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# Improving the Help-desk Service of the Facility Superintendents at Laurea Leppävaara

Thieu, Nguyen

2014 Leppävaara

Laurea University of Applied Sciences  
Laurea Leppävaara

# Improving the Help-desk Service of the Facility Superintendents at Laurea Leppävaara

Nguyen Thieu  
Degree Programme in Facility Management  
Bachelor's Thesis  
5, 2014

Nguyen Thieu

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The subject of the thesis project is the facility management help-desk service of the Facility Superintendents at Laurea University of Applied Sciences, Leppävaara campus. The main purpose of the thesis is to develop the help-desk service by examining the experiences of customers. The strategy of the research included three stages. Initially, information about the current situation of the service was investigated and then problems were identified. After that, based on literature and the results of research, suggestions for improvements were formulated.

The theoretical background consist of three main sections. Firstly, basic knowledge of facility management, including a definition, description of the functions and models of facility management are provided. Subsequently, the roles and management procedures of the help-desk service are discussed. In additions, consideration is given to theories relating to the customer's perspective, particularly in the field of facility services.

Both quantitative and qualitative research methods were applied in the research process. Analysis of questionnaires and a service record yielded quantitative research data, while observation, interviews and service design tools provided qualitative research data. These research methods took place during a two and a half month period from March 3rd 2014 to May 9th 2014.

The empirical study is constructed as an upside-down pyramid. The initial segments describe the general information of the help-desk service of the Facility Superintendents, such as the main functions, customer groups and their expectations. In deeper segments, two significant requests relating to asking for information and technical support are selected for further researches. Moreover, three problems explored in these researches studies relate to providing information about study units and computer rooms, as well as audio-visual technology support in the classroom.

Keywords facility management, facility service, help-desk service

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## 1 Introduction

The thesis concentrates on the help-desk service in the facility management field. In fact, the study is based on customer experiences. All of the research and theories aim to answer a sole question “How to improve the help-desk service of the Facility Superintendents?” In order to answer the question, the researcher first identified the issues including in the help-desk service. After that, two remarkable issues were selected for further research which were concluded with suggestions for improvement. The case study for the empirical part of the thesis project focus on the facility management help-desk service of Facility Superintendent team at Laurea University of Applied Sciences, an educational organization.

Both quantitative and qualitative methods were applied in the study. To clarify the customer experiences of using the help-desk service, the researcher recorded customer requests during a certain time. The record was also used for defining values of the service on customers' point of view. Furthermore, a variety of research methods were utilized to investigate information and solutions. Customer feedback was collected from a Co-co workshop, interviews, and service design tools.

The thesis was limited in scope. Only the help-desk service of Facility Superintendent team was researched and the study did not include all of the services that the team was responsible for. The study solely examined the issues of the help-desk service operated by the Facility Superintendents team, but not the help-desk service of other departments in the organization such as, IT or library. Moreover, the research focused on the help-desk service at the campus Laurea Leppävaara, but not at other campuses of Laurea University of Applied Sciences.

The structure of the thesis is divided into five main parts as shown on the Figure 2. Following the introductory chapter, the theoretical background present knowledge of facility management help-desk, facility management system, and theories of customer perspective in facility services. These theories were stated to determine the role of customer in the help-desk service and necessary aspects of customer experiences for improving the service. The next chapter mentioned about the methodology describing the research methods, as well as the purposes and implementing processes of these methods. Lastly, the empirical study indicated the issues relating to the help-desk service of Facility Superintendent team at the case organization. In fact, elements inside the help-desk service were clarified through the results of the researches. Problems would be investigated and the researcher applied the service design tools to recommend the resolutions. At the end, the summary of the outcomes was stated in the conclusion.

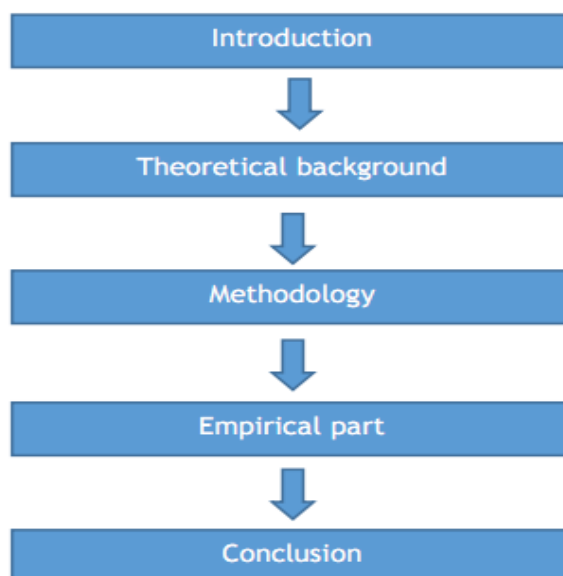


Figure 1: Structure of the thesis

## 2 Theoretical background

### 2.1 Facility management

According International Facility Management Association, facility management is “the practice of co-ordinating people and the work of an organization into the physical workplace” and “an integrated management process that considers people, process and place in an organization context”. (Wiggins 2012, 5) Moreover, there are a great deal of definitions. Besides, depending on the viewpoints of separate organizations and their core business, they selected the relevant definition of facility management. For instance, Strathclyde Centre for Facility Management defines “Facilities Management is a process by which an organization delivers and sustains agree support levels with a quality environment to provide full values in use to meet strategic objectives”. (Wiggins 2012, 5) Generally, facility management includes activities relating to delivering and monitoring supporting services, maintaining the efficiency of working environment for employees and customers in order to support the main objectives of an organization. (Wiggins 2012, 6)

Furthermore, facility management is contributed by three main elements including people, process and place which are illustrated on the Figure 2. “People” is considered as the social environment including human interactions, relationships, cooperation. The physical workplace reflected on a “Place” circle mentions about space, real estate, property, facilities. “Process” indicates the virtual environment in which technical process, computerized programs

are applied in the working activities. Facility management is operated in the environment integrated by these components to obtain the supporting purposes. (Teichollz 2001, 1.3)

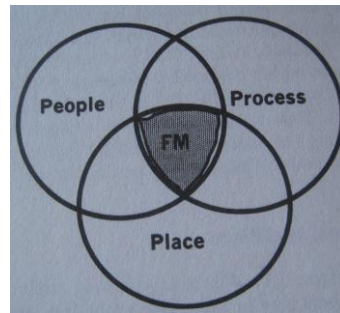


Figure 2: Facility management Components (Teicholz 2001, 1.4)

In addition, it is important to understand the roles of facility management in an organization. According to Wiggins (2012, 9-11), basing on the core business, an organization establishes activities and processes to achieve their objectives. These activities are divided into three levels of strategy, tactic, and operation which are illustrated on the Figure 3. Besides primary activities, the organization also has the supporting services. Facility management indicates its supporting functions through three levels of the organization.

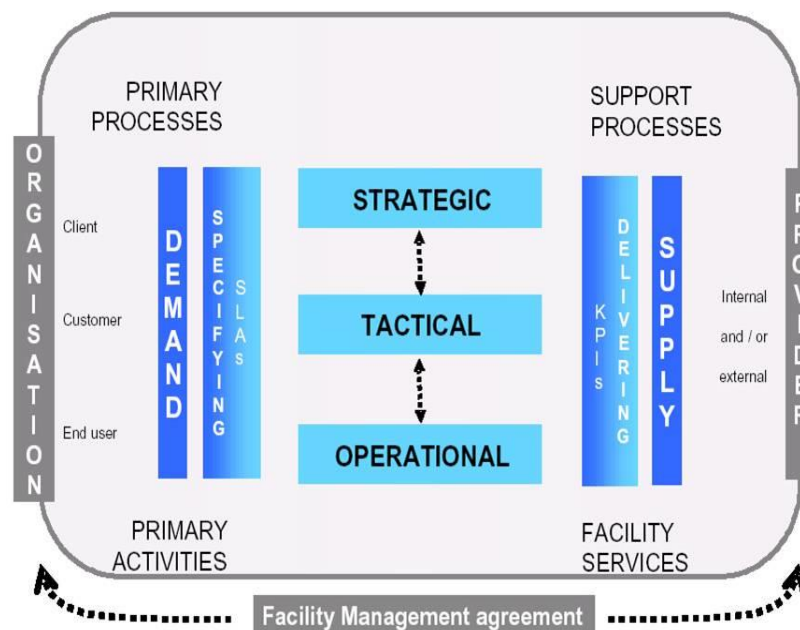


Figure 3: Three levels of facility management (Graves et al)

At the strategic level, policy and facility management direction are conducted. Facility managers estimate hazards and risks at the workplaces and then make the strategy to prevent them. Key performance indicators are supervised. The influence of facility and workspace on core processes are analysed and controlled. Besides, the managers have to manage the coop-

eration between the organization and important partners, clients, external associations and so on. (Wiggins 2012, 11) The next level is tactical level in which implementing plans are conducted to obtain strategic objectives. In facts, those plans relate to calculating and preparing budgets, supervising contracts and relevant projects, examining legal rules and regulations. Moreover, monitoring teamwork and dealing with outsourcing service providers are also involved. (Wiggins 2012, 11) Operational level is the last one in which supporting services are provided to customers, and the operation processes are examined. Service requests and fault reports are perceived through the help-desk or call centre. Supervising outsource services is one of the tasks of facility management staffs. Besides, feedback and expectation of customers are recognized and aggregated at this level. (Wiggins 2012, 11)

## 2.2 Facility management organizational models

There is not a common structure for all of the organizations because each of them establishes their own objectives, processes, resources and development path. Facility management is regarded as a segment of an organization so its standards are constructed differently in different organizations, even though facility management always aims to the same purpose of supporting the core business. (Teicholz 2001, 1.12) This section mentions about facility management models in public and private sector, single and multiple sites, owned and leased space.

Firstly, public sectors include state, institutions or associations belonged to government, public educational organizations. They are funded by government and their core business is not making profit. The procurement process are followed the legal regulations to ensure the equal opportunity for service providers. The facility managers in this sector must not ignore legal rules if they plan for the changes. However, these public sectors stabilizes and are well-organized. (Teicholz 2001, 1.13)

On the other hand, private organizations are not as stable as the public ones. They have plans to reduce cost but remain the productivity. Besides, facility management department serves both customers working inside the organization and external customers. In this sector, the efficiency is more important than the fairness. (Teicholz 2001, 1.13)

Next, organizations that organize their own facility management team and place in one site operate the single site model. (Barrett & Finch 2014, 15) The organizations may include one or several buildings but all of them are applied the similar standards. An organization in this site prefers to hire a few facility management employees who can be responsible for a variety of tasks. (Teicholz 2001, 1.14)



However, the multiple sites model is more complex. If the organizations divide their premises in the same area or city, the top facility management will locate in the main site and facility staffs in operational level are distributed to sub-sites. But if their sites are placed on different areas, they will have establish the roles of management and operation for each site. (Teicholz 2001, 1.14)

Lastly, facility management models in owned and leased spaces have different requirements. If the organizations locate in the owned property, the maintenance plan bases on the life cycle of their property. The organizations with their owned premises tend to hire more employees to undertake a great number of facility services than the organizations with leased spaces do. The facility managers delivering services in the leased spaces should have the leasing management skills. (Teicholz 2001, 1.14)

### 2.3 Facility management help-desk service

According to Wiggins (2012, 470), the activities of the help-desk are answering inquires, resolving problems and requests emerging when customers operate the facilities supporting for their working tasks. Moreover, the productivity of the core business will reduce if the equipment and the property do not performed as they expected or if the failures occur in the process of service delivery. However, according to Friday and Cotts (1995, 26), in the world of facility management, even though the faults happen, the satisfaction of customers can be maintained. Facility management team cannot always avoid the problems but they can recover from those problems. The facility management help-desk is responsible for the task of failure recovery that ensures the efficiency of facilities and supporting services. (Wiggins 2012, 470)

The help-desk serves both internal customers and the organization. Furthermore, the help-desk can be helpful to measure the value of facilities and recognize needs of customers. (Wiggins 2012, 470-471)

Several organizations combine the functions of facility management, human resource, and information technology into one help-desk team while others separate them. A help-desk team regularly encounters the requests such as failure reports, space reservation, office supplies, supports on transporting and posting, audio visual devices, pest control, and complaints on facility services. (Wiggins 2012, 471)

The author Wiggins (2012, 472) indicated the necessary features of managing the help-desk relating to workload identification, skills of a help-desk team, problems clarification and communication ways. Firstly, a facility manager should identify the amount of requests and

problems to organize a help-desk team. Estimating workload is also essential to define the adequate number of staffs for responding requests and restoring failures. In order to obtain the purposes, the help-desk team needs to know how to distribute the tasks among team members during the working time. Secondly, management skills are vital. A team leader of the help-desk should identify the primary skills that team members need. It also necessary to decide on what extent of faults that the team should recover by them-self before transferring to the experts because that costs high and even consume a long time. Thirdly, one of the features of managing the help-desk is to define the types of problems. In some organization, the roles of a help-desk team may not include cleaning, maintenance, and security and so on. Therefore in those cases, the help-desk team needs to clarify the types of requests or faults to send them to correct people responsible for handling. The next feature is communication method which should allow customers to contact the help-desk promptly and conveniently. The both stakeholders can communicate by phone, email, messages, internal network and informative ways. (Wiggins 2012, 472)

#### 2.4 Customer perspective on facility services

In order to obtain the full understanding of customers, facility service providers need to identify their customer groups, as well as customer expectations and perceptions.

Facility management services serve both internal and external customers of an organization. (Wiggins 2012, 264). According to Friday and Cotts (1995, 9), a facility manager need to recognize several types of customer groups. Internal customers are considered as the main customer groups dividing into three types. The first one is the customer group by organization unit that involve the staffs working in all of the departments of an organization such as public relation and marketing, human resource, production, finance and so on. Next, there may be the case that an organization is separated into different buildings with different facility management teams. Each team will consider people using the facility services in the building unit as their main customers. Moreover, customers are recognized as the population in a business unit established by an organization. Besides, facility manager must remember to consider the personnel of a facility management team as the customers of facility services. (Friday & Cotts 1995, 10) Furthermore, customers from outside have an impact on the process of facility services. Each individual in the primary customer groups has her or his own guests who facility management team must regard as external customers. The team should clarify the impact of these visitors on delivering the services to the core customers. Outsourcing service providers should be also treated as customers and allowed to share the similar value as facility management team. (Friday & Cotts 1995, 11) Besides, according to Friday and Cotts (1995, 12), facilities them-selves are customers. When getting faults, these facilities require the facility

management team to repair. Even the team can foresee the need of facilities by calculating their life cycle and apply the appropriate maintenance plans.

After defining the customers, facility manager should understand the expectation and perception of their customers. First of all, customers have their own criteria of expectations. When evaluating a service, customers base on six criteria. They need to know the objective of a service which is the initial criteria so that they adjudicate if the service is valuable for them or not. Besides, two next criteria are the levels of necessity and importance of a service. If customers find the service essential, they will increase their expectation. Moreover, customers have own ways to examine the result of the service which is considered as an expectation criteria. They also reveal their criteria on the cost of the service. Furthermore, with the same price, some customers find it low-cost because they receive a good customer care whereas the price is high for the customers who do not find the service useful for them. The factor of risk also impacts on customer evaluation. If customers realize the existence of risk during the service delivery process, their judgment of the service value will be low. (Friday & Cotts 1995, 12-14) The second issue relating to expectation is the group of factors influencing the standards of customer expectation. The initial affect is the customer expectation before they use a service. For example, if a service provider in space designing provides a space with characteristics different than the anticipation of the individuals in the customer organization, the customers' measurement of service value will be affected significantly. The next influence is the customers' perception of the previous service that contributes on the expectation of the following service of the organization. Furthermore, comparison between one target service and other services is a method customers tend to use for evaluating service quality. The service provider should recognize the customers' standards of the comparison. Besides, the expectation of customers is contributed by the experiences of other customers. The previous study indicated that a customer could share their dissatisfaction to more than eleven people, but tell to only two or three people about their satisfaction. (Friday & Cotts 1995, 15-16)

About the customer perception of a service, the research of Zeitheml, Parasuraman and Berry (1990) indicated that the perception was impacted dramatically if customers had problems in using the same service in the past. Therefore, service should be delivered with high quality that pleases customer at the first time. However, in the case that problem was inevitable, organization could remain the customer perception if they recovered the problems satisfactorily. However, if they failed at the second time of delivering the service, the customer may not want to use the service again. Moreover, the study demonstrated that the higher perception of customers was, the more customers suggested the service to other people in their social network. (Zeitheml et al 1990, 30-33)

A facility manager should acknowledge about the combination of customer expectation and perception. According to Friday and Cotts (1995, 18-22), if what customers received is lower than what they expect, customers are dissatisfied about the service. Customer satisfaction will be obtained if customer perception and expectation are adequate. The service will delight the customers by increasing the customer perception so that it is higher than expectation.

Furthermore, the gap between customer expectation and customer perception determines the quality of a service. There are five gaps in service quality. In fact, the differences between expectation and perception of customer mentioned above is the last gap of service quality which is also contributed by four lower gaps. This paragraph is concentrated on simple descriptions and reasons of these four gaps, as well as the relationships among the five gaps. (Wiggins 2012, 468) The first gap is occurred when customer expectation perceived by organization is different to what customers expect virtually. Managers designing the service strategy do not understand the customers because of inappropriate research to investigate customer expectation, ineffective communication between managers and service users. Besides, it is an enormous barrier in recognizing customer expectation if there is a great distance between top management and employees who contact with customers. (Zeitheml et al 1990, 51-70) The second one relates to the standards of the service which does not meet the service provider's perception of customer expectation. There are several reasons causing this gap. Quality of service is not firmly guaranteed by the top management level. In some companies, services are personalized and specific so that it is difficult to establish the standards in delivering services. Eventually, it will cause the problem that the quality of service did not obtain the customer expectation. Moreover, the missing of objectives in service delivery is one of the reasons of this gap. (Zeitheml et al 1990, 71-88) In the third gap, managers had the understanding of customers, but the performance of the service is not similar with standards established to achieve customer expectations. The gap is contributed by unproductive management system, ineffective working condition or working task distribution. (Zeitheml et al 1990, 89-114) The fourth gap happens if the organization cannot provide the features of service quality they promised in advertisements or in other media. In fact, some service providers had a tendency of advertising the level of quality that they have not yet obtained. Besides, the gap is derived from an inefficient cooperation among departments inside an organization. (Zeitheml et al 1990, 115-134)

The figure 4 shows the combination among service quality gaps. In order to develop the satisfaction of customers, the fifth gap needs to be excluded by removing four lower gaps. (Zeitheml et al 1990, 46) In fact, the two first gaps can be eliminated if managers can recognize customer expectations and then establish the accordant service standards. If a service provider improves the management system and empowers personnel, the third gap can be

closed. The fourth gap can be removed when the service provider's commitments of service quality on media are equal with the service specifications delivered to customers. (Zeitheml et al 1990, 132)

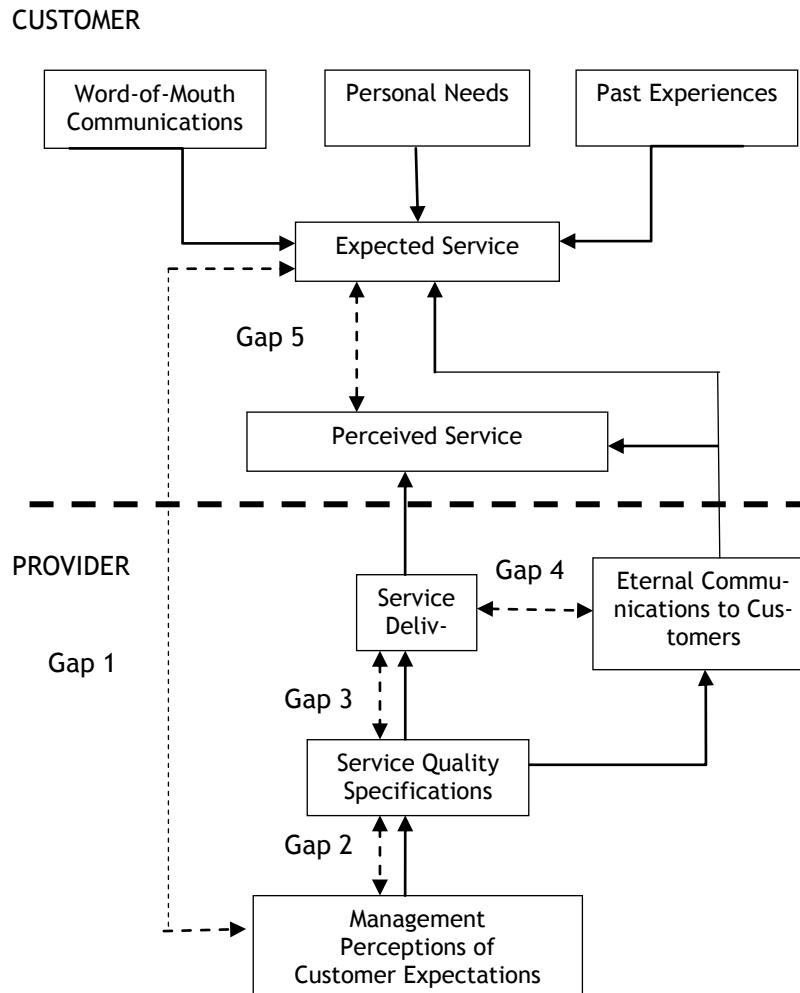


Figure 4: Conceptual Model of service quality (Zeitheml et al 1990, 46)

### 3 Methodology

The thesis includes a categories of research methods and tools dividing into three types of research such as, quantitative research, qualitative research and service design tools. The table 1 indicates the name of research methods and tools, as well as the time-line that they were applied.

Timeline (Year 2014)	Research methods	
Weeks 10 - 19	Observation	
Week 13 - 14	Service request record	
Week 16	Unstructured interviews with Facility Superintendent team	Customer journey maps
Week 17	Co-co Cosmos workshop	
Weeks 18-19	Semi structured -interviews with teachers	Questionnaires
Week 19	Idea Interview	Expert evaluation
Week 20	SWOP analysis	Value Hypothesis

Table 1: Timeline of research methods and tools in the thesis

### 3.1 Quantitative research

According to author Dawson (2006, 15), “Quantitative research generates statistics through the use of large-scale survey research”. Moreover, in a quantitative research, it is important to considered sampling, validity and reliability of methods. According Dawson (2006, 48), sampling is a technique of selecting an amount of customer or interested items representative for the research population. Besides, validity is considered as the level of efficiency that the measurement contributes to what it is intended to measure. (Webb 2002, 148). As report by Webb (2002, 148), reliability is the degree of stability of the outcomes that the measurement provides. In the thesis, one service record and one questionnaire were applied. Excel software was utilized for analysing data from the record and questionnaires.

First of all, to familiarize with the topic of the thesis, the researcher recorded daily service requests that Superintendent team received from customers. In fact, there had not been any previous research or report about the help-desk service of the team before the researcher conducted the record. The purpose of the record was to investigate the facility management help-desk service of Superintendents team, as well as to identify the services valuable to customers and the services need to be improved. The researcher used the electronic questionnaire form to record five main elements of daily customer requests including types of service requests, customer groups, the methods that customers contacted to Superintendents team, time that those inquires were conducted, and consumed time to complete each inquires. (Appendix 3) The target customer groups were students, permanent teachers and staffs working at the campus, visiting lecturers and other visitors. The record was conducted at the Laurea

Leppävaara campus in the two weeks, from the beginning of week 13 to the end of week 14, in the year 2014.

The customers' request record was operated in two normal weeks when there were not many special and occasional events occurring. The results of the record could generate the common characteristics of the Help-desk service of the Superintendent team. Besides, about the record project, it did not cover all of the customer requests, because the recording time was around 8 hours per day averagely while the Facility Superintendents served customers around a half of a day. It was considered as a limitation of the research. However, all of the member working in the team participated in the research by informing the researcher about services that they delivered to customers. Therefore the record included majority of customer orders. It was properly reliable.

The second research method in this filed was the questionnaire utilized for investigating customers' satisfaction of using audio-visual devices in classrooms and the technical support of Facility Superintendent team. The type of questionnaire was open response-option which combined an open-closed question type and specific options that the respondents could select. (Altinay & Paraskevas 2008, 125) The questionnaires were delivered to the customers in the interviews described on the section below. The questionnaire included five questions. Two questions were about quality and adequate amount of audio-visual devices while another question related to the instruction method on using devices. The rest of questions were about the technical support of Facility Superintendent team. (Appendix 4)

The questionnaire was valid because the content of all questions contributed to the purpose of the research. Besides, the sample of the research was a consistency of 9 permanent teachers working at Laurea Leppävaara campus where around 80 teachers totally have worked. (List of teachers at Laurea Leppävaara campus) It meant that approximately 11.25% of total amount of teachers were interviewed. In fact, the questionnaires of the thesis were distributed to 9 teachers and all of them responded. Thus, the response rate was 100%.

### 3.2 Qualitative research

Qualitative research aims to analyse actions, attitude, acquirement and insights of customers. The amount of participants is regularly smaller than it is in the quantitative research. (Dawson 2006, 15) In the thesis, observation, unstructured interviews and semi-structured interviews were implemented.

Observation is a technique of collecting information. The users observes behaviours, interactions of customers and listened to their conversation and even talking with them. (Altinay &

Paraskevas 2008, 117). The participant observation was utilized for the research in thesis. According to Dawson (2006, 33), in the participant observation, the observers involves themselves in the environment or community of the customers. Observers spends a long time working or living with the people they have observed so that they can understand particularly the attitudes, relationships of the customers. (Dawson 2006, 34). As an intern working in the Facility Superintendents in two and a half months, the researcher had observed working process, activities, and behaviours of Superintendents team as well as their interactions with customers.

In an unstructured interview, the researcher asks less than five questions to interviewees who could have answered and expressed their experiences without limitations. (Altinay & Paraskevas 2008, 112). Three members of the Superintendent team were asked from one to four questions about requests relating to audio-visual devices. The purpose of the interviews was to identify the teachers' technical problems that needed to be supported by the team. Depending on the context, the researcher delivered questions about the common technical cases, reasons of the technical problems, instruction methods for teachers on using devices, and personal comments of the team members on this issue.

A semi-structured interview combines both structured and unstructured interviews. It is necessary to prepare a list of questions before the interviews. During the interviews, the researcher must be flexible to motivate the conversation. It aims to explore not only customers' experiences, but also new aspects and innovation ideas. (Altinay & Paraskevas 2008, 113) This type of interview was applied to investigate how teachers used audio-visual device in classrooms at Laurea Leppävaara campus. Customers were 9 teachers working permanently at the campus. There were five topics of the interview including interviewees' familiar devices, technical problems, and their reactions if getting the problems and their opinions on technical support service of Facility Superintendents and instruction papers. (Appendix 1) Beside these primary topics, teachers were encouraged to reveal their insights. Therefore, the researcher obtained the extra results of teachers' psychology, their expectations and suggestions for improvement. In the end of the interview, teachers were asked to completed questionnaires mentioned on the upper section. Voice recorder was utilized for recording all of the interviews.

### 3.3 Service design tools

Service design tools are communication tools applied to support the process of service innovation. The tools are selected according to design objectives, process, methods and participants of the project. (Service design tools. Accessed on 16 May 2014 ) These tools are also involved in the qualitative research. However, the purpose of these tools in the thesis was to support



the thinking process of service design which was not similar to the purpose of qualitative research methods mentioned above. Hence, they were displayed in a separate section. The categories of the service design tools utilizing in the thesis have included service customer journey maps, SWOP analysis, expert evaluation, and idea interview, value hypothesis, and CoCo Cosmos tool.

The first tool, a customer journey map, describes movements or activities of a participant with a visual structure in which touch points of a participant is considered as components to direct a journey. (Stickdorn & Scheneidar 2012, 158) The thesis researcher utilized this tool for exploring the delivery process of technical support service of Superintendent team. The main character in the journey map was a Superintendent team member.

Next, in order to discover innovation concepts for improving the audio-visual technology support of the Superintendents, the researcher applied the tool called Idea interview. The Superintendent team members and their supervisor were the interviewees. According to Moritz (2005, 213), Idea interview is used for discussing with experts or customers to provide the researcher further ideas and understandings for the initial ideas.

Besides, SWOT analysis tool allows the users to define the strength, weakness, opportunities and threats of a target issue. (Moritz 2005, 223). As stated by Moritz (2005, 219), the expert evaluation is the tool that experts examine the usefulness of an idea so that researchers can notify the disadvantages and advantages. The researcher selected the most appropriate resolution among many rising ideas for developing audio-visual technology of the Superintendent team with these both tools. SWOT analysis tool also contributed on the design process of the service concerning to providing computer rooms. The experts in the thesis case were the most skilled team members of the Superintendents who helped to inspect the feasibility of a resolution of instructing teachers to use devices.

Moreover, according to Kumar (2013, 208), with a Value hypothesis tool, the users can determine values of upcoming offers and it also supports to develop ideas. The tool was applied to clarify values of the resolutions for improving audio-visual technology of the Superintendent team. The final outcomes would provide the directions for exploring detailed contents of each resolution. To construct the value hypothesis picture, the researcher initially divided options relating customer group, customers' expectations, solutions, and benefits of solutions into four columns, and then drew the connections among the potential options.

Furthermore, according to Keränen (2013, CoCo Cosmos, 1) "CoCo Cosmos is a communication tool. It uses cards as a visual methods of blueprinting a service setting." The tool involves a categories of cards representing for stakeholders, action, location and outcomes of a service.

Beside, a game board and pens with three different colours are used for connecting cards and noting customers' comments. (Keränen 2013, CoCo Cosmos, 1-5) The thesis owner utilized the CoCo Cosmos tool in a workshop which was organized in the Well-being Afternoon event at Laurea Leppävaara campus on the 16<sup>th</sup> of April 2014. The workshop aimed to investigate how students used the services at Laurea Leppävaara campus. The list of issues that the research expected to investigate is shown below.

- What did the services in Laurea Leppävaara look like from students' point of view?
- How did students use the services?
- What were feedback of students on these services?
- Insights opinion of students

The help-desk service of Facility Superintendent team contributed on the whole service system at the campus. In the workshop, students also revealed their experiences and feedback on using services of the team, as well as facilities managed by the team. Participants were required to create a setting of services they used at the campus, and then expressed their feedback on specifications of those services. The facilitator of the workshop asked further question relating the aspects mentioned in the participants' setting. The participants of the workshop were twelve students including four Finnish and eight international students. They were divided into 5 groups to create the pictures of services they used at the campus by using the CoCo Cosmos tool. The researcher was the facilitator of the workshop who presented the topic, instructed participants to use the tool for expressing their experiences, and also asked students the relevant questions. Conversations in the workshop were recorded by a voice recorder.

Lastly, the researcher also followed the steps of service design (SD) to research issues and finally recommended ideas for developing the help-desk service. According the author Moritz (2005, 123), there are six steps of service design process including SD understanding, SD thinking, SD generating, SD filtering, SD explaining, SD realizing. The objective of the first phase, SD understanding, is to investigate the current situation of the service. In the service design thinking phase, all of the information and feedback are transferred into insights. The determinations of this phase will establish the direction for resolutions of the next one. Users can discover innovation ideas during the SD generating phase and then examine them to select the most appropriate one in the SD filtering phase. In the next stage, SD explaining, users have clarified concepts, combined ideas and presented them with visual illustration. In the last phase, after promoting innovations into the market, service designer has realized inspect the effectiveness through customers' experiences. (Moritz 2005, 123-147) However, the thesis did not include the last stage of SD realizing which is used for investigating customers' feedback after the innovation is promoted in a real market.

#### 4 The empirical study

Vertically, the structure of the empirical part is considered as an up-side-down pyramid. The broad and general information was presented on the upper segments, and the deeper and more specific researches were clarified on the lower segments. The structure of the empirical part was summarized on the figure 5.

Horizontally, the empirical part included three broad segments. The first one mentioned about the main function of the help-desk service of Facility Superintendents. The second one related to the general information of the service such as customer groups, service requests, communication channels. These information were derived from the data of the customer service record. Moreover, two remarkable types of customers' requests were investigated. For each of them, the researcher had further researches on selected noticeable specifications of service. Finally, suggestions for improving these specifications of service would be explored.

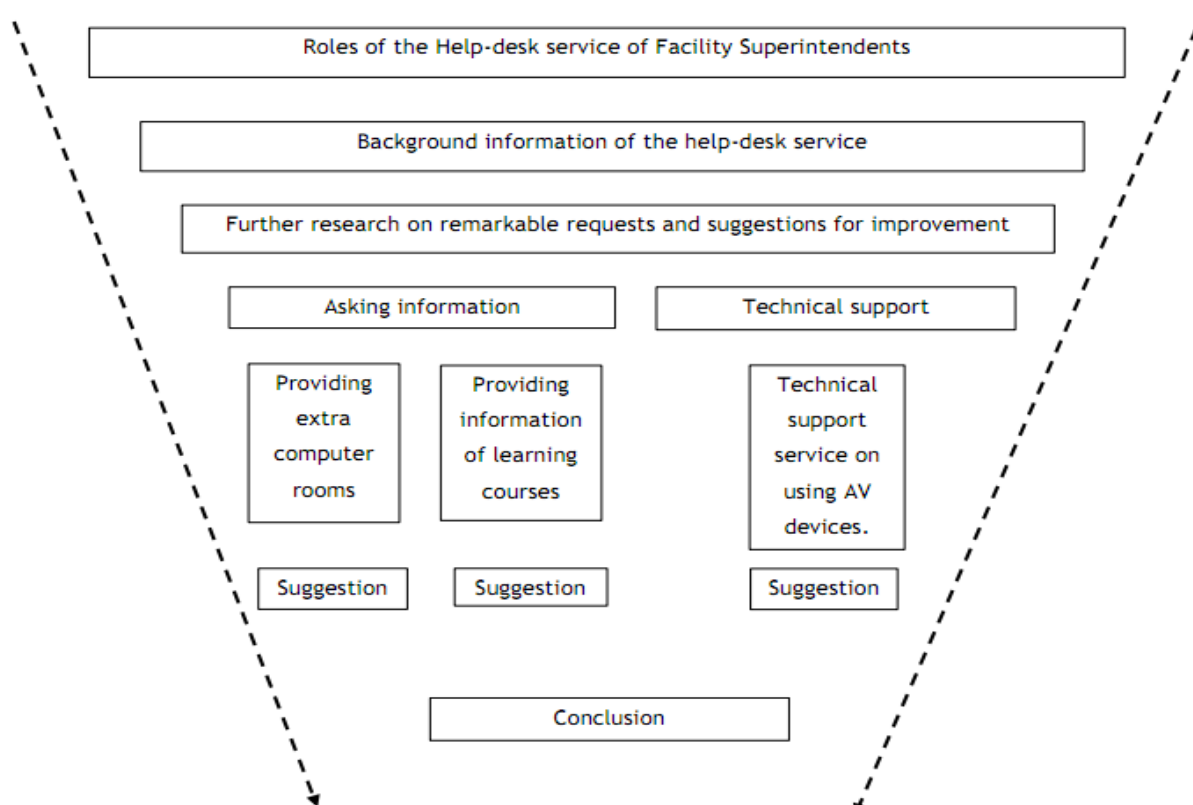


Figure 5: Structure of the empirical part

#### 4.1 Role of Help-desk service of Facility Superintendents

The primary function of the help-desk service was to ensure the productivity of the working environment for all of the customers. In fact, the Superintendent team received and implemented requests of the customers who utilized facilities at the campus. The team also restored the mistakes or problems of facilities reported by customers or discovered by the team members. Moreover, in order to maintain effective workplace, the team examined the usefulness of facilities to realize the customers' demands of these property. Therefore, they could identify the resolutions to supply customers' needs.

Customers of the help-desk service of the Facility Superintendents were identified by campus unit. The help-desk service was delivered to internal customers and external customers of Laurea Leppävaara unit. The internal customers were teachers and staffs working in the functional departments at the campus and students studying there. External customers included outside teachers and outside staffs, visitors of internal customers, outsourcing service providers' employees, and others guests. The Figure 6 presents the customers of the help-desk service.

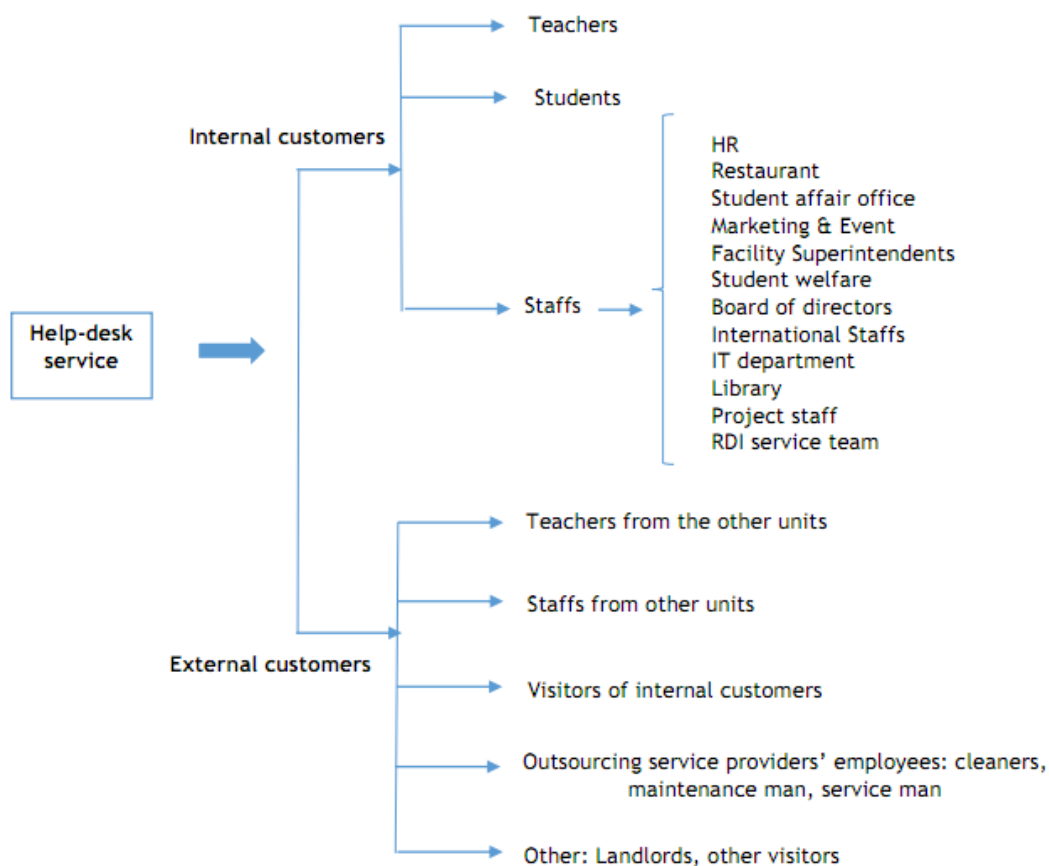


Figure 6: Customers of Help-desk service of Facility Superintendents

## 4.2 Customer group and their needs

Results of the record showed that in two weeks, generally Facility Superintendents responded 534 daily customer requests and spent more than 1500 minutes to complete them. Diagrams and charts were generated to clarify value of the service relating to rate of customer groups, and comparison among service requests, the density of requests by time, rate of communication methods.

First of all, Chart 1 presented that the majority of the service requests were required by student group with 56% of total number of customers while the group of teacher and staff had 37% of the total number. Besides, the percentage of the visitor group with 14,6% was less than two first group but more than the group of outside teacher and outside staff which kept the lowest rate with 0,6%. However, Chart 2 indicated that the Superintendent team spent around 750 minutes, almost the same amount of time for both student group and the group of teacher and staff. The consumed time for the visitor groups was also higher than spending time for the group of outside teacher and staff. In the conclusion, it can be said that both of student group and teacher-staff group were the most important customer groups. Even though students asked more requests than teachers and staffs but spending time for both groups were nearly equal.

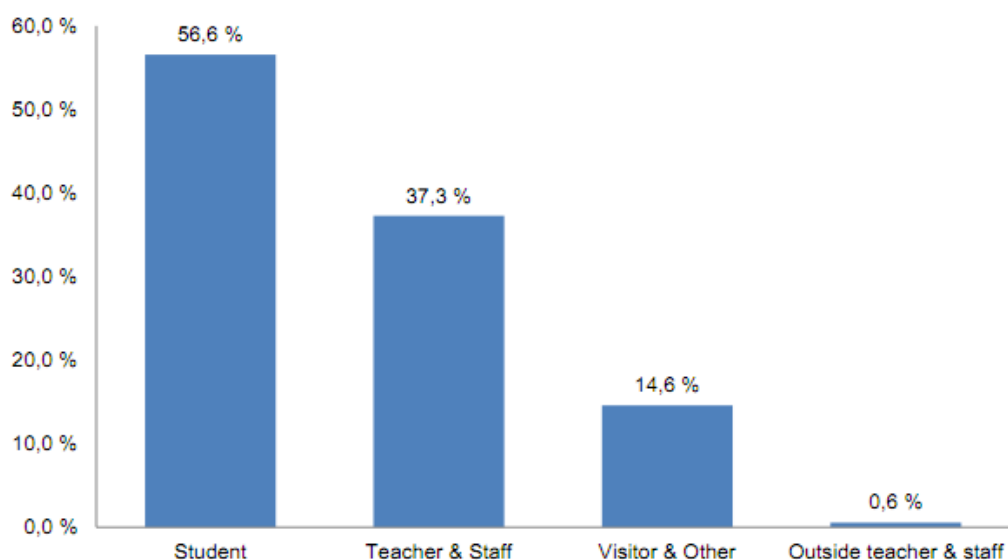


Chart 1: Rate of customer groups

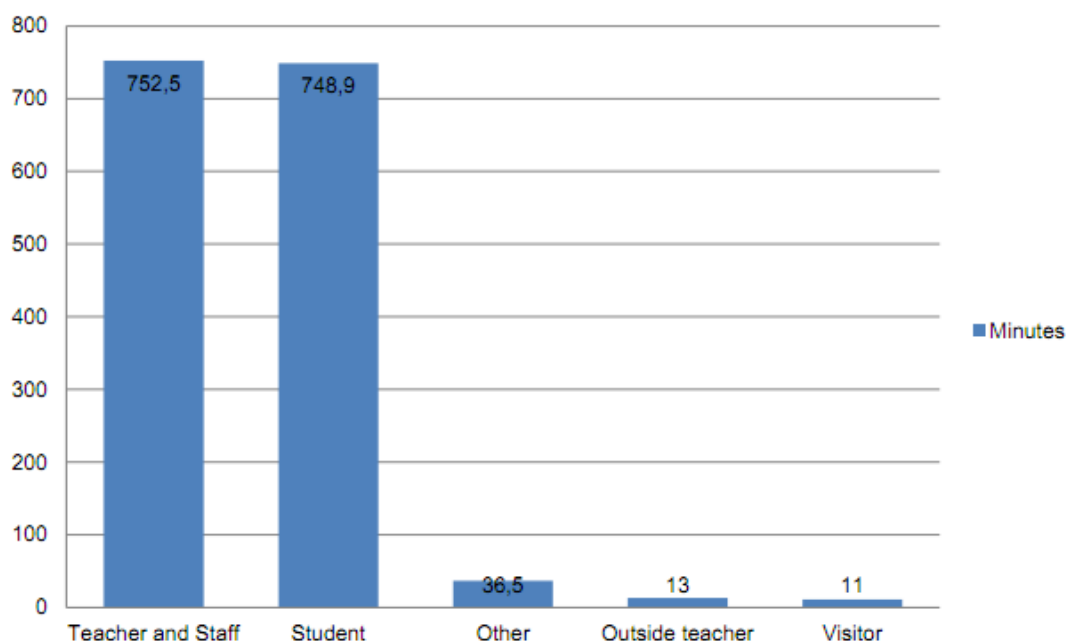


Chart 2: Consumed time for customer groups

Secondly, the record included the categories of requests that Superintendents team received from customers during daily working time. The purpose of analysis was to recognize the valuable types of requests to customers. There was the collation between types of requests and their consumed time. The data also indicated the figures of the requests of student group and teacher-staff group, the primary groups of the help-desk service. The Table 2 presented the customer requests divided into 19 types relating asking information and counselling, technical support, facility supplies, space reservation, opening door, maintenance, announcement on campus website, and other assistance. One type of the request called "Other" may cause the equivocation for the readers. Other types of request were considered as the daily service requests but they were not conducted frequently. For example, a teacher had Superintendents copy their materials, or a student asked a Superintendents to call and inform IT help desk about her situation, or a worker of Superintendents helped a staff to prepare a cloth hanger in a classroom.

Service requests	
1	Ask information
2	Equipment loan& return
3	Guidance to use device, machines
4	Inform the broken facility
5	Key borrow & return
6	Lost and Found service
7	Technical support
8	Office supplies
9	Open door
10	Room reservation
11	Storage service
12	Parking licence
13	Supporting in the event
14	Class cancellation
15	Install equipment
16	Business gifts
17	Pick up print paper with the receipt
18	Laurea Live
19	Other

Table 2: List of service requests recorded

The figure of the Chart 3 indicated that the highest number of the service request was asking information and guidance with 102 items which was followed by the request of room reservation and request of opening doors with 86 items and 75 items respectively. There were 48 requests of borrowing equipment. Next, request of technical support and other types of request had the same amount with 31 items for each of them. Besides, there were lowest figures of customer needs on parking license, equipment installation, assistance in events and updating information on Laurea website. Besides, the consumed time for customer requests was included in the chart. It was reasonable that the request of asking information gained the greatest amount of spending time. However, technical support and other types of requests had the third and the second highest amount of consumed time even though they were rated as the fifth largest amount of the requests. It implied that both types of requirement had a higher spending time per request than the others.

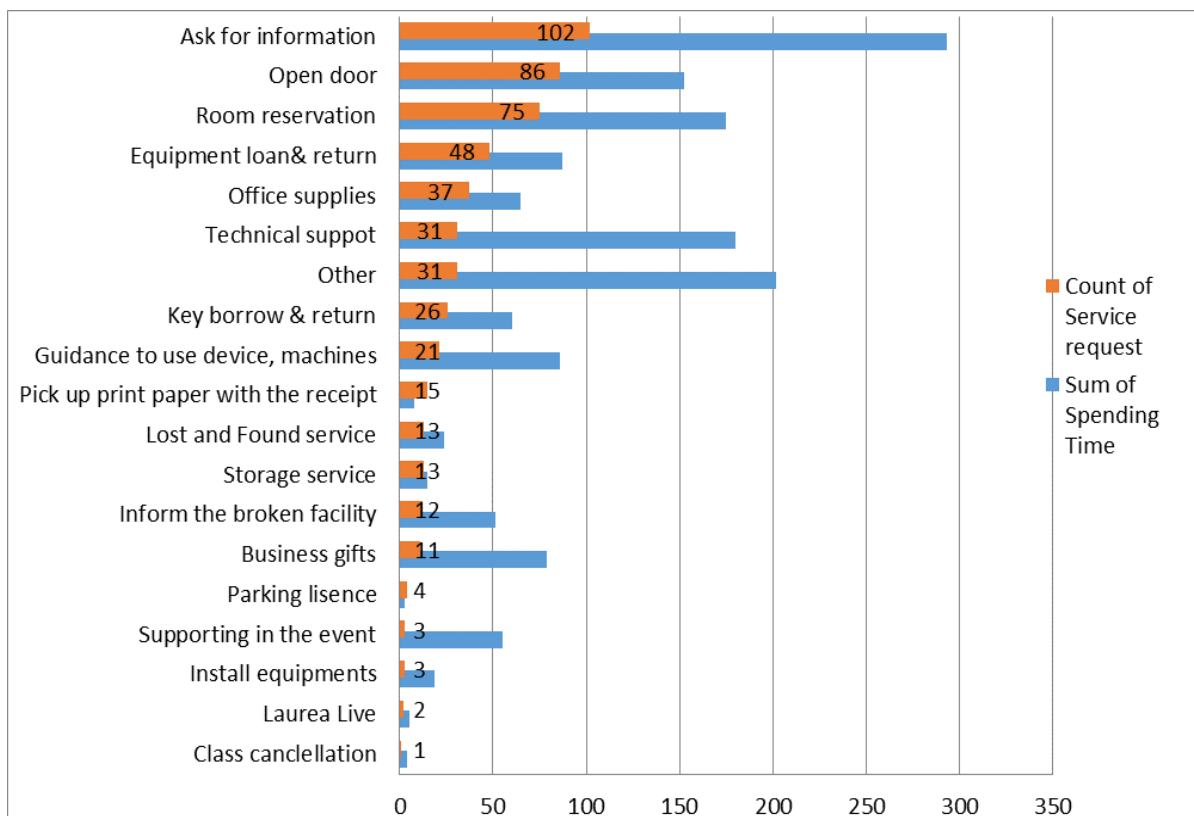


Chart 3: Service requests and consumed time

Chart 4 showed the categories of requests asked by students. Opening door gain 76 requests which was the highest amount. Room reservation and asking information were the second and the third important demands of students with 60 requests and 57 requests respectively. And equipment loan was the next request which also gained the high amount comparing to the other requests in the chart. Moreover, students needed not ask issues relating to announces on Laurea website, parking licence, class cancellation and business gift and supporting in events. On the other hand, Chart 5 proved that the amount of asking information request, with 28 requests, was highest for the group of teacher and staff. Technical support and office supplies were the following most popular requests. The needs of teacher and staff were broader than students because only one request of picking up papers was absent. In short, asking information was the most common requests that customers asked the Superintendent team. However, depending on the customer groups, the most valuable requests were different. For students, opening door was the most popular request while teacher and staff considered the request of asking information as the most common one.



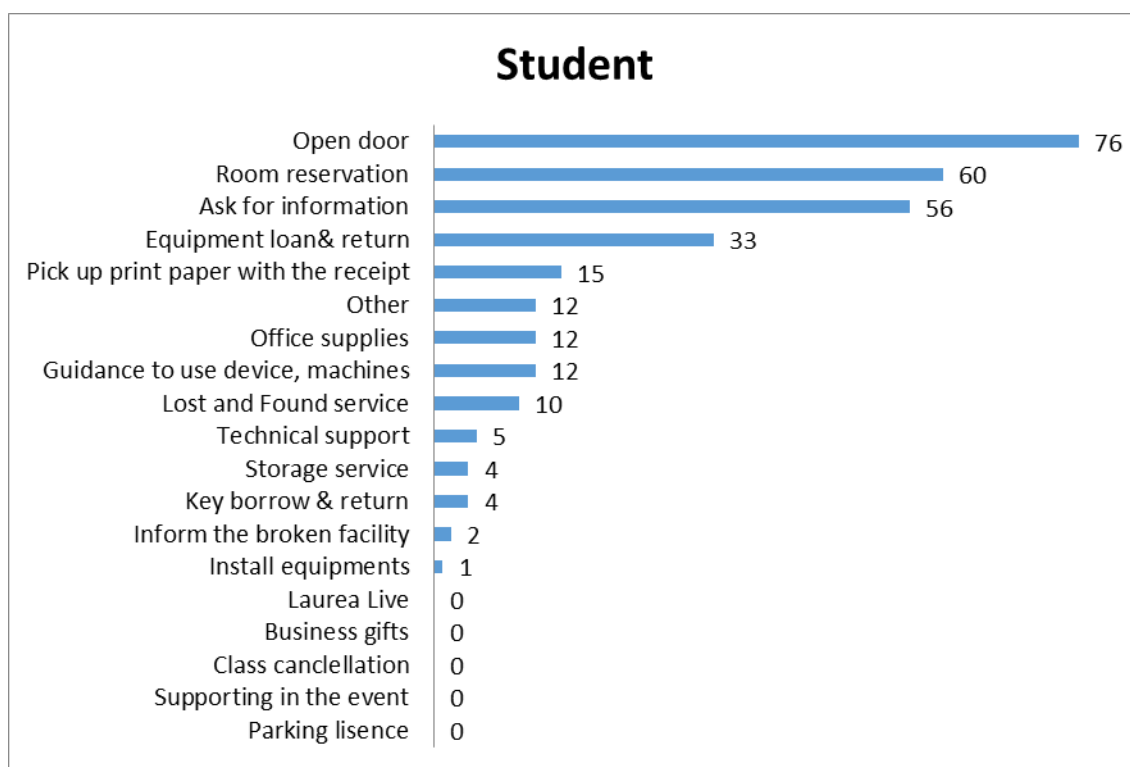


Chart 4: Requests asked by students

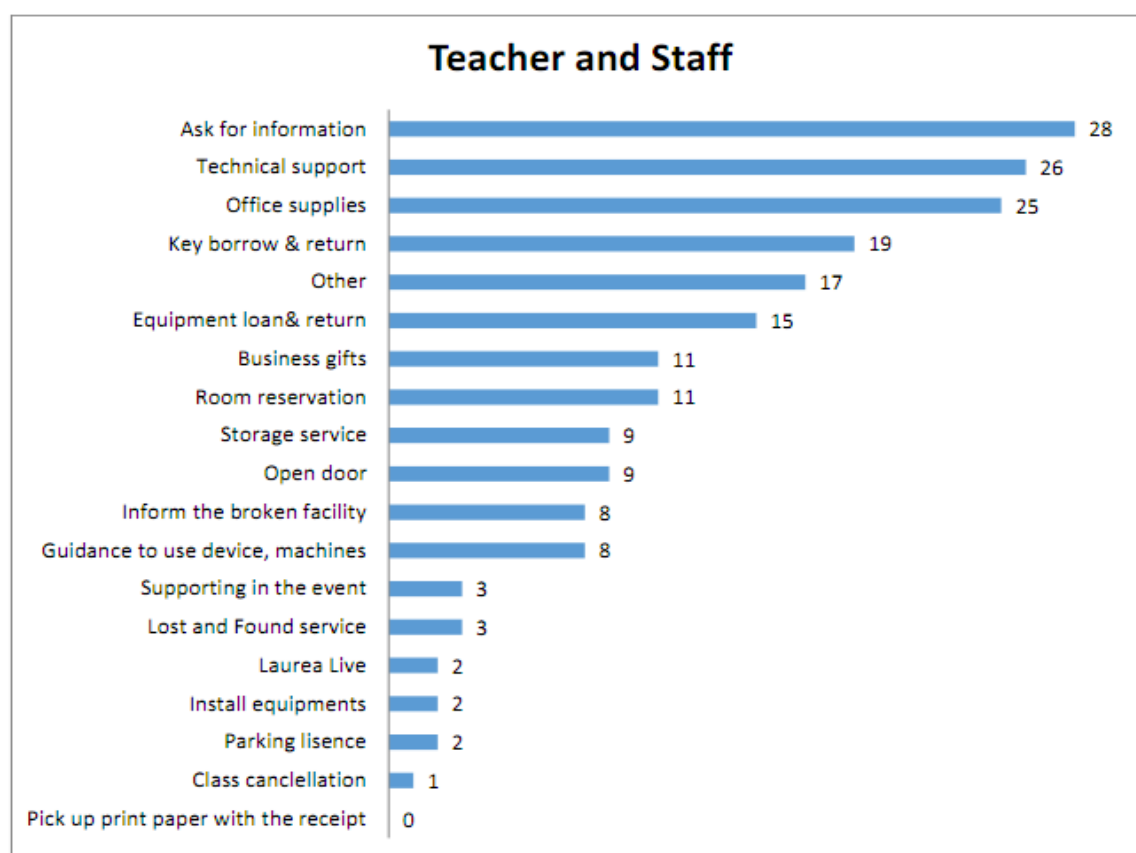
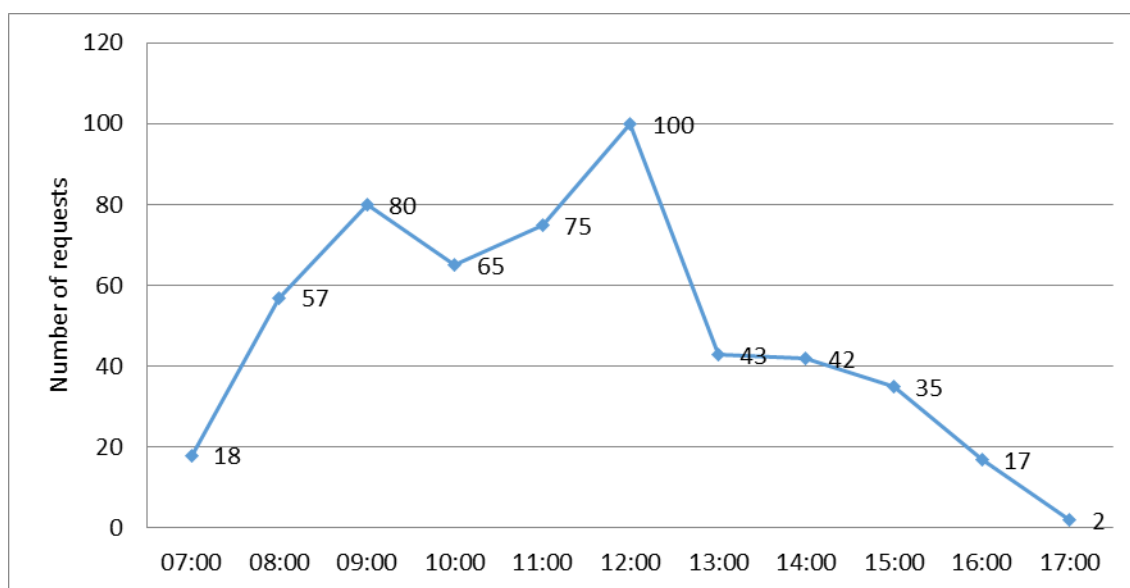


Chart 5: Requests asked by teachers and staffs

Thirdly, time of customers' request were recorded. The figure in the Graph 1 revealed the density of the requests during working time. Starting from the opening time of the building around 7 a.m, the amount of request increased rapidly until reaching the peak with 80 requests at 9 a.m. The amount slightly reduced from 10 a.m to 11 a.m. After that, it went up to the highest point of 100 requests at 12 a.m. However, the number of request decreased dramatically after noon and continued going down until to the closing time. In short, the most crowded time for perceiving customers' requests were around 12 a.m and around 9 a.m during a working day. In fact, the amount of request at noon was higher than it was in the morning.



Graph 1: Density of requests during the working time

Collected data also allowed the researcher to clarify specific requests asked at the rush time. Chart 6 showed eight types of request at 9 a.m and 12 a.m. These types of request were selected according to their popularity over the all types of the request on the list. It can be seen that opening door was the most common request at both of the rush time. At these time, the inquire of opning door was followed by the requests of room reservation and asking information. Besides, the demand of technical support, key borrowing, and guidance on using machines at 9 a.m were higher than they were at 12 a.m. On the contrary, equipment loan and other types of request at 12 a.m were asked more than they were in the morning. Particularly, the need of office supplies was absent at 9 a.m but it was significantly high at noon.

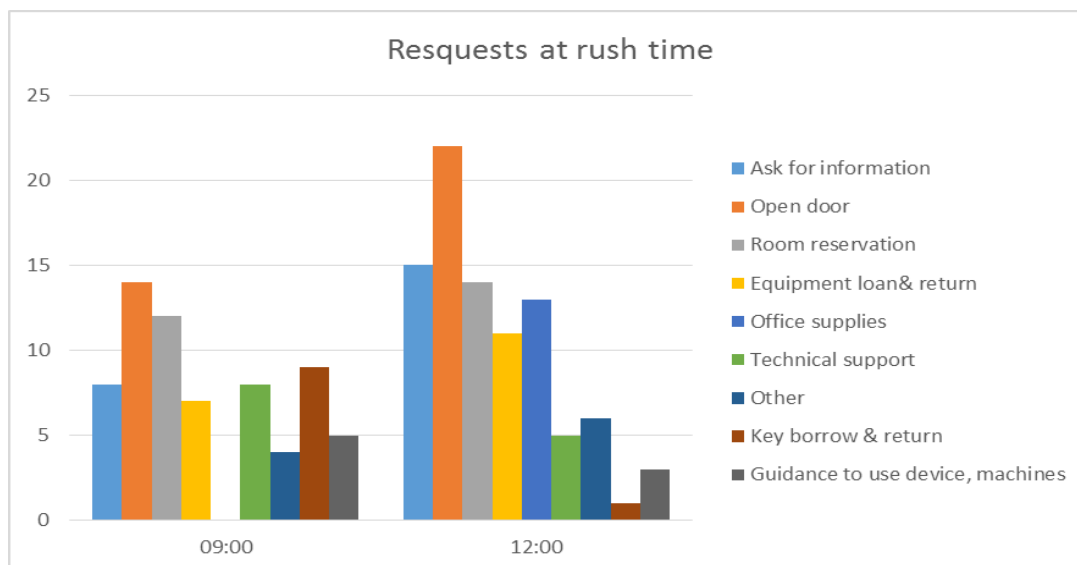


Chart 6: Popular requests at the rush time

Lastly, there was variety communication methods and channels during the delivering process of the help-desk service. The Superintendent team received customers' requests by 6 ways including face-to-face contact in the office, group email, personal email, group phone call, personal phone call and other in which customers has occasionally met a team member around the building and sent the request at the same time. The figures of these communication methods were revealed on the Chart 7. Approximately 90% of customers came to Superintendents office to make service requests. Email and phone were used to communicate with customers but they had much less percentages with around 5% for email and 1.5% for phone. Besides, 2.5% of customers met the Superintendent team members occasionally around the building and required the services at the same time. During the recording time, personal call of the team members were not used for contacting with customers.

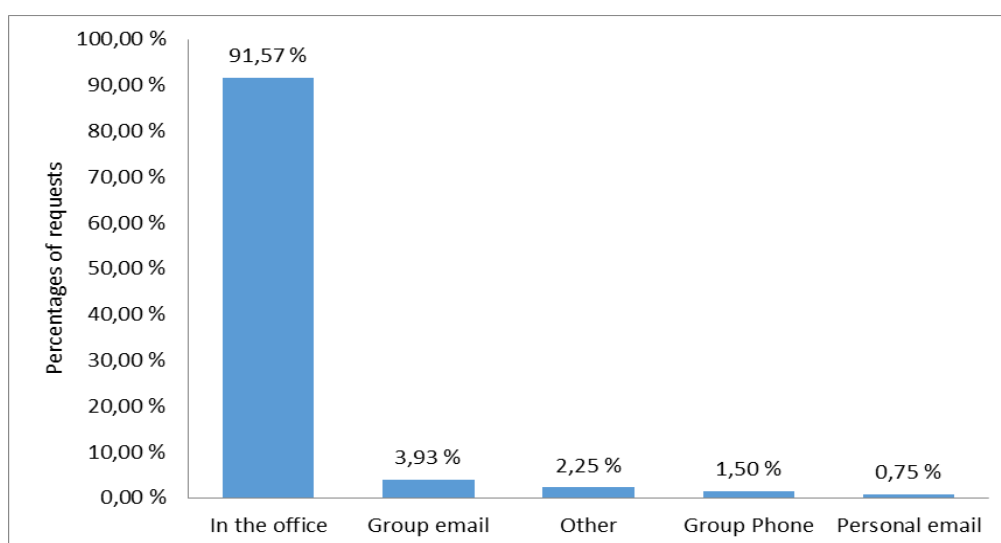


Chart 7: Ways to contact

#### 4.3 Further research on remarkable requests and suggestions for improvement

The remarkable types of request were asking information and technical support. There were reasons to select these issues for the further research. Asking information was considered as the most popular request that Superintendents team received. Besides, for teachers and staffs, technical support was the second most important one following the request of asking information. Moreover, when the analysis of the record above was reported to Facility Superintendent team, they expressed their interest in two requests and would like to see the further researches about them.

The data recorded in two weeks also revealed the list of information that customers required. The list is shown on the table 3.

Customer group	Information	Number of requests
Student	ATK room (computer room)	13
	Schedule of classroom	8
	Course - information in Soleops	2
	Schedule of the teacher	2
	Location of rooms, facility	8
	Office of teacher and staff	6
	Information in building to prepare for their project	6
	Guidance to get student's locker, buy print paper, mail delivery, location to set up device	4
	Opening time/ working time of Superintendents, library	2
	Other	5
Teacher and staff	Check room reservation	2
	Copy machine Code/ computer password	5
	Classroom of the teacher/course whom they need to contact	3
	Other staff's contact	2
	Location of printer, equipment, other facility	4
	How to loan equipment	1
	Information for their project	5
	Events, incidents happened at the campus	2
	Working time of Superintendent - how to contact in evening	2
Other	3	
Visitor	Staff's contact	4
	Location of the classroom, office, course, exam	8
	Location of facility	3
	Internet password, visitor key	1

	other	2
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Table 3: List of information required by customers

The researcher noticed a special request relating to providing information about study units. Actually, there was another department, Student Affairs office, specialized in providing information about study units. But analysis of data indicated that some students visited Superintendents team to ask about these information. One member from the Superintendents also confirmed about this issue that sometimes students came to his office to ask about the content of the study units. To examine the reasons of this issue, the researcher used Coco workshop described in the chapter of Methodology to investigate students' experiences. Exceeding the researcher's expectation, the result of the workshop not only was useful for the function of providing information about study units, but also revealed another problem in the function of providing extra computer rooms of Facility Superintendents.

Technical support included activities that the Superintendent team supported customers to operate the technical facilities such as audio-visual devices, copy machines, printers and so on. In this field, the request relating to audio-visual devices in classroom was most remarkable because of several reasons. The audio-visual devices were essential equipment in teaching nowadays. At the campus, there were a wide range of types of devices installed in all of the classrooms. It may cause many troubles if the users did not know how to operate. Particularly, during a class session when the time was restricted, if technical problems of these devices emerged, teachers may be annoyed and even stressful, and that would cause the negative effects on the quality of the class session.

Generally, the further researches would concentrate on three issues. The first one related to the function providing information about study units. The second one mentioned about the function of providing extra computer rooms. The target customer group in two first issues were students. The last issue focused on the resource of the Superintendents called the audio-visual (AV) technology support in classrooms. The primary customers of AV technology support were teachers.

#### 4.3.1 Providing information about study units

In order to investigate issue relating to providing information about study units, the researcher initially discovered the reasons that students came to Facility Superintendents to ask for information about study units which should be provided by Student Affairs Office, and then indicated recommendations to resolve the problems.

In the workshop, some participants were asked to clarify which types of information they could require from Student Affairs Office and from Superintendents team. They answered that Student Affairs Office responded information relating to studying courses, and students' benefits. The Superintendent team was responsible for information relating to facilities and space. It meant these students understood the main role of two service providers. Therefore, it can be stated that although students acknowledged the main functions of two departments, they still would like to ask the information of learning course from Facility Superintendents, the department did not specialize for this service. The result of the workshop demonstrated that the problems were not derived from marketing or advertising the service.

Moreover, two groups of students in the workshop mentioned about Student Affairs Office and stated their feedback on the service of this department. As a result, the department received positive feedback including high quality service, helpful staffs and always available service. (Appendix 5) Therefore, the performance of the Student Affairs Office was not the reason.

The researcher argued that there was a service quality gap emerging in this issue. It was the first gap that service manager did not completely understand customers' expectation.

Back to the data that the researcher recorded in two weeks, there were two students visiting the Facility Superintendents to ask for information about study units. When observing these cases, the researcher explored two reasons these students would like to request this type of information from the Superintendent team. In the first case, the student firstly wanted to know about the timetable and location of the course, but she was confused about the information of the course. So she expected to ask about both the schedule of the study unit and the information of the study unit from the Superintendent team. The team had to spend over ten minutes for completing the request because they did not have the good skills to determine the basic information of the study unit that the student mentioned about. In the second case, the student selected the Superintendent team because their office was closer to her than Student Affairs Office. The student asked about the course information in Sole-opt, the online management site for course information. She did not know how to access and how to explore the information she needed. The Superintendent team guided her to access the site but they did not know how to discover the required information. The service took them around 4 minutes. Generally, students expected to ask for the schedule of the course and the information of the course at the same place, same time and preferred to ask from the place which has been easier and quicker to access.

In order to provide information about study unit to students more effectively, the researcher suggested two resolutions. Firstly, the Superintendents team should be trained to know how

to define to basic information about study units. Students tended to asked timetable and location of the study unit even though they did not ensure the name or code of their study units or even their teachers' name. The schedule of the courses was managed by Superintendent team, but their skills of identifying the study unit was inadequate. Hence, if they can be instructed the ways to identify the basic information about study units, they will provide the timetable of the study units more efficiently and rapidly.

Secondly, the Student Affairs Office should bring their services closer to their customers. The location of this department is quite far from the centre of the building. The office is not able to move, but they can move their services. The researcher suggests that they sometimes organize temporary station in the lobby to deliver their services.

#### 4.3.2 Providing extra computer rooms

In order to investigate the function of providing extra computer rooms to students, the researcher followed service design (SD) stages mentioned on the chapter of Methodology. The summary of the design process of this function was presented on the table 4.

Stage	Research method/ tool	Outcome
<b>SD Understanding</b>	Recorded data CoCo Cosmos tool	High demand of ATK Ineffective service advertising
<b>SD Thinking</b>		Should marketing the service Using communication channels
<b>SD Generating</b>	Idea Interview	Inform the extra computer room in Live Inform the extra computer room on TV A Notice to advertise the service in Comms Develop a software Inform the extra computer room in front of the Superintendent office
<b>SD Filtering</b>	SWOT analysis	Set a notice to advertise the service in Comms
<b>SD Explaining</b>		Design the notice and implement

Table 4: Summary of design process of the function - Providing extra computer room

The first stage called SD Understanding revealed the students' needs and the current situation of the function of providing extra computer room. The data from table 3 above showed that many students asked for opening extra computer rooms. Actually, there was a many permanent computers defaulted only for students including three computer rooms and several com-

puters in library. However, students stated they needed other computer rooms because those permanent computer rooms were full or noisy. Moreover, relevant information relating to computer rooms was obtained from the results of the workshop in which Coco Cosmos tool was used for collecting students' feedback. One team of participants expressed that the amount of computers at the campus was inadequate, especially in the beginning and the end of a month. Particularly, they did not know that they can ask Superintendents team to open other available computer rooms if they demanded. After this outcome of the research, the researcher and the Superintendent team examined the channel of Laurea website where students were noticed officially that they can ask for extra computer rooms from the Superintendents. It showed that the relevant notice was not clear on the site for the Finnish student group. Even the notice was absent on the site for the international student group. It demonstrated that the function of providing extra computer rooms was not advertised effectively.

In the next stage, SD Thinking, the researcher explored the insights of these background information above. It can be determined that the students' demand of using computers was high, so providing more computers was necessary. However, the function was not noticed by all of the potential customers. Therefore, Facility Superintendents should advertise the function of providing extra computer rooms to students. The communication channels can be used in this cases. The communicating channels at the campus included Laurea Live website, Info-television, advertising boards in the lobby, notice board in Comms which was the primary computer room for students using.

The Idea Interview tool was applied on the third stage, SD Generating. The researcher recommended a concept of advertise the service through communication channels and suggested the idea of informing extra computer room in Laurea Live website. Moreover, the researcher presented the concepts and the first idea to the Superintendent team and the team supervisor and then ask them for the comments and ideas. Finally, many ideas and innovation were collected. The category of those suggestions was below.

- Inform the extra computer room in Live every day
- Inform the extra computer room on info- television every day
- Set a notice to advertise the service in Comms
- Have a software in which students can see the available computer room, available computers in those rooms
- Inform the extra computer room in front of the Superintendent office

SD Filtering was the following stage in which the most appropriate solutions was selected. SWOT analysis tool was used to investigate advantages and disadvantages of suggestions which were shown on the table 5. The first three ideas showed their weakness that the offer-



ing could be properly difficult to attain the students' attention. These solutions could help to direct student to the available computer room, however this benefit was not necessary because students easily visited and asked from the Superintendent team. Next, the idea with the highest strength was developing a software which students could examine the free computer rooms. However the threat of this idea was highest because operating a new software would take a long time and great amount of money. The most appropriate resolution was setting a notice to advertise this function in Comms. It was the most effective way to promote the function to the students who needed computers. It implied that the function will be easily reach the potential customers. Moreover, it was not a dramatic weakness that the offering did not guide students directly to the available computer room. Students who needed computers could contact with Superintendent team to ask for that room. The Superintendent office was opened almost all the time during working time. At the end, advertising the function with the notice in Comms was the final selection.

Ideas	Strength	Weakness	Opportunity	Threat
Inform extra computers room in Laurea Live	Guide students directly to the extra computer room	Students may not notice because of many information on Live website		Must be updated everyday
Inform extra computers room in info -TV	Guide students directly to the extra computer room	Students may not notice because many information on the screen and slow slide rolling	TV in the lobby - central of the building	Difficult to update every day because TV is managed by other department
Inform the extra computer room on the small board in front of the Superintendent office	Guide students directly to the extra computer room	Students may not notice	Easy to update  The office is in the lobby - central of the building	Must be update everyday
Notice to advertise in Comms	Information easily reach students who have the need	Not guide the students directly to extra computer room	Easy and quick to conduct	

Develop a software to manage computer rooms	Guide students directly to the extra computer room  Students can check and select computers rooms online		Easy to update	Spend long time for developing the software  Expensive
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Table 5: SWOT analysis of solutions for providing extra computer room

In the last stage, SD Explaining, the researcher designed a notice paper with the content: “If Comms is full, you can ask for free computer rooms from Facility Superintendent (Room 181)” in English and Finnish. The notice was designed with the official form of Laurea Leppävaara. (Appendix 2) After it was approved by the Superintendents team, the researcher contacted with the staff responsible for Comms to find the space for installing the notice. Eventually, the notice was installed on the door of Comms where easily attracted students.

#### 4.3.3 Audio-visual technology support

The researcher followed the service design (SD) process to explore the AV technology support resource of the Superintendent team. The outcomes and the research methods of five phases were summarized on the table 6.

Stage	Research method/ tool	Outcome
<b>SD Understanding</b>	Observation Interviews Questionnaires Customer journey maps	Main activities of AV technology support Customers’ experiences in using AV devices Delivery process of AV technology support resource of Superintendents
<b>SD Thinking</b>		Support of Superintendents is important and reliable Teachers ask the supporting team to fix technical problem which they can manage by themselves Instruction methods should be improve Customers need more device
<b>SD Generating</b>	Idea Interview tool Interviews	No more instructions, only the phone number of Superintendents teams

		Refill instruction papers in the classrooms Buy more devices Instructions on Laurea Live website Colour label for cables and port Instruction video
<b>SD Filtering</b>	Expert evaluation SWOT analysis	Available support from Superintendents team Label 2 types of cables and connecting ports with colours Install Instruction papers in classroom with document cameras Promote an Instruction video Post instruction on Laurea website Buy and equip changing slide remote in every rooms Buy and equip attached microphone in large rooms
<b>SD Explaining</b>	Value Hypothesis	Develop the solution, more detailed content for solution

Table 6: Design process of the AV technology support resource of Facility Superintendents

First of all, SD Understanding phase aimed to identify main activities of the AV technology support, to investigate customers' experiences on using the resource, and to analyse delivery process of AV technology support of Superintendent team.

According to Superintendents team (interview Week 16, 2014), the system of audio-visual devices involved computers, overhead projectors, document-cameras, laptops, loudspeakers, microphones, televisions, connection cables, and remotes. Facility Superintendent team was responsible for all types of technical devices with the exception of hard-ware and soft-ware of computers, network connection which were managed by IT help-desk. Besides, as the result of the observation, the researcher realized that two main activities of AV technology support resource were responding requests and instructing teachers to use the devices. Initially, teachers asked technical requests to the Superintendent team when they had problems or difficulties in operating the devices. Table 7 indicated the list of popular technical problems which were revealed by the Superintendent team members (interview Week 16, 2014) the reasons could be divided into three groups. The first one was that teachers did not select the right functions of the devices. The second one was that cables were not connected. And some times, electricity caused technical problems of the device. Moreover, the setting of de-

vice systems was varied from classrooms. Computer and projector were equipped in most of the classrooms, but only several rooms were equipped with document cameras or loudspeakers. Besides, the settings of the document cameras was not the same because they came from different brands. (Superintendents team members, 2014)

Cases need technical support	Causes/ Reasons
Devices not activate (Projectors, document cameras, loudspeaker,	<ul style="list-style-type: none"> <li>- The setting of sharing pictures between computer and projector were changed on the computer.</li> <li>- The connected document camera has not yet opened</li> <li>- The right button for exchanging the pictures on computer with the picture on document camera was not selected</li> <li>- Teacher totally did not know how to activate the whole system</li> <li>- The right button for activating the loudspeaker was not selected</li> <li>- The cable between projector and document camera was not connected</li> <li>- The cable between computer and document camera was not connected</li> <li>- All of the cables were not connected</li> <li>- The cable of loudspeakers was not connected</li> <li>- Problems of electricity</li> <li>- Internet wireless was not connected</li> </ul>
Laptop installation	<ul style="list-style-type: none"> <li>- Teacher did not know which cables could connect to laptop</li> <li>- The laptop connection cable was installed, but the right button was not pressed.</li> </ul>

Table 7: Technical problems of audio- visual device

Another activity relating to the AV technology support was to instruct teachers to use the devices. There were two main ways to guide teachers to use the device systems including face-to-face guidance and instruction papers. In fact, a Superintendent team member guided a teacher to use the device whenever he came to help the teacher to operate it. Therefore, the teacher could learn and manage by her-self or him-self if she or he encountered with the same case in the next time. Moreover, in classrooms, the instruction papers on operating device system were stuck on the tables and next to the equipment. However, not all of the rooms were equipped the instruction papers and several of these papers were missing in rooms where they were supposed to locate.

Moreover, in order to investigate customers' experiences on using the device, the researcher interviewed and delivered questionnaires to nine teachers about how they used these devices. The Appendix 6 summarized feedback that teachers provided in the interviews. The col-

lected data from the semi-structure interviews and questionnaires were analysed and presented by seven topics below:

- Background information of the customers
- Technical problems
- Problem solving behaviours
- Instruction methods on using the devices
- Psychological aspects
- Customers' needs
- Customer satisfaction on elements of the AV technology support

Background information was first topic. There were 3 male interviewees and 6 female interviewees. They were teachers working at the campus. They also revealed audio-visual devices which are necessary in their class sessions. All of them needed computers and projectors. However, only 4 over 9 people required document-cameras and there was the same amount of people need loudspeakers. Only a third of interviewees usually used laptops when teaching. Secondly, the researcher recorded technical problems of these lecturers. The majority of participants, 7 over 9 lecturers, faced with unconnected cables. In their opinions, after the previous users had removed cables from the original place to connect those cables with their own device, they did not plug them back. Moreover, 5 over 9 teachers confused about operating the system of devices if a document-camera was installed in the device system in classrooms. Besides, a third of them did not ensure how to connect laptop with the device system. Some of teachers found it difficult to activate loudspeakers in classrooms, as well as using televisions in meeting rooms and the touch pad in auditorium. Thirdly, interviewees have been suggested to show their reactions when they had technical problems. Particularly, all of them asked for help from Superintendent team if they could not manage the problems. Most of the interviewees tried to fix the problems by themselves before finding the supporting team. 2 over 9 people prepared and inspected devices before starting their class sessions. Besides, one teacher did not want to touch the device but ran as quick as possible to Superintendent team to ask for assistance if he encountered a technical problem. The next topic related to customers' feedback on using instruction methods. The instruction papers were not noticed by 4 teachers. Besides, 3 teachers expressed that the instruction papers were useful, clear and easy to follow. On the contrary, the instruction papers were not considered as the useful methods by two teachers. According to one teacher, she did not have enough time to focus on instruction paper in classroom, and even these papers usually covered by other files, documents, thus she has not found them useful. Another teacher revealed that the instruction papers were not helpful in the cases he needed to connect a laptop with the device system. Most of teachers could learn how to operate the devices when they were guided directly from the Superintendents team. However, one teacher could not remember how to connect the

cables even though the supporting team has guided her many times. Another one presented that her colleague instructed her several times to operate the document-camera but she not remember.

Teachers' expectation was the following topic discussed in the interviews. Their needs on using audio-visual devices were:

- Want to know how to connect laptop with the systems
- Visual instructions on connecting laptop with the system on Laurea Live
- Simple instruction for TV in the rooms
- Instruction paper should be in all of the classroom, even for the projector
- Instructions on connecting and using loudspeaker
- The instruction paper should be more visible in classroom
- Prefer that someone guides her how to use, then she can learn
- Teacher who connected laptop with cable should plug the cable back into the previous port after using them
- Need more document cameras, slide changing remote available in classrooms, attached microphone in large classrooms
- Document camera shouldn't be defaulted in classroom

Furthermore, teachers especially expressed their feelings when they must face with the technical problems during the class sessions. Teachers were disturbed and stressful if the devices did not activated as they expected. They were confused how to apply the instructions at those moments. Several of them also may forget how to operate the devices after a long time they did not use them.

The last topic was the satisfaction of nine customers on AV technology support in classrooms shown on the Chart 8. The scale-measurement included five levels starting from "poor" as 1 to "excellent" as 5. As a result, teachers rated the usefulness of the instruction papers with around 3.7 that was in the between of satisfactory and "very good" level. It also was the same points for quality of devices in classroom. Besides, the quantity of device was thought to be adequate with 4.3. Finally, quality of technical support and technical skill of Facility Superintendent team gained highest score with 4.7. It meant that teachers were delighted with two these issues.

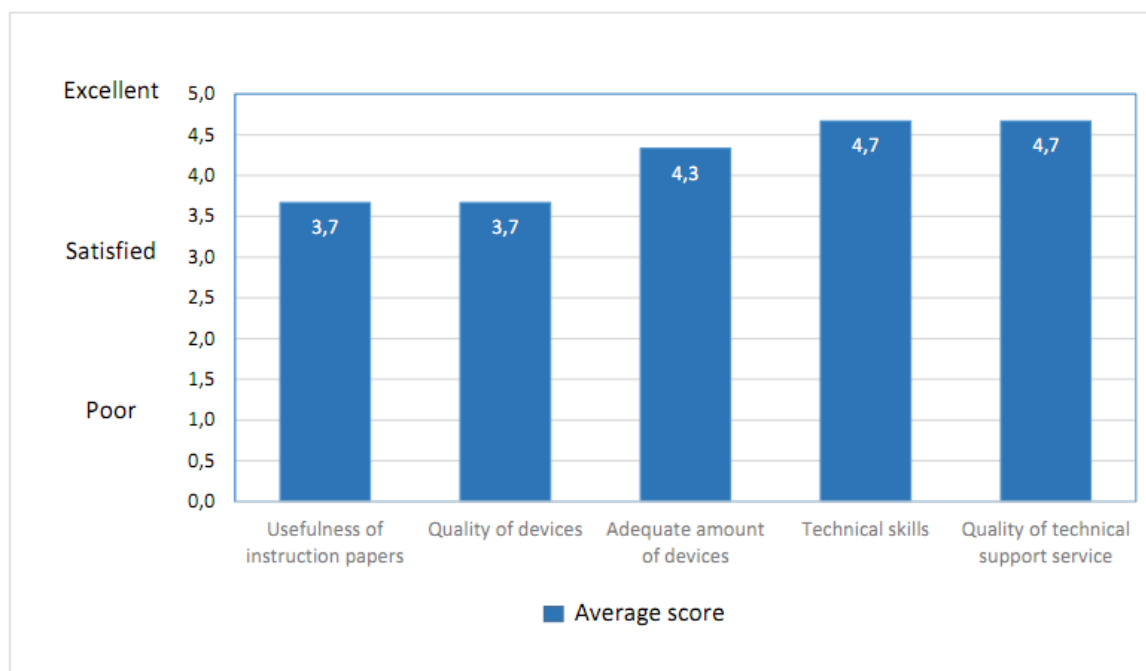
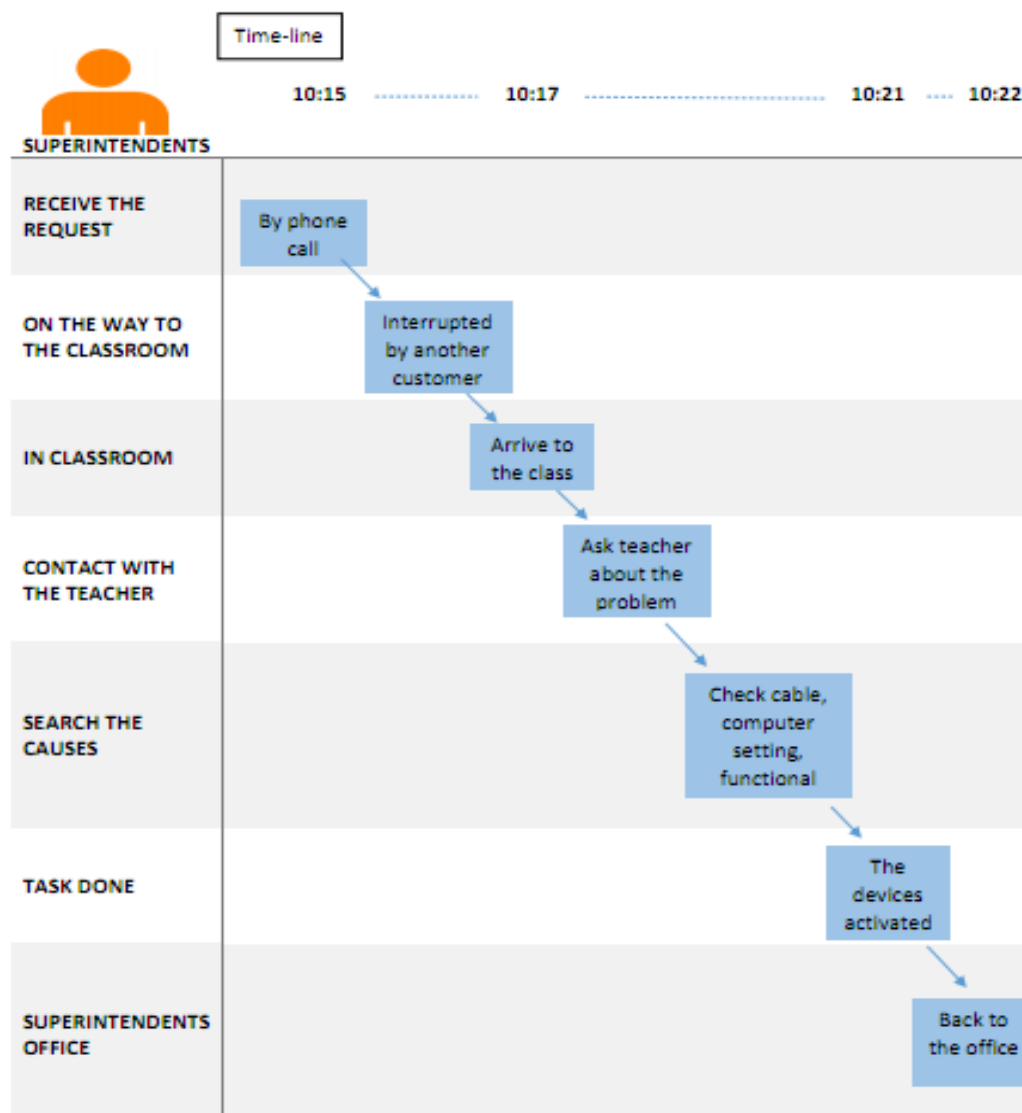


Chart 8: Customers' satisfaction on using device and AV technology support

Beside the results from observation, interviews and questionnaires, customer journey maps were applied to impress the delivery process of Superintendents team when they supported teachers to operate the devices. A Superintendents team member was the main character in the maps. Two cases were selected to describe by journey maps.

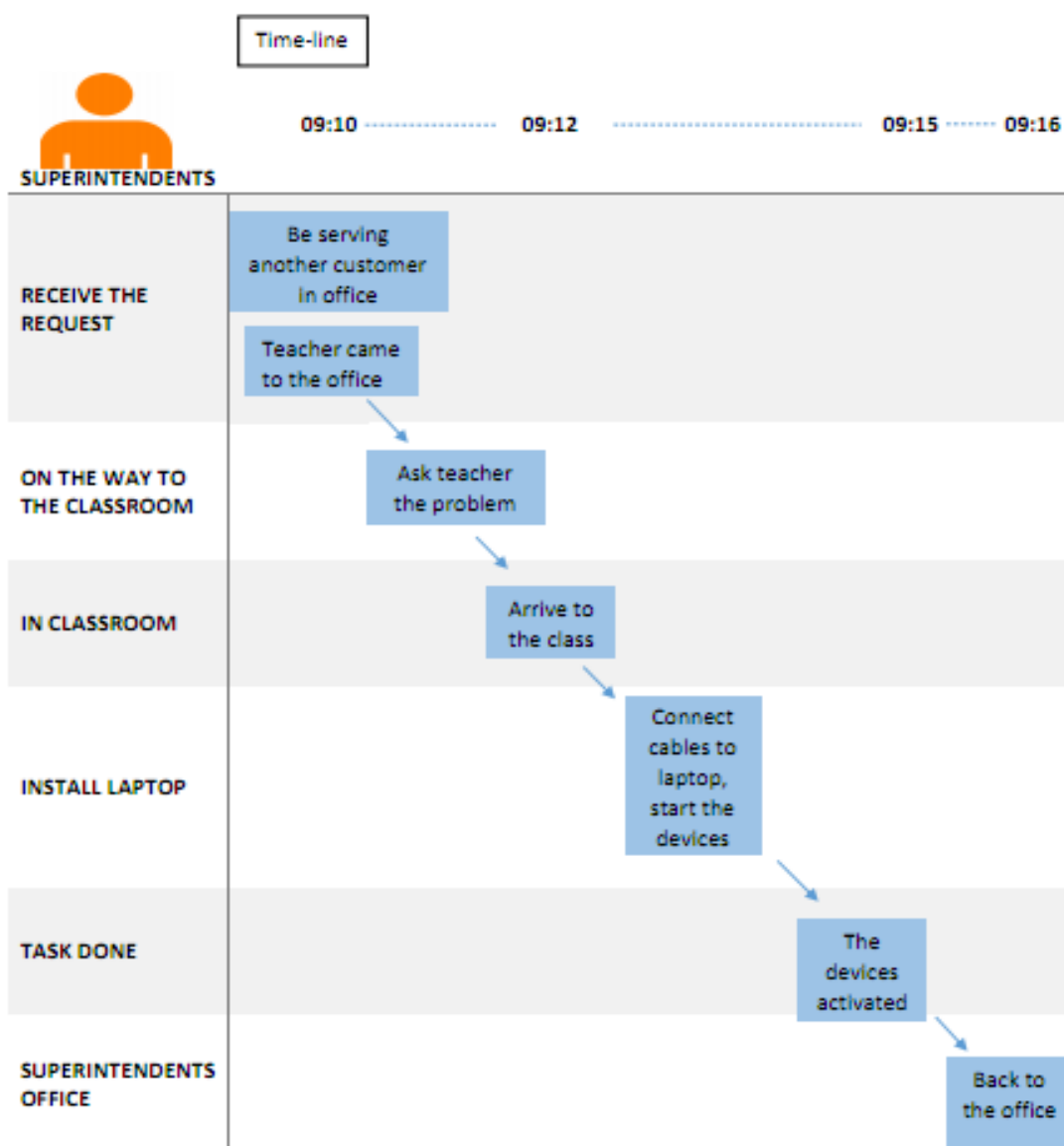
In the first map, the team member received a request of a teacher by a phone call. On the way going to the teacher's classroom, he was interrupted by another customer and spent around 40 seconds to talk with that customer. Therefore, it took him around 2 minutes to arrive to the class. In the class, the teacher described briefly about her technical situation to the supporter. Then the supporter searched for the causes and activated the device system in around 4 minutes. Finally, 7 minutes was the total consumed time counting from the moment he responded the call to the moment he returned to his office. Especially, the cause of this technical problem was that teacher did not press a functional button on the document camera long enough, in 2 seconds. The teacher in this case was also participated into the interview.



Journey map 1



In the next map, a teacher ran hurriedly to the office of Superintendents team to ask for help. At that time, only one team member worked in the office and he was serving another customers and even other customers were on the queue. Even though the technical case of this teacher was priority, it took them 2 minutes to arrive to the classroom. The Superintendents team member asked the teacher about his technical request on the way going to the class. The team member spent more three minutes to complete the request. Then he returned to the office. The total spending time has been 6 minutes. Moreover, the teacher's request was to connect his laptop with other devices.



Journey map 2

In the phase of SD Thinking, the researcher inferred four directions for improvement from the materials indicated in the first service design phase.

Firstly, as the result of previous research, all of the teachers would ask Superintendents for help if they could not manage the technical situations. According to these interviewees, the quality of resource and technical skill of Superintendents were high-qualified. It was concluded that assistance from Superintendents was the most reliable and essential solution for teachers when they encountered with technical problems.

Secondly, the present instruction methods were not effective and adequate. They received the face-to-face guidance from Superintendents which were clear and easy to apply, but they may forget after not using devices in a long time. Besides, the current instruction papers were helpful and simple enough for teacher to follow. However, they were not been usually noticed and not consisted all of the guidance to solve problems. Therefore, it is necessary to improve the resources of instructing teachers on operating technical device.

Thirdly, some of teachers stated that they needed slide changing remote in classrooms. The teachers who had soft voice expected to use attached microphone in classrooms. Furthermore, these facts were recognized by an employee of the Superintendents for a long time but it was not seriously considered and reacted. Hence, they should supply and equip these devices as soon as possible.

Fourthly, an impressive conclusion was discovered by combining the customers' experiences from interviews and the service process of Superintendents team from journey maps. The teacher of the journey map 1 revealed that she tried to fix the problem by herself and asked her students before calling Superintendents team for help. It implied that she spent a few minutes for these actions. The technical supporter in that case spent around 6 minutes to finish the request after receiving the call. However, it was extremely simple to solve the problem that was to press a button in 2 seconds. In this case, if the teacher could press the button in 2 seconds, she would not wait for around 6-10 minutes to activate the devices. Almost a same result could be recognized from the case of journey map 2. Even though, in the interview, the teacher expressed that he ran quickly to the Facility Superintendent office when he needed to install the laptop, he still must spend totally 6 minutes for running from his classroom and receiving the support from the team. If he could install the laptop by him-self, he only needed 3 minutes and the other customers would not have to wait longer for the Superintendent team member in the office.

Therefore, the researcher realized that some teachers asked Superintendents to solve technical problems which they were able to manage by them-selves. In fact, the reason for this

behaviour was that teachers lacked of knowledge and instructions on using the devices in classroom. Moreover, they were stressful and complicated when encountering technical problems during their teaching sessions. Some of teachers confused about the solutions because the device systems were complex and different from classrooms. In these cases, teachers would be able manage the technical problems if obtaining enough necessary technical knowledge and well-preparation before their teaching sessions.

In the next phase, SD Generating, ideas and recommendations were collected.

The researcher applied the tool called Idea interview. Results on customers' experiences and issues deriving the previous research were presented to Superintendents team members who then were asked for innovation. The team suggested three ideas which were listed below.

- No more instructions, only the phone number of Superintendents teams on the instruction papers.
- Refill instruction papers in the classrooms where document-cameras are inside
- Buy more devices: changing slide remote, attached microphone

According to a team member, because teachers spent time to read the instruction papers but were not able to manage the device, they may waste more time than to directly contact with the supporting team. Therefore, instructions should not be added but only the phone number for calling the team if teachers need help. Another member stated that they should refill instruction papers in the classrooms in which a document camera was equipped. The instruction paper should be not only clear and simple as it was currently, but also added the phone number of the Superintendents and an English version of the instructions. Moreover, he will order more devices that teachers expected such as changing slide remotes and attached microphone because they are not expensive.

Other innovation ideas coming from the interviews with teachers. One of them expected to read visual instructions on installing a laptop to device system on Laurea Live website. Another teacher suggested the Superintendent team to label cables and connecting ports with colours so that users can easily connect them together by themselves.

The researcher personally recommended the idea of instruction video. The video will short and content simple guidance on operate device system in classrooms that teachers can manage by them-selves. The video will be shown to the teachers on the event called Development Day once or twice a year to remind teachers how to use devices after holidays. Besides, it should be kept on Laurea Live website so that teachers can watch if they need.

The appropriate resolutions would be decided in the phase of SD Filtering. The researcher examined the feasibility ideas and then combined selected ideas. Expert evaluation tool was used to examine the idea of colour codes. SWOT analysis was used for evaluating ideas relating to instruction papers in classroom, instruction video and instructions on website.

Firstly, the researcher was asked two members of the Superintendent team about the feasibility of labels cables with colour. These members were considered as the experts in installing audio-visual devices in classrooms which they had many years-experiences. (Superintendents team members. 2014). According to one of them, the most popular cables unconnected were the cables between document cameras and projectors (cable 1), and the cables between computers and document cameras (cable 2). So that cable 1 and its ports can be labelled with red colour and cable 2 and its ports can be set with the yellow colour. Moreover, when inspecting about labelling cables for laptop installation, they showed the research ports of document cameras from which the cable should connect to laptop. However, the installation process for laptops were varied from classrooms which distinguished by the presence or absence of document cameras. Even the process was not the same for document cameras of different brands. In short, labelling cables for laptop installation was complex and different from rooms. Therefore, it was thought that the instruction on laptop installation should be conducted according to specific types of device systems in classrooms.

Secondly, three other ideas evaluated by SWOT analysis tool were presented on the table 8. The instruction paper shows its advantages on easily using and implementing, but it limits in the term of guidance for the device systems with the document cameras. On the other hand, the idea of the instructions uploaded on Live website can cover a wide range of guidance. Users can check instructions online before starting their class sessions, but they will find it difficult to use these electronic guidance if they face with technical problems in class. Moreover, the video is the most attractive instruction method and even is easy to be followed. However, disadvantage of this offering is the same as weakness of online instructions and the video cannot include guidance for all types of the devices. In short, all of the resolution are useful for users even though they are not perfect. Moreover, there are many risks for each ideas but most of the risk can be avoided by establishing an effective service delivery process. Finally, three resolutions should be implemented altogether so that they can complement each other and provide great benefits to customers.

Idea	Strength	Weakness	Opportunity	Threat
Instruction papers in classrooms that document cameras are inside	Clear, simple, easy to follow	Only for the system with the presence of a document camera  Not include the guidance to install a laptop	Easy to conduct and install	Don't be noticed  Not useful if teachers are confused and in hurry  Can be covered by other documents  Not stuck on the table because glue is dry
Instructions on Laurea Live website	Provide many necessary instructions  Easy to applied with visual guidance  Never be lost	Difficult to check guidance on line during the class sessions	Can be used for preparing before class session  Can be used for reminding if teachers forget how to operate device	Difficult to find its location, because there are many information on the website  Must spend time to design instruction
Instruction video	Impressive, easy to follow, short  Be kept on Live, then never be lost	Not include the guidance to install a laptop  Difficult to watch video during the class sessions	Be shown on the meeting for teachers, in the beginning of a semester  Can be used for preparing before class session  Can be used for reminding if teachers forget how to operate device	Difficult to find its location, because there are many information on the website  Must spend time to design the video

Table 8: SWOT analysis of ideas relating to instruction on using devices

In summary, the selected resolutions are on the categories:

- Availability of the direct support from Superintendents team
- Label cables and connecting ports with colours
- Install Instruction papers in classroom
- Promote an Instruction video
- Post instruction on Laurea website
- Buy and equip changing slide remote in every rooms
- Buy and equip attached microphone in large rooms

The last phase, SD Explaining, aimed to develop the resolutions of AV technology support. Based on the value hypothesis of the resolutions clarified on the Figure 7, more detailed contents of resolutions was constructed.

The first issue was about other devices such as attached microphone and changing slide remotes. The researcher suggested Superintendents team to purchase changing slide remotes and equip them in all of the rooms with widescreens. Besides, attached microphone should be install on large classrooms, particularly before winter time when many teachers usually have got flu which drives their voice weak.

Next, the most important resolution is maintaining the availability of the direct support from Superintendents team. As can be seen on the figure 7, the support of the team can supply all of the demands relating to audio-visual device. The team is the most reliable solutions to teachers.

Thirdly, Superintendents should provide two types of instruction paper. The first one includes using instructions for Televisions in meeting rooms, and the second one is about operating the device system in which a document-camera is installed. Both of the instruction papers will be simple and clear so that guidance is easily applied by users. The phone number of the Superintendent team will be added to both of them. Moreover, they should include English version of instructions which will be helpful for international users who do not speak Finnish. The team need to select a high quality glue for sticking these papers on a table in long time. The Figure 7 showed that the benefits of these papers is guiding users to operate the device system rapidly by them-selves.

Fourthly, teachers can connect the cables by themselves in simple cases by collating colour labels of cables and connecting ports. In the first case, cables and ports connecting document cameras and projectors will be coded with a red colour. Another cables and ports combining documents camera and computers will be labelled with a yellow colour.

The next solution is to conduct an instruction video. The concept of the video is the instruction method of operating devices which is vivid, easy to apply and simple. In the video, an expert will present how to activate the device systems in class rooms. The length of the video should not be exceeded three minutes. Moreover, the video should be shown to teachers in the beginning of a semester and uploaded on Laure Live website where it is quickly accessed. Therefore the video will be helpful for teachers to prepare device before class session and even remind them to activate devices if they have forget. The content of video will include:

- Guidance on starting the both types of device systems in which document-camera has been installed and in which document-cameras has not.
- Guidance on connects cables with their suitable ports with colour labels.
- Phone and office of Superintendents if teachers need supports.

Lastly, the resolution of uploaded instructions on Laurea Live website will provide not only the same values as the video has, but also another utility of installing a laptop into the device system. The content of the video will be a segment of categories of the instructions uploaded on the website. Furthermore, guidance on installing a laptop should be separate into four cases:

- Install a laptop into the device systems without document camera
- Install a laptop into the device systems with document camera of brand A
- Install a laptop into the device systems with document camera of brand B
- Install a laptop into the device systems in other specific classrooms

Moreover, the researcher recommended that the idea of preparation and development of instruction on Live and instruction video can be conducted by students who can consider them as their studying assignments or reports. The reason is that Superintendents team is busy with their daily working tasks so that they do not have time to implement these innovations. Besides, students at Laurea Leppävaara campus have frequently had assignments relating to service design, creative innovation. Therefore, the topic of establishing these instruction methods can be one of their practices. It will be useful for three parties involving Superintendents team, students and teachers.

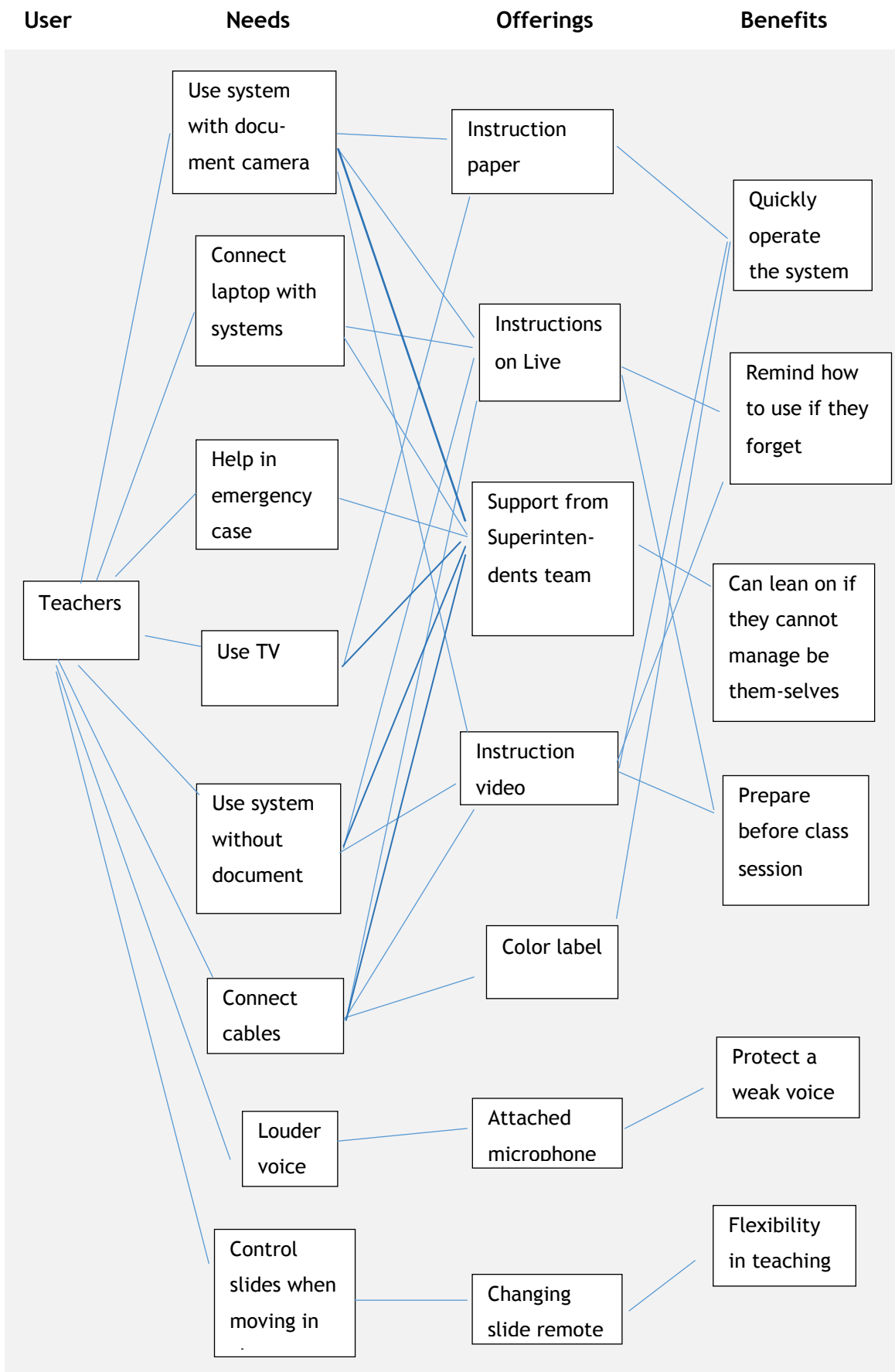


Figure 7: Value Hypothesis of technical support resolutions



## 5 Conclusion

In the conclusion, the results of the thesis consisted customers and their demands, the function of supplying extra computer room, the function of providing information about study units and audio-visual technology support. They were discovered to develop the help-desk service of the Facility Superintendents.

Customers of the help-desk service were divided into 4 groups involving students, teachers and staffs, outside teachers and outside staffs, and visitors. The group of students and the group of teacher and staff were primary customers of the help-desk service. In fact, students tended to ask more request than the others, however, the requests of teachers and staffs consumed more time than the others. Moreover, the daily customer requests were separated into 19 types. The major quantities of inquires belonged to asking information, opening doors, room reservation while the requests of asking information, technical support and occasional requests consumed highest amount of time. Furthermore, student groups preferred the requirements of opening door, room booking and asking information, whereas teachers and staffs had majority of demands on asking information, technical support and office supplies.

The highest amounts of customer requests were gathered at 9 o'clock in the morning and at noon, around 12 o'clock. The requests of opening doors, asking information and room reservation were highly demanded at these rust time. Therefore, the Superintendent team should organize working shifts in the way that at least two of them can be present at the rust time. Besides, over 90% of the requests were asked in the office of the Superintendents. Thus, the team should ensure that their office is opened almost all the working time.

The outcomes of the research also revealed that the students' demand on computer rooms was high, however, the function of providing extra computer rooms was not recognized by the potential customers. To resolve this problem, a notice for advertising the function was promoted. The advertisement was located at the entrance of Comms, the most popular computer room defaulted for student using.

Besides, there was the problem rising in the function of providing information about study units. Some students expected to ask the Superintendent team about study units which were supposed be answered by the Student Affair Office, another department at the campus. The service quality gap occurred because the manager did not completely understand customers' needs. Students wanted to know the basic information and schedule of the study units at the same time and the same place and preferred to ask about that information at the closest place to them. Hence, the Superintendent team should be trained how to identify the basic information about study units including the name, code and the lecturer of the courses so

that they can easily providing the schedule of the study units to the students who did not ensure their course information. Moreover, the researcher suggested Student Affairs Office should sometimes bring their services closer to the students by establishing the temporary working stations in the main lobby of the building.

Lastly, there were many shortages in the resource concerning to audio-visual technology support. For examples, lecturers usually spent a longer time for asking the Superintendent team to resolve simple technical problems which they can manage by them-selves because these users lacked of technical knowledge. The instruction methods of using these devices were insufficient and inefficient. Lecturers also expected more attached microphones and changing slide remotes which have not yet supplied. Finally, the researcher discovered several resolutions to address these issues. The availability of the direct support provided by the Superintendent team must be maintained because it was the most reliable resource for teachers in all of the technical situations. Besides, the team should equip necessary devices which were demanded by lecturers as soon as possible. In fact, the changing slide remotes should be supplied in all of the classrooms. The attached microphones need to be installed in the large classrooms before the winter time. In addition, it is important to use instruction methods to train teachers to operate the audio-visual devices in classrooms. The cables and their suitable ports should be labeled with colors so that teacher can be easily reconnect them without waiting for the help from the Superintendents. The instruction papers need to be as simple and easily followed as they were, and even to be updated with the phone number of the Superintendents so that the visiting lecturers will know how to ask for help in emergency cases. The Superintendent team should also prepare the instruction papers for using loudspeakers and televisions. Furthermore, the instruction video should be conducted and showed to teachers at the beginning of every semester in order to remind them how to use the devices. The video should present how to activate the device system simply and clearly, and it needs to be short. The online instructions should involve the guidance for operating the device system and connecting laptops into the system. The Superintendents can cooperate with students who have studied service design courses to implement the audio-visual technology instruction methods. The students can consider these activities as their assignments or learning projects.

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### Interview

Facility Superintendents team members. Week 16, 2014.

Teachers. Week 18-19, 2014.

Workshop

Coco Comos Workshop. Week 17, 2014.

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Table 7: Technical problems of audio- visual device

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## Appendix

### Appendix 1: Semi-structured interview

1. What AV device in classroom are you familiar with?
2. What are technical problems you have when using device in classroom?
3. Instruction paper - Quick guide for devices. Suggestions for the instruction paper-
4. What do you do when you have a technical problem?
5. Technical support resource and technical skill of facility Superintendents
6. Rate the quality of the services in the form

### Appendix 2: The notice to advertise the function of providing extra computer rooms to students





Appendix 3: Electric form of the customer request record  
<https://elomake3.laurea.fi/lomakkeet/8970/lomake.html>

## Customer Service Record

### Ways to contact

- |   |   |
|---|---|
| <input type="checkbox"/> In the office  | <input type="checkbox"/> Group Phone    |
| <input type="checkbox"/> Group Email    | <input type="checkbox"/> Personal Phone |
| <input type="checkbox"/> Personal Email | <input type="checkbox"/> Other          |

Owner of personal mail / phone

Other way to contact?

### Customer

- |                                  |  |
|----------------------------------|--|
| <input type="checkbox"/> Student | <input type="checkbox"/> Outside Teacher & Staff |
| <input type="checkbox"/> Teacher | <input type="checkbox"/> Visitor                 |
| <input type="checkbox"/> Staff   | <input type="checkbox"/> Other                   |

Other customer?

### Service request

- |   |   |
|---|---|
| <input type="checkbox"/> Ask for information                | <input type="checkbox"/> Maintenance service (fix problems, refill) |
| <input type="checkbox"/> Equipments loan + return           | <input type="checkbox"/> Office supplies                            |
| <input type="checkbox"/> Guidance to use machines, device   | <input type="checkbox"/> Open door                                  |
| <input type="checkbox"/> Inform the broken + empty facility | <input type="checkbox"/> Room reservation                           |
| <input type="checkbox"/> Key borrow + return                | <input type="checkbox"/> Storage service                            |
| <input type="checkbox"/> Lost and Found services            | <input type="checkbox"/> Other                                      |

Description

### Date and Time

Date

Time (00:00)

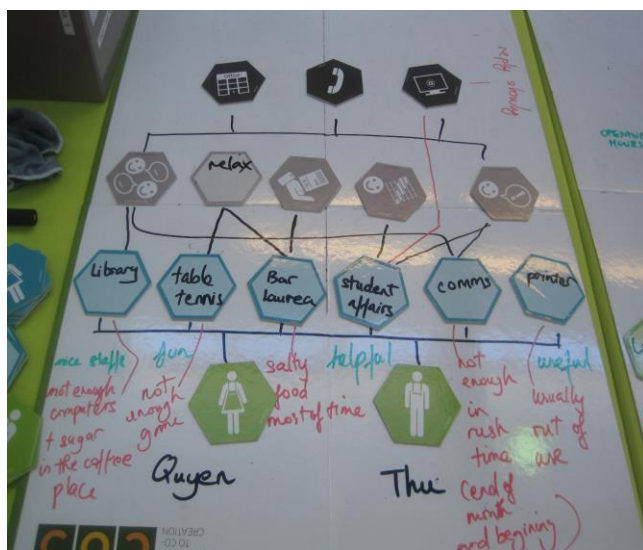
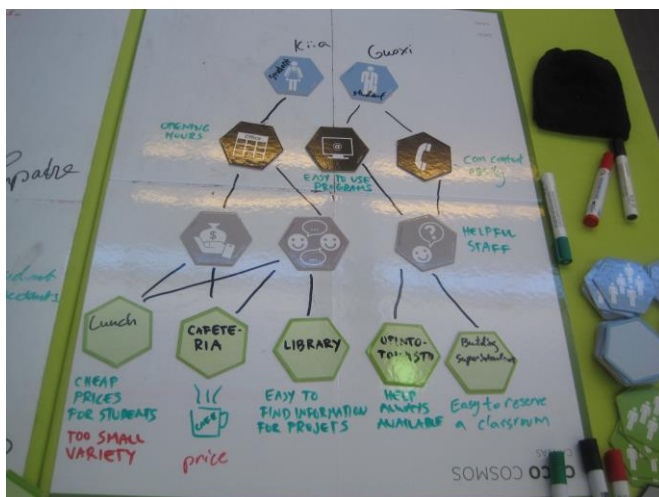
### Spending time for the service

Appendix 4: Questionnaires

You are an important customer and we value your opinion on how well we are meeting your need. Please take a moment to answer the following questions and rate us:  
 1=Poor 2=Need Improvement 3=Satisfactory 4=Very Good 5=Excellent

	1	2	3	4	5
Usefulness of Instruction paper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quality of AV devices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enough AV devices to use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quality of technical support of Superintendent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Technical skill of Facility Superintendent staffs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix 5: CoCo Cosmos - Campus service setting of students



## Appendix 6: Summary of data from semi interviews

Personal information: gender, responsibility	Device using	Technical problems	Needs	Behaviours - Solving problems	Instruction methods
Female Experiences in using device (used to work in Nokia)	- Private laptop - Projector - Computer - Loudspeaker - Microphone	- Loudspeaker: disconnected cable - Visiting lecturer uses private laptop - Television: hard to use if the previous user didn't turn off the channel - Confuse when connect laptop with devices	- Instructions on connecting laptop with the system - With pictures, on Laurea Live - Simple instruction for TV in the room - Instructions on connecting and using loudspeakers	- Prepare the device before the classroom starts - Walk to Superintendents if getting problem	- Instruction paper is clear and simple enough to start the system
Female	- Projector - Computer - Document camera	- Cables are not connected after the previous lecturer uses own laptop	- Prefer that someone guides her how to use, then she can learn	- Try to fix by herself → see the instruction paper → ask students in classroom → Ask help from Superintendents	- Instruction paper is clear and simple enough to start the system
Female	- Computer - Projector	- Cables switch off - Picture of the projector is not clear	- Need microphone in classroom	- check and fix by herself → call/ walk Superintendents	Superintendent guided her, then she learn by herself
Female Language teacher	- Document camera - Projector - Computer - Loudspeaker	- Cable not connect: Document camera doesn't show because the cable not be returned into the right hole		- Walk to Superintendents if getting problems	Doesn't notice the instruction paper in her room, but she know how to use the device well
Male BIT teacher	- Projector - Computer	Sometime confused on using the system if there is a document camera in a classroom	The instruction paper should be more visible in classroom		- Doesn't notice the instruction paper on the table  - Ask for help from Superintendents firstly, then learn by himself
Male	- Computer - Projector - Document camera - Microphone - Loudspeaker	- All of cables not connected because the previous users didn't return the cables back into right place - Problem with document camera - Show video from CD	Teacher whose connect laptop with cable should put the cable back into the previous hole after using them	- Fix by himself → find Superintendents or IT support	- Instruction is clear and simple enough to start the system
Male	Not familiar with using all device	- Always problems with document camera when he connect laptop with the system  - Don't know how to connect cables		- Right away run to Superintendents	- Instruction paper not useful enough if he connect own laptop with the system
Female Accounting teacher	- Computer - Projector - Document camera	- Don't know how to use document camera. - Don't know how to use touch pad in Auditorium - Different classroom, different ways to use the systems - Don't know how to use loudspeaker	- Instruction paper should be in all of the classroom, even for the projector  - Want to know how to connect laptop with the systems  - Need more document camera	- Not spend long time to fix by herself, and then quickly find Superintendents	- Her colleagues show her how to use document camera, but she doesn't remember
Female Usually teaching master students or adult students,	- Computer - Projector - Loudspeaker - Laptop - Slide changing remote	- Cable is not connected. - Doesn't know how to plug the cable in - Don't know how to open the projector if there is a document camera in a classroom - Confuse on using loudspeakers  - Projector doesn't show the good picture	- Need the slide changing remote available in classroom  - Need attached microphone, especial in large classroom 182, 181, 253  - Document camera shouldn't be defaulted in classroom	Try to fix by herself → ask students → Call Superintendents for help	Instruction paper is not useful because: - she doesn't have time to concentrate on it when teaching in class - she changes classroom - not notice the instruction paper because it's covered by other files