and explained the reasons). Which means investment is required due to the high importance.

### 4.3.1 Features of the ideal educational platform

As mentioned previously, students seemed to be using the services similarly and also reporting the issues similarly. According to the research conducted and through UCD approaches, the ideal platform for students contains the following features:-

- Course workspaces: where students can get course materials and submit assignments.
- Discussion forum: Collaborative learning tool where students can discuss and ask questions.
- Grade board: a board to see course grade
- One calendar: one calendar only, with timings and info related to locations of classes
- Info bank: properly categorized website where students can look for information
- Mobile app: an application for the same exact platform
- Mailbox: Communication tool when the matters are not urgent.
- Easily-accessible library services: for library matters including e-books viewing.

Add-ons:-

- Direct Chat service: communication tool when the matters are slightly urgent.
- Restaurant menus: Student restaurants' menus available and weekly updated.
- News board: a board where news are posted and updated
- Social board: available board for all students to post anything related to university life such as urgent general questions.

#### 4.3.2 Things to consider while developing

- All-in-one approach: students highly demanded to have all the services under the 'same roof'.
- Simplicity: students demanded well-categorized and simple platforms.
- Simple and well-designed visualization: Respondents also demanded modern and simple visualization for the services/websites.
- User-friendliness: good user-friendliness automatically improves user-experience.
- Additional extras such as dictionaries are acceptable by students as long as it does not affect categorizing, heaviness of the platform/app, or user experience.

A noticeable amount of answers mentioned that there is some non-technical common mistake which affects the user-experience of the online services in general. The mistake was in the usage of the platforms and services by teachers without one-guide approach. This is not mainly related to the research topic and features. But, it is good to mention that user-experience can be improved by having one guide approach which means one way of using the platforms by teachers. The confusion happens when teachers are using a platform such as optima in a different way that another teacher, which causes having the student in a place where it is needed to adapt both ways causing more time spent just in understanding the technique used by teacher in creating a workspace. An example scenario is mentioned below:-

- Teacher A creates three folders in the workspace. Course info, assignments folder with a deadline for each, and materials folder. While

teacher B creates a new folder for each topic/contact lesson, in addition to not setting a deadline for each assignment assuming that students will be checking all the folders frequently.

This particular issue could be avoided, for example, by preparing a how-to guide for all users from staff and students using clear instructions and a one-method approach.

### 4.3.3 What to avoid (what students dislike)

Respondents constantly reported the following (and how to avoid):-

- Too much information (well-categorizing)
- Different information that does not meet on different pages (all-in-one approach, Monitored update)
- Complexity and difficult-to-use services (UDC approach and AB testing)
- Coding bugs and errors (testing team or testing service).

## 5 Discussion

### 5.1 Objectives and results

The research aimed to get a deeper understanding of students' perspectives on technology integration in education by determining the importance of the new technologies integration in their learning processes as well as involving them in creating the proper online platform that they would like use to get the online services helping their learning process. Results showed that technologies are quite important for students at the current stage as it helps their learning process in many ways (shown in results), which was not the case not so long ago, comparing to other studies held a few years ago. Results also showed students' opinions on how the ideal online educational platform would look like and how they would like it to be in order to fulfill their needs and wants which will result in an improved learning process. The process was using UCD approach with involves end users in the process of developing a product/service in order to increase effectivity and decrease

unwanted side effects of the normal process without UCD. Using UCD approach was a success for this research as the results could determine the features that are actually wanted by students, add-ons that are wanted, and what students hate as end-users of this platforms (what to avoid). The research could meet the objectives planned, which can be considered a success. Screenshots of the designed prototype based on results can be found in appendices.

## 5.2 Limitations

Even though conducting a survey through questionnaires has a lot of advantages. The research will still have some limitations due to certain disadvantages. Limitations of the conducting survey through questionnaires are as following:-

- Respondent may not feel encourages to give a full, in-depth, honest answers all the time
- Answers available for each question may sometimes not reflect the truth behind a certain respondent's actual experience. For example, a respondent may answer with 'no' to a certain question if there is no 'only once' option. However, there was an attempt to avoid this limitation by offering 'other' option whenever possible even when it is kind of not needed.
- Due to an early exploratory stage of the research, reliability, and validity of the survey instrument is beyond the scope of this study.

The survey offered 'other' option as a chance for students to express their opinions freely when they feel that they need to, even in quantitative questions. It was used as expected but in some answers, the other answers did not directly meet the question's goal. For example, Even though the description of the survey mentioned the aim, two of the answers were demanding more computers in the campus, which is not related to the research.

Time was a considerable limitation as this research could be done on larger scale with larger data and more in-depth if time allows such as more data collection techniques and statistical tests of validity and reliability of the survey instrument.

Cross-sectional studies in general, as this research, has a disadvantage that data provided by respondents could be reflecting an older situation and or experience. However, the chance of such limitation in this research is low, as the survey was sent to only current students in JAMK who has used the available services.

Large scale deductive approaches in researches normally do not have so serious time limitations.

### 5.3 Further development

The research could be taken into further development in a longer time horizon, in different research field (Different institution), or with a larger sample. As technology, in general, is always going towards improving and developing, a similar research must take a place every certain period of time based on the changes in technologies available. This research can be used as a base for other future research aiming to develop the concept further. The dataset could be used to deliver results in the form of reports to related departments in order to make new decisions for improvements.

### 5.4 Recommendations

For educational institutions, the author recommends using the data collected with the information after analyzing the data and the prototype in releasing an actual platform with the app for students of the institution. A considerable amount of responses has been collected which means that a good amount of the task has been done from the non-technical part and partly technical part as well. As UCD approach has been used, many errors and common mistakes will be avoided. In addition, there will be a noticeable increase in satisfaction rate on the online services from students.

For future researchers, it would be recommended to set larger timescale for researches related or set this research as a base. One of the methods of using this research is to run it on wide nation/international scales, which means the same exact research is being run in different universities and different countries in order to determine and monitor the differences of technologies that are being used based on place and how could each place develop their technologies available for education by monitoring results of other places. For example, university X might have modern technologies used which are not yet being used in university Y. While university Y has better techniques. By conducting such researches in both universities, results can be shared in order to decide developments and improvements where it is needed in addition to avoiding mistakes that were done already (knowledge exchange).

## **6 Conclusion**

Education has been rapidly changing since the technology started to develop. Technology has been creating new tools and methods to gain knowledge and learn faster and sometimes better, only if it has been planned properly and used in the right way. There are many ways how technology is integrated into education by institutes and universities. Some universities may depend mainly on digital learning and some other universities might prefer to use technology only as a supporting tool for traditional learning. There is no evidence with one is better and which is not. What matters is the outcome. New tools and methods are definitely going to be created in the future creating new paths for learning which make it reasonable to keep monitoring and using UCD approaches in creating what actually works for students, teachers, and staff altogether. Especially that these tools are mainly being used by students which mean integrating them in the process of creating educational platforms and tools will help to avoid the errors or misunderstanding and improve the result by having what actually works students and support their learning process avoiding future difficulties and errors that will require time and resources to fix and redevelop.

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## 8 Appendices

### Appendix 1. Survey 1/3

QUESTIONS      RESPONSES      137

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Please rate your current satisfaction on the current online services offered by JAMK (Intra, elmo, Optima, Janet). \*

Very good, no complaints at all

Good, minor complaints exist but nothing major

Fair, it just does the job

Poor, bad experience/major errors

Which services do you use on daily basis? (Pick one or more). \*

ELMO

INTRA

OPTIMA

JaNet/Library website

Other...

Which service(s) are you satisfied with the most? \*

ELMO

INTRA

OPTIMA

JaNet/Library website

Other...

## Appendix 2. Survey 2/3

**QUESTIONS**    RESPONSES **137**

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**Which JAMK service(s) are NOT satisfying and why? \***

Long-answer text  
.....

**What are the current difficulties you are facing while using any of JAMK online services? (Errors, Features messing...etc). \***

Long-answer text  
.....

**If you were the manager of IT department at JAMK, What would you develop, Improve, fix, or add to the services ?**

Long-answer text  
.....

**How would you rate the importance of having new online technologies available for educational purposes? \***

	1	2	3	4	5	
Not important at all	<input type="radio"/>	Extremely Important				

**How does integrating new technologies (example: online workspace) in education helps you in your learning process? \***

Long-answer text  
.....

Your opinion matters a lot. You can share your comments/thoughts/suggestions or whatever you would like to share about JAMK online services. (skip if there is nothing to add).

## Appendix 3. Survey 3/3

QUESTIONS

RESPONSES

137

## JAMK First App prototype

The data collected will be used to improve the current services. In addition, data will be used to create a prototype of JAMK smartphone application that will offer a lot of features and services on your phone.

It is the app for you, your opinions matter!

Select the features you would consider 'So important' to have in the app. \*

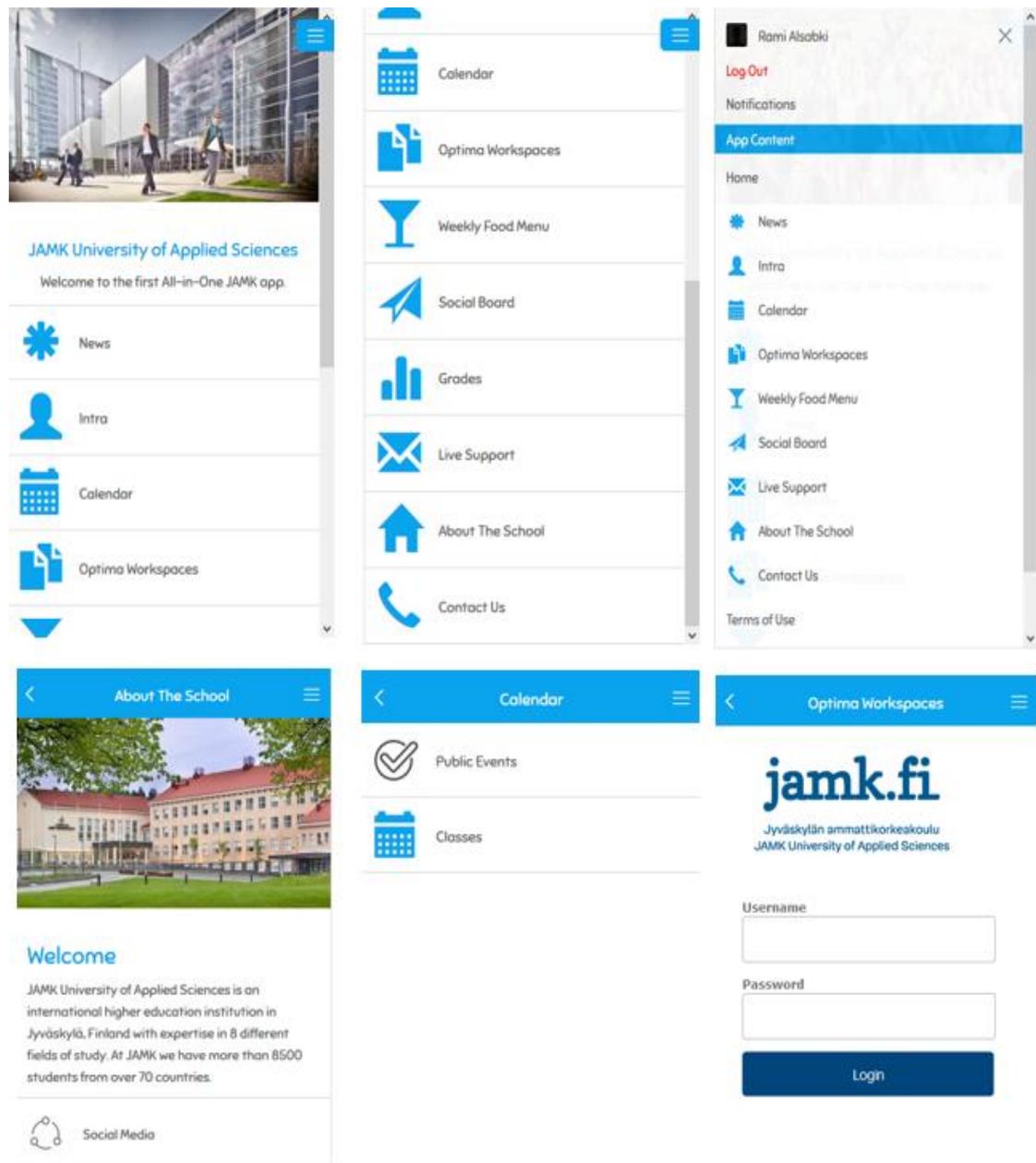
- Elmo
- Intra
- Asio
- Optima
- Mot Dictionaries
- JaNet
- Helpdesk
- Live chat with helpdesk/info
- JAMK on social medias (facebook, instagram...etc)
- Other...

Please write your thoughts and suggestions here. What other features/services would you like to have in the new app? (anything that can be important or matters for you).

Long-answer text

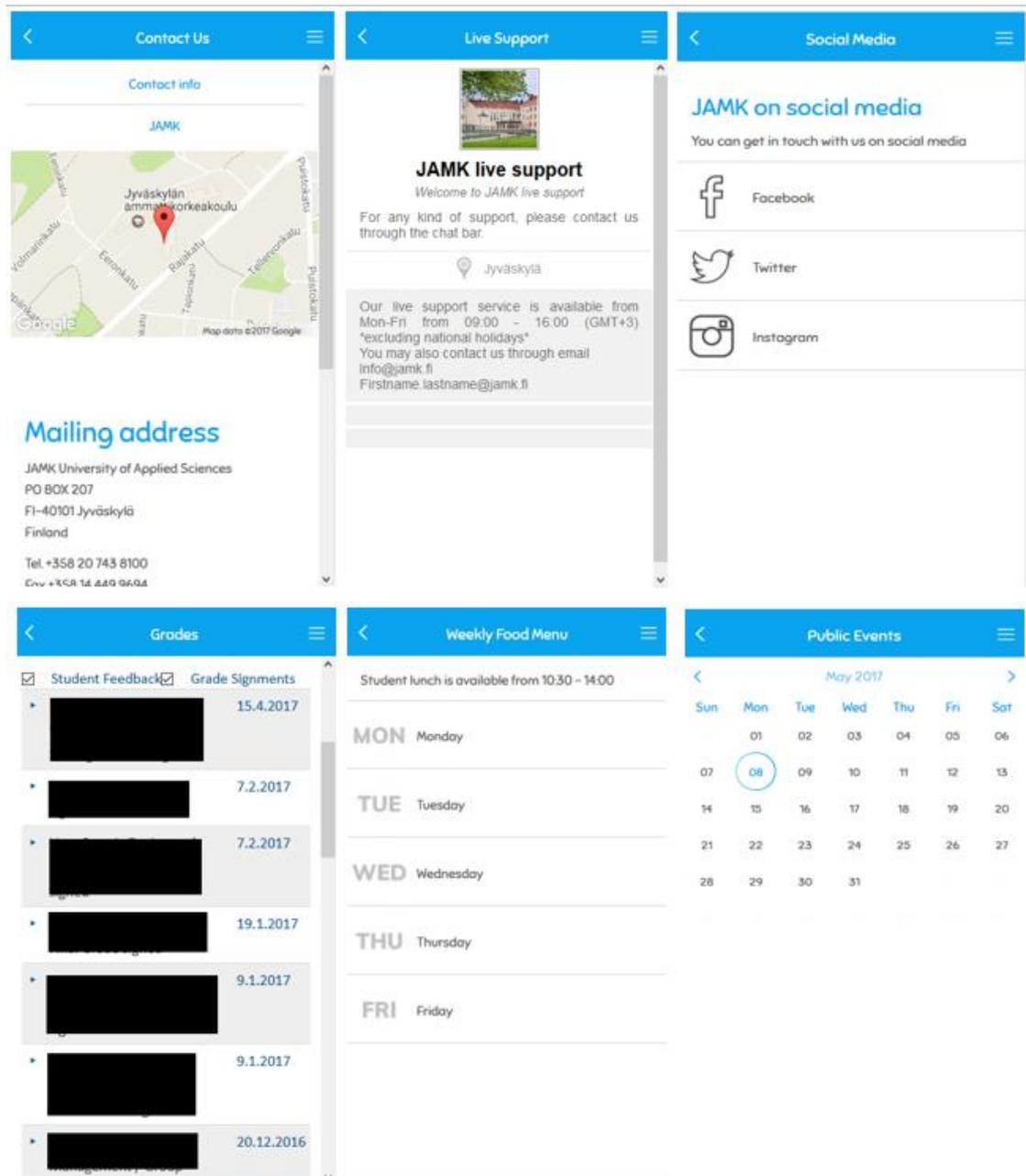
.....

## Appendix 4. Screenshots from the application 1/3



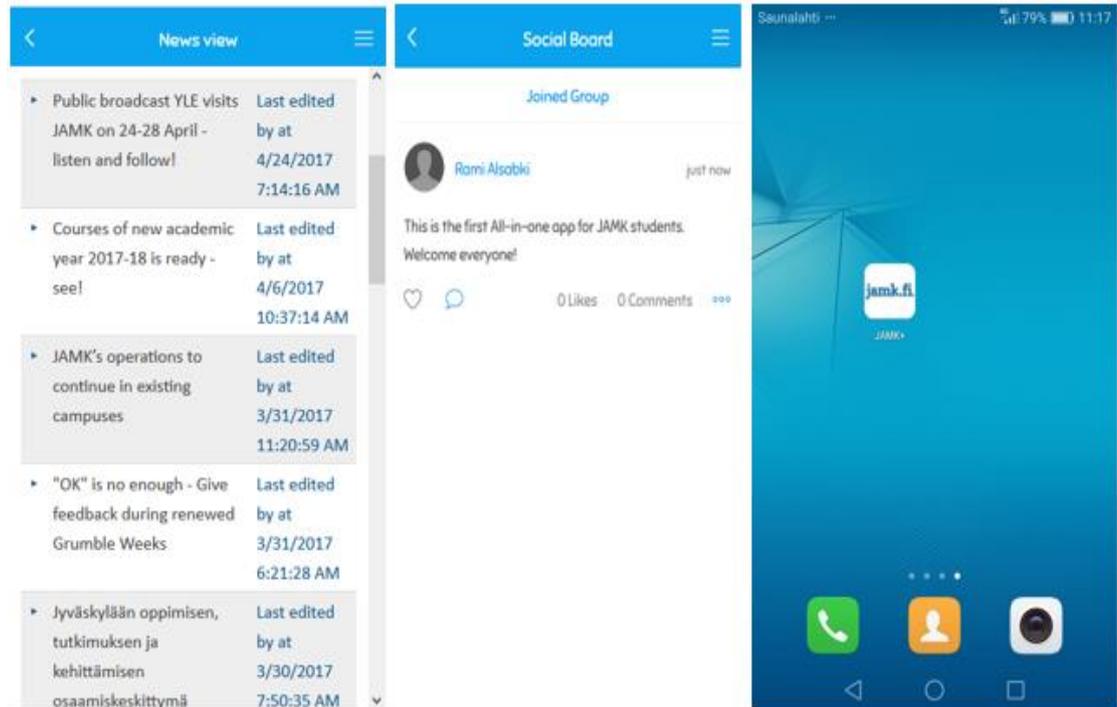
From left top to right bottom: Home page of the app (1), Home page of the app after scrolling down (2), Side menu, 'About the school' page, Calendar page, Optima workspaces page.

## Appendix 5. Screenshots from the application 2/3



From left top to right bottom: Map/address/contact info of the school, Live chat support service, Social media news feed, Grades, Weekly food menu, Public events calendar (different that classes calendars).

## Appendix 6. Screenshots from the application 3/3



From left to right: News feed (School's news feed), Social board, App's icon and name on home page of an android smartphone above three other icons.