The Six Sigma Rocailles Team | MBA 2

Six Sigma IT Project

An Analysis of Service Quality Using COPQ

An evaluation of Les Roches' faculty's IT experience, using COPQ to measure and guide suggestions for areas that IT should prioritize and improve.

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Statement of authorship

We certify that this Six Sigma Assignment is our own work and contains no material which has been accepted for the award of any degree or diploma in any institute, college or university. Moreover, to the best of our knowledge and belief, it contains no material previously published or written by another person, except where due reference is made in the text of the assignment.

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List of Abbreviations

DMAIC: Define, Measure, Analyse, Improve and Control

COPQ: Cost of Poor Quality

VOC: Voice of Customer

TRIZ: Theory of Inventive Problem Solving

DMADV: Define, Measure, Analyse, Design and Verify

QMS: Quality Management System

VPN: Virtual Private Network

List of Appendices

List of Figures:

List of Tables:

Table of Contents

Introduction

Six Sigma is an aggressive, systematic method for breakthrough improvement in speed, quality and cost of operation in an organisation. In today's scenario, most companies aim to have flawless operations, and defect free products to increase their profits and performance. Six Sigma is a smarter way to manage a business. It puts the customers first and uses facts and data to derive better solutions. The Six Sigma effort targets three main areas:

1. Improving customer satisfaction
2. Reducing cycle time
3. Decreasing defects

More than a quality initiative, Six Sigma is a business initiative. Achieving the above six sigma requires a breakthrough in operations. Six Sigma is a total management commitment and philosophy of excellence, customer focus, process improvement and the rule of measuring rather than a gut feeling.

The goal of Six Sigma is to assist organisations improve their performance through examining the process and through an in-depth observation of knowing where and what to improve (Pande & Holpp, 2022, p. 10). Six Sigma changes how management operates. It is much more than improvement projects: Six Sigma is about putting into practice the notion of working smarter, not harder.

This study is aimed at applying the Six Sigma approach to improving the level of service quality provided by the IT Department to Faculty at Les Roches School of Hotel Management, Switzerland. This investigation is being carried out by the Rocailles Team of the 2012 MBA II class, in order to apply Six Sigma theory and provide recommendations to the IT Department to help them improve their processes. In this report we have used the DMADV tool of Six Sigma to measure, analyse and suggest improvements to the current IT processes.

Section 1: Background

1.1 Previous Research

A similar study was conducted by the previous MBA batch – 2011.1. They went through the entire DMAIC process to suggest improvements to the IT department in order to solve system issues with regards to faculty members. As per their research, they recommended that the IT department more regularly track performance in order to compare their performance over a period of time.

1. The very first issue that was identified in the previous report was "a delay in repair" that causes customer (faculty member) dissatisfaction. The root causes of these delays were excess workload, broken machines, poor repair, and misunderstandings between Faculty members and the IT staff.
2. They also stated that the IT department, with a manpower of 5 was understaffed. Besides, there was a difference in the technical skills of each IT staff, which cause delays in service as certain issues can only be fixed by a particular IT staff member, who may or may not be on duty or available at the time of a breakdown.
3. Their study also recommended a more frequent replacement of the machines instead of the current 3 years gap.
4. Another major finding of their research was that there was a massive lack of communication amongst the faculty members and the IT staff that causes confusion, dissatisfaction and frustration.
5. They also suggested organising periodical training to improve the basic technical knowledge of Faculty and went on to recommend having instruction cards for each audio and video equipment in the classrooms, in order to help Faculty overcome the basic problems that may occur.

1.2 Framework of Paper

The Authors of this report will be going through the classic Six Sigma stages to accomplish their study. They will be applying the DMADV approach – which consists of the define, measure, analyse, design and verify stages.

In the first stage the authors will define the Project Charter, its objective and success criteria. In order to arrive at the actual problem the authors have chosen the Voice of the Customer approach to understand the problem from the customer's (faculty) perspective. As part of the Define stage the process map has been outlined and explained along with the goal and objectives of the Charter.

In the Measurement stage, the authors have conducted written surveys and observations with faculty to measure the problems defined earlier. To measure the IT side of the problem they have adopted the COPQ (Cost of Poor Quality) tool - collecting data from IT's Spider Incident system.

In the Analyse stage, the results collected from the survey have been statistically analysed and explained. There is also a graphical analysis of the data collected in order to help better visualise and understand the findings.

Post the analysis, the authors have attempted to design suggestions and recommendations to improve and streamline the current IT process, in an attempt to make it defect free. This report provides logical ways to provide solutions to help IT better manage and reduce Faculty's issues with service delivery.

Finally, the Verify stage involves brainstorming, evaluating suggestions and recommendations that will be made in this report in order to check the feasibility of each.

Section 2: Using Six Sigma

2.1 The Six Sigma Team Problem Solving Process

Improvement, problem solving and process design teams are the most visible and active components of Six Sigma efforts. These teams are formed to solve organisational problems and to capitalise on opportunities. Led by a Black Belt or the Green Belt these teams are formed of 3- 10 members and represent different parts of the process being worked on. These teams are usually diverse in terms of the departments they belong to, their skill set and level of seniority. However, in the Six Sigma team everyone is equal and the contribution of each member is relevant to achieving process breakthroughs. In bringing people from diverse backgrounds together, it is important to have a common process or a model that all members can share to get their work done. The answer to this is the DMAIC process:

Define, Measure, Analyse, Improve and Control.

By following this process, the team works from a state of the problem to a solution for improvement, with various activities in between.

While working through the DMAIC process the team also interacts with the bigger organisation.

Some of the key stages in forming a DMAIC team are:

Phase 1: Identifying and Selecting the Project

Most of the projects are chosen based on the following two M's: meaningful and measurable. A project must have real benefits to the business and customers, and must be small enough so the team can accomplish it. The bigger challenge is to articulate the business necessity of the project, how much a project is costing the company and what benefits the improvement will bring to the company?

Phase 2: Forming the Team

It is important to select the team members who have good working experience, not only of the situation but also who are not so deeply rooted in the problem itself.

Phase 3: Developing the Charter

The Charter is a key document that provides a written guide to the problem or the project. It includes the reason for the project, the goal, the basic project plan, scope and other considerations.

Phase 4: Training the Team

Training is an important requirement of Six Sigma. After the first week of training, the team leader or team members go back to their regular work, but still spend an significant portion of their time thinking and working on the Six Sigma project. The focus of the training is on the DMAIC process and its tools.

Phase 5: DMAIC and Implementation Solutions

The DMAIC team is responsible for the implementation of the solution rather than just handing it over to another department. It is their responsibility to put solutions in place and ensure that they work by measuring and monitoring results for a specified period of time.

Phase 6: Handing Over Process

Eventually, once the project is over the DMAIC team members return to their regular jobs, or move on to take up another project.

2.2 DMAIC Problem Solving Model

Step 1: Define (the Problem)

Some of the fundamental questions to be answered in this stage are:

1. What is the project?
2. Who is the customer?
3. What are the customer's requirements?
4. How is the work currently being done?
5. What are the benefits of making the improvements?
6. Once these questions have been answered a project charter can be formulated.

Post answering these questions, the next job at hand for the Six Sigma team members is to identify the customers (either internal or external). It is extremely important for the Black Belt and the team to have clear knowledge on what the customers want. This can be challenging, as the customers most often are not sure themselves as to what they exactly want. However they do know for sure what they do not want. Hence, it is important for the team to listen to the Voice of the Customer and translate them into meaningful requirements as depicted below:

Figure 1: Translating the VOC into Requirements

Customer Says	Meaning to our Business	Customer Requirement
Your deliveries take too long	We are seen as slow in making promised deliveries	Orders must be delivered within three working days of receipt of the purchase
I did not know I have to ring back within seven days of my purchase to get a refund	We are unclear in our return policy	Clear communication of the return policy is important

Step 2: Measure

This step is a logical follow up to the Define stage and is a bridge towards the next step. The Measure stage has two main objectives:

1. Gather data to validate and to quantify the problem/opportunity.
2. Gather facts and numbers that offer clues about the cause of the problem.

This process has three main categories of measures

1. Outcome: The results of the process such as deliveries, defects, profits and satisfaction.
2. Process: These help the team to identify the cause of the problem.
3. Input: Things coming into the process for change into output. A bad input leads to a bad output, therefore inputs' measures also help in identifying the cause(s) of the problem.

Step 3: Analyse

In this step the team tries to identify the root cause of the problem. Often the root cause is buried under piles of paperwork and old processes, and is lost among the complexity of many people doing work in their own way and not documenting it year after year. Some of the common cause categories are:

1. Method: The technique used in doing the work.
2. Machine: Such as computers and manufacturing equipment.
3. Material: Data, files, facts and forms.

4. Measures: Faulty data resulting from the measurement process.
5. Mother Nature: Environmental elements, like weather.
6. People: A key variable in producing business results.

Step 4: Improve

Most people have a habit of starting to solve a problem without understanding it. This habit is so strong that many teams find it a challenge to stick to the rigorous DMAIC process. However, when they see the value of asking questions and using data, they realise that the Six Sigma approach is better.

Step 5: Controls

Avoiding a "snap" back to the old habits is the main objective of the control step in the DMAIC process.

2.2.1 Transition from DMAIC to DMADV

It is important to note that the team's initial focus on the DMAIC process methodology was deemed as incomprehensive after an investigation of the current process. As a result, the analysis was modified to follow the DMADV methodology which substitutes the Improve and Control stages of the DMAIC process for the Design and Verification steps. It became apparent that the team needed to suggest new processes or corrective steps to the existing, in order to address some of the issues that have been identified. By simulation, the team has been able to gauge the enhancements to performance that can be achieved when these suggestions are implemented. As a result, the focus is not on readjusting and controlling current processes like the DMAIC process requires, but is on redesigning certain aspects of the current process to better meet faculty's needs.

2.3 Project Charter

Definition

''The Project Charter defines interactions of the project and sets the stage for a successful completion". (ISixSigma, 2000) A Project Charter is the first step in the Six Sigma research methodology. It uses the Define step of DMAIC. The Charter defines the success or failure of the project. The Charter specifies the necessary resources and boundaries that will affect the success of the project. On the other hand, it can negatively impact the project by limiting team focus, effectiveness and motivation.

Project Title

Review and Analysis of IT Service Delivery to Les Roches' Faculty

Project Start Date

10th of February 2012

Team Members

Sponsor	Black Belt	Secretary	Editing Team	Presentation Team
Dr. David Wood	Fernanda Novakovic	Martha Patino	Stephanie Ansah	Aigerim Aitmambetova
			Debasree Roy	Ruchi Lahoti
				Nekyra Rogers

Application to the IT project

a. Project Description

The purpose of this project is to identify loopholes in IT service delivery to faculty and to make suggestions for improvement.

b. Objectives and Success Criteria

The aim of this project is to provide recommendations and improve the IT department at Les Roches in terms of enhancing the quality of the services they provide to faculty. The tool for measuring the problems in IT Department is COPQ.

c. Stakeholders

Stakeholder	Name	Benefits	Win Conditions	Constraints
Project Sponsor	Dr. David Wood	Improve IT Service	Staff Cooperation and In-Depth Research	Resources
Project Client	IT Department	Time Saving, Better Image and Less Complaints	Acknowledge Openness	Resources Training

Implementer	Rocailles Team	Knowledge, Experience and Recognition	Team Work and Cooperation from the IT Department and Faculty	Time and Knowledge

d. Project Scope

This project is aimed at conducting detailed research into the problems faced by faculty members at Les Roches in terms of IT services. We intend to arrive at our finding by interviewing faculty members and the IT department team. The emphasis of the project will only be on the faculty and will not take into consideration students and administrative problems at Les Roches.

e. Assumptions and Dependencies

This Project has been initiated with the assumption that there are some problems in the IT department at Les Roches, which are currently affecting faculty's productivity.

f. Constraints

The Constrains that this project may face are as follows:

i. The Sponsor is not present in the study area
ii. The implementers do not have enough knowledge and experience about the topic being researched
iii. The IT team and faculty members are hard-pressed for time due to their schedules

g. Time Frame

Event	Due Date	Responsible
Faculty Questionnaire	Week 7	Team
Interview with Mr. Aston	Week 8	Black Belt and Secretary
Analysis	Week 9	Team
Final Report	Week 11	Team

2.4 Choice of Tools

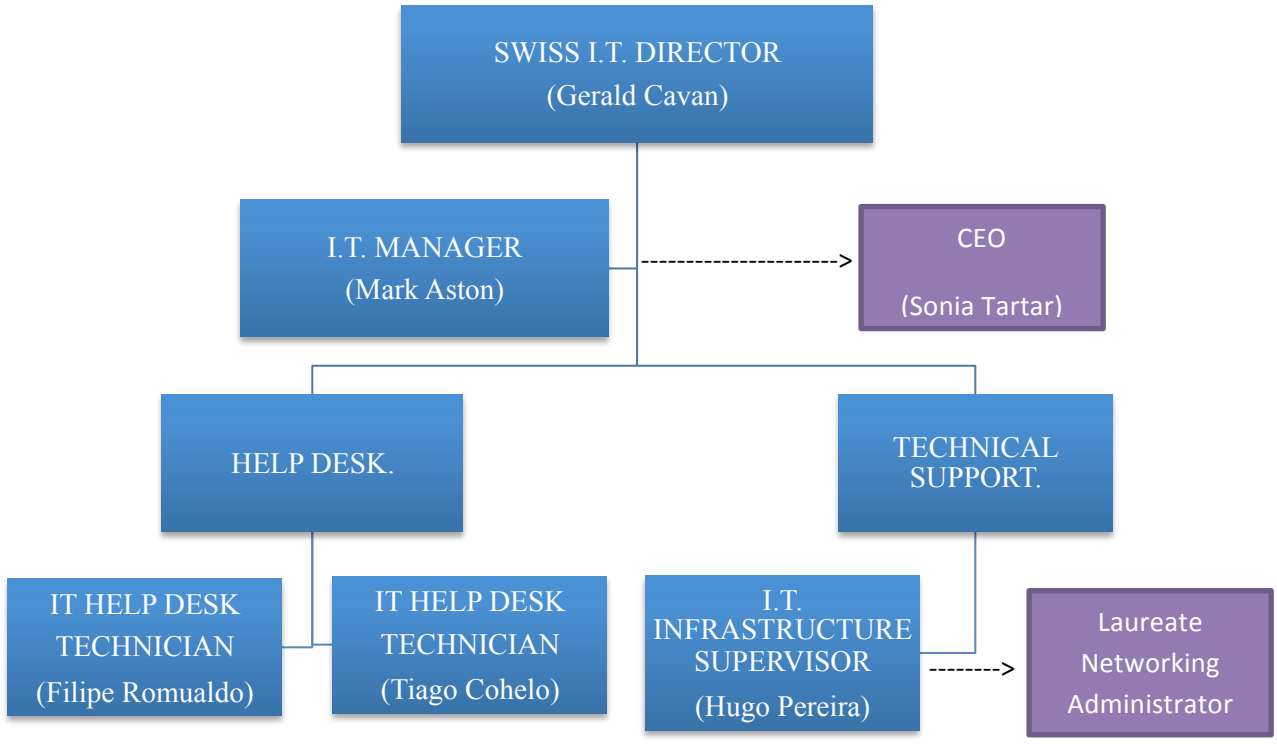
From the seven tools the team decided not to use four of them for the following reasons:

- Control Charts: They are seldom the method of choice because when a process step is important, it is preferred that there are no variations. A control chart is only used when this cannot be accomplished in an economical way. Control charts are only useful if the step over time exhibits measurable random variation (Six Sigma Training Consulting, 2009).
- Histograms: They provide a picture of a set of data created by grouping the data collected into cells or bars in a chart. Histograms take data and give it a shape called a distribution. With this it is possible to observe the data set's spread, central tendency and if it meets requirements. In this project the data collected is not related (independent), as a consequence it is not possible to group it.
- Scatter Diagram: These are used to see if there is some correlation between the data collected. In this project the data analysed were conformed by independent and mutually exclusive variables and this tool does not apply.
- Pareto Charts: A pareto chart is used to graphically summarize and display the relative importance of the differences between groups of data. The purpose of a pareto chart is to graphically summarize and display the relative importance of the differences between groups of data. The pareto chart is based on the 80–20 principle (the law of the vital few and the principle of factor sparsity) which states that for many events, roughly 80% of the effects come from 20% of the causes (I Six Sigma). The team did not decide on using a checklist to track this data with enough time to gather sample data that would be adequately representative.

Section 3: The Current Situation

3.1 IT Organizational Structure

Figure 2:

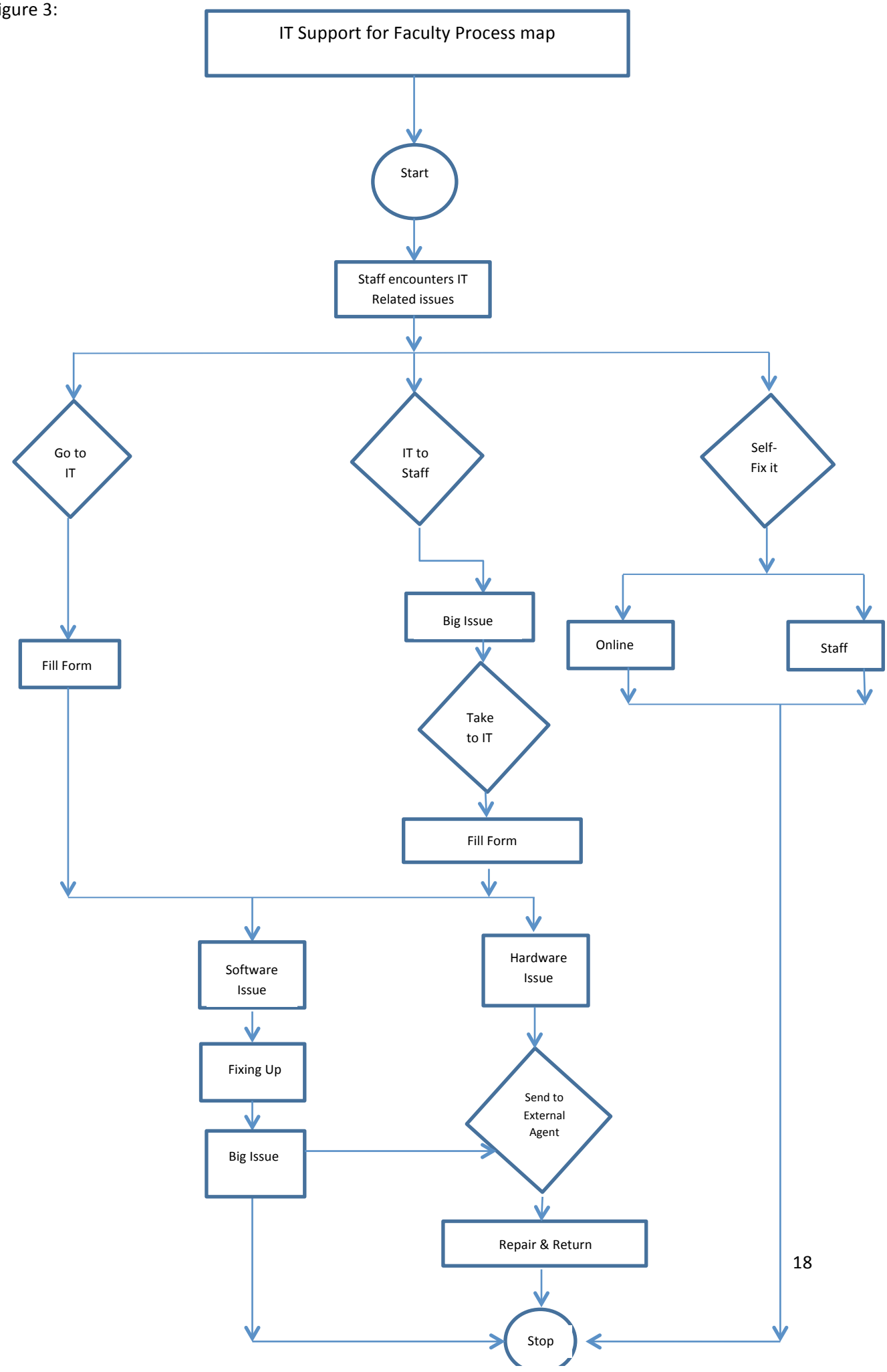


The IT Department is managed by the Swiss IT Director for the Laureate Group. On campus there is an IT Manager (Mr. Mark Aston) that reports to the Swiss director and CEO (Sonia Tartar). Under the IT Manager there are the help desk and technical shift staff that deal with any issues that students, staff and faculty may encounter during their time on campus.

3.2 Process Flow Chart

The process flow chart is a tool used in the Six Sigma methodology to identify all relevant events of a process improvement project before work begins. It helps define a complex project that may not be well scoped, and is typically employed at the Measure phase of the Six Sigma DMAIC process. It is similar and related to Process Mapping and 'In/Out Of Scope' tools, but provides additional detail.

Figure 3:


IT Support for Faculty Process map
Start
Staff encounters IT Related issues
Go to IT
IT to Staff
Self-Fix it
Fill Form
Big Issue
Online
Staff
Take to IT
Fill Form
Software Issue
Hardware Issue
Fixing Up
Send to External Agent
Big Issue
Repair & Return
Stop

Processes Flow Chart Analysis

According to the process map of the IT department, they have a well-defined procedure for the problems Faculty might face and also they provide an 'online option' that allows the help desk staff members to access faculty's systems remotely. This provides a faster solution in cases where there is a minor issue.

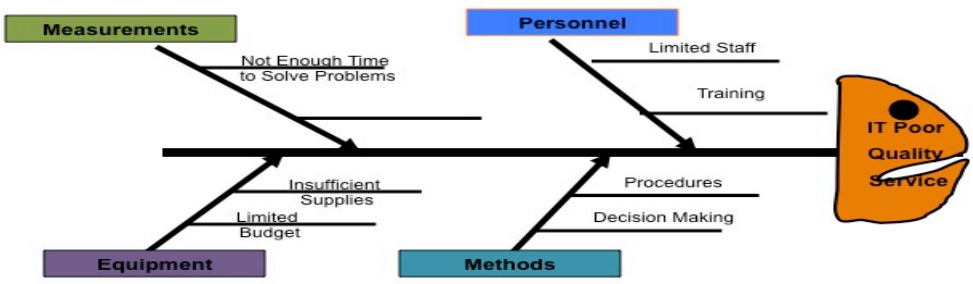
One limitation of this process is when there are hardware problems or major issues that the IT staff are not able to solve, there is a high cost in terms of time for the faculty since they will have to send their computers to a third party. In cases where information is not adequately backed up, staff might loose some files. In addition IT staff might need to reinstall additional software programmes that are specific to Les Roches. The department is currently restricted by limited resources for e.g. there are only two help desk technicians that handle the IT needs of both faculty and staff.

3.3 Fishbone Analysis

Also known as the cause and effect diagram that helps to visually display the many potential causes for a problem or effect.

The fishbone has an ancillary benefit as well: Because people by nature often like to get right to determining what to do about a problem, this tool can help bring out a more thorough exploration of the issues behind the problem – which will lead to a more robust solution (I Six Sigma).

Figure 4:



Measurements: The team believes that one of the causes of the poor quality in the IT department, regarding faculty is the limited time to work on all the tasks the IT Department has to deal with.

Personnel: With regards to personnel, the Rocailles Team believes that the lack of enough staff to solve faculty issues and the lack of training (up to date) are other causes of the poor quality in the department.

Equipment: The team is of the opinion that the IT equipment provided to faculty is not the latest technology. This might be as a result of limited funds the department has access to.

Methods: Undefined standards operating procedures and centralized decision-making cause poor quality service delivery to faculty.

3.4 Cost of Poor Quality

The fact that quality is a necessity and is no longer a differentiator in today's strongly competitive business environment, is well known. However, what is not clearly known is the fact that the cost of poor quality is substantial (QIMPRO, 2005). Calculating the cost of poor quality permits an association to define the magnitude to which organizational resources are used for events that exist only as the result of deficiencies that happen in its process. Having such data permits an organization to manage the possible savings to be gained by applying process improvements.

COPQ is defined as a cost that would disappear if systems, processes and products were perfect. The Cost of Poor Quality is made up four cumulative areas of costs, which are appraisal, detection, internal failure and external failure. Cost of Poor Quality is a combination of internal and external failure. The results of the two aspects will add up to the value of Cost of Poor Quality (Six Sigma Material , 2012). The figure below presents some of the costs that are related with poor quality. Each organization should evaluate their model and determine what factors are causing poor quality.

Figure 5:

(Six Sigma Material , 2012)

To use Cost of Poor Quality an organization should follow the below steps:

1. Identify all activities that exist because of poor quality
2. Identify where in the organization the cost of each activity is experienced
3. Determine the method you will use to calculate the cost of poor quality

An organization will have to gather a team that will execute the next steps to make the organization function better and to eliminate the poor quality of services and products to customers.

Section 4: VOC and Data Results

4.1 Survey Design

To determine Faculty's views of the current IT service delivery a Voice of Customer approach was chosen using paper surveys. The sample size of 29 professors was chosen based on their availability. As indicated by Les Roches' telephony system, staff are classified into three groups: Lecturers, Culinary Instructors and Kitchen staff. The IT needs for each of these categories of faculty differ. The Rocailles Team focused primarily on Lecturers, whose needs can again be further broken down into distinct academic areas such as languages and mathematics. Due to the wide range of groupings at this level of categorization, the team simply dealt with the general set of lecturers.

To reduce the chance of faculty misinterpreting the questions, two members of the team were available for clarification. The members were present in person to answer any queries the Professors had pertaining to the survey sheet. However, due to the inundated schedules of faculty, this was not practical in most cases and some surveys were returned with uncompleted answers.

A combination of closed and open-ended questions were chosen to investigate some of the potential issues that were identified in Figure 2, and were asked in this order. Closed-ended questions were chosen in order that our team could analyse the responses in a quantifiable format. Open-ended questions were also asked in order for the team to probe further and for professors to elaborate and point the team in the direction of the x's. As a result, the rationale behind this survey design was to allow for more expansive responses after respondents were guided on the purpose of the survey from the initial, closed-ended questions.

The general areas that were addressed include the following:

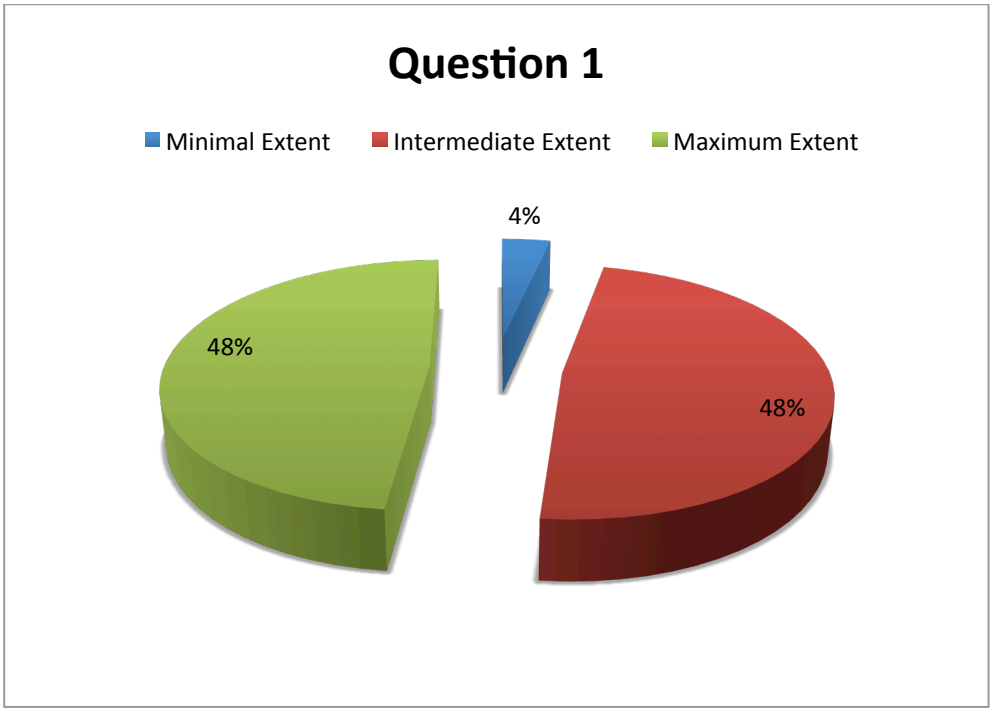
- Level of usage of IT services and Faculty's IT needs
- Quality of service
- Problem areas

4.2 Analysis of Responses

Q. 1: Please rate your usage of your computer for Les Roches related purposes.

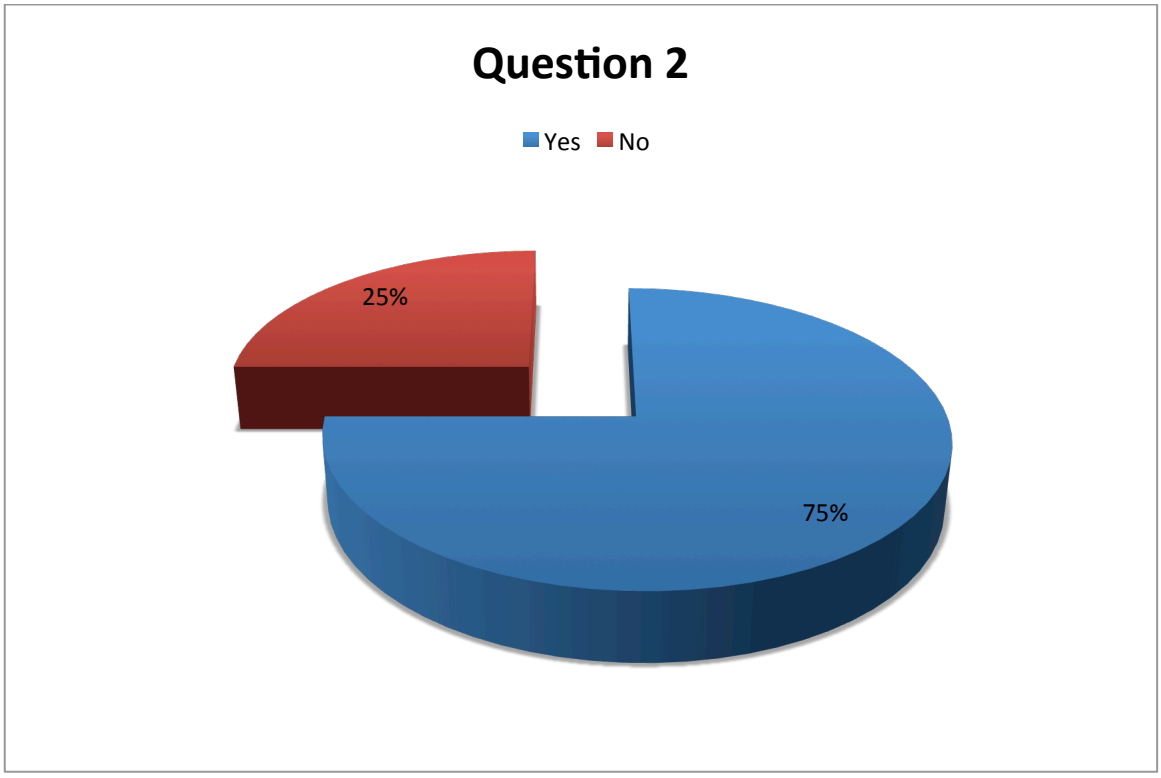
Question 1 was answered by all 29 respondents. The 3 options that were provided ranged from 1 (minimum) to 3 (maximum). The chart shows that 14 respondents use their computers to an intermediate extent and 14 answered for a maximum extent. And only one respondent used their computer to a minimal extent.

The chart below shows that 96% (28 Faculty) believe that the usage of their computers is necessary for their jobs.



Q. 2: Are you satisfied with the support provided by the IT Department?

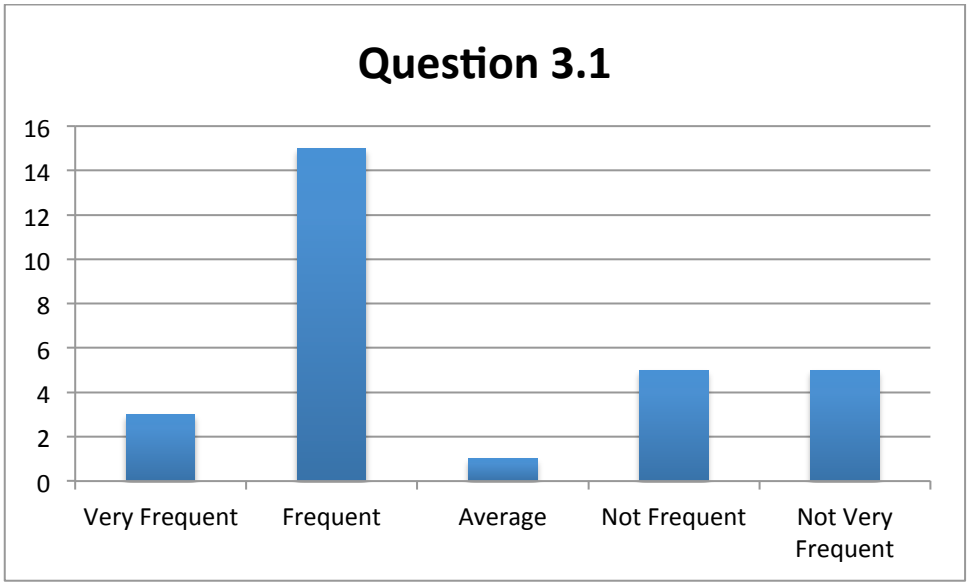
The Question was answered by 29 respondents. The respondents were provided with two possible answers "Yes" and "No" where 1 denotes "Yes" and 2 denotes "No". The results showed us that 21 respondents were satisfied with the support provided by the IT department and 7 people were not satisfied with the service provided to them. Overall, 75 % of the faculty are satisfied with the support of IT department.



Q. 3: Please rate the frequency with which you experience the following issues on a scale from 1 (very frequent) to 5 (not very frequent).

3.1. Please rate the frequency with which you experience the following issue: Internet Connectivity

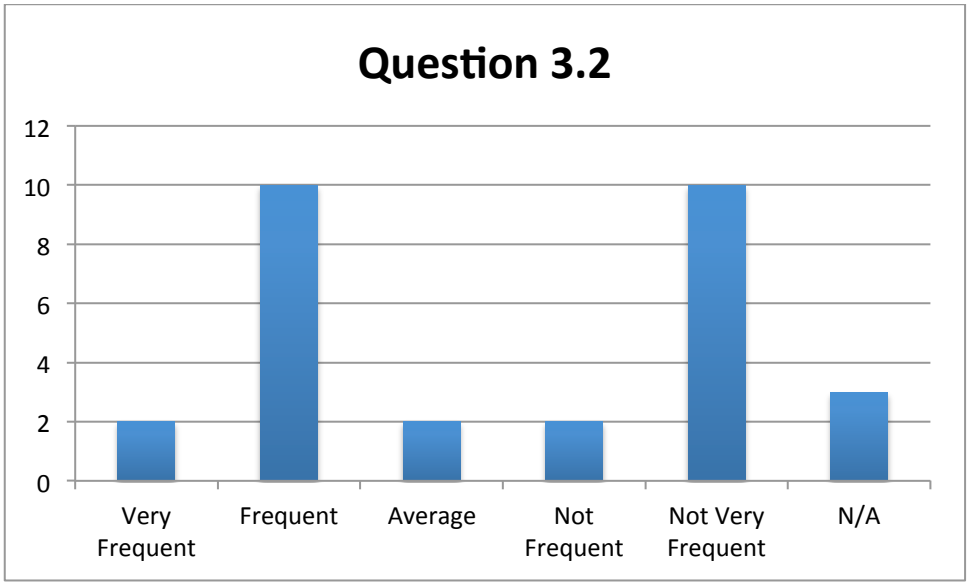
The question was answered by 29 respondents and five possible answers were provided. More than 50% of the respondents were in agreement that they experience internet connectivity issues frequently. About 20% answered that they experience problems with internet connectivity very frequently, 30% not as frequently, and 30% not very frequently. However, about 10% of respondents experience average internet connectivity.



Q. 3.2. Please rate the frequency with which you experience the following issue:

Issues with Operating Equipment in Classrooms

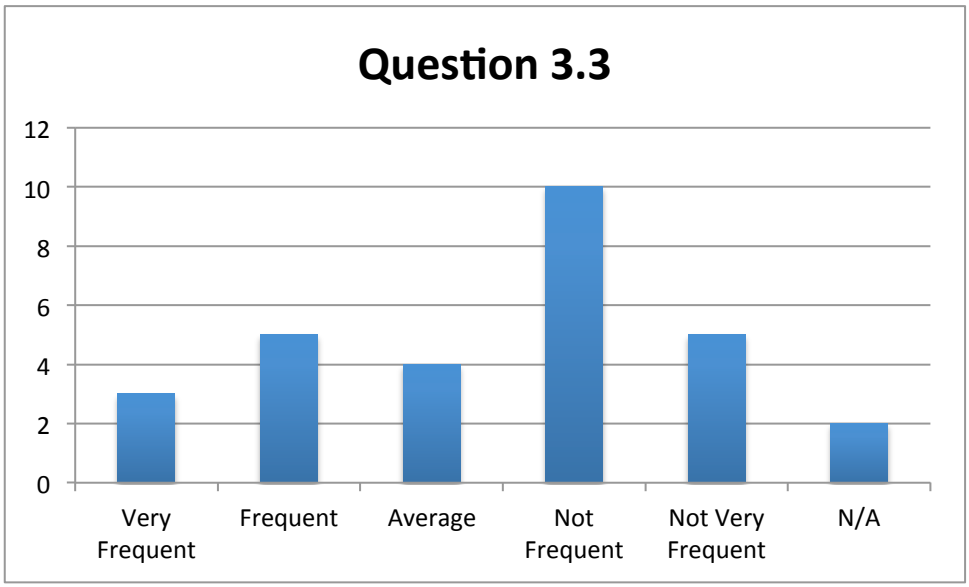
The question was answered by 29 respondents and five possible options were provided. Three members of the faculty were non responsive. It was noticed that the number of respondents that experienced issues with operating equipment frequently and not very frequently were the same.



Q. 3.3. IT Training and Resources for Professors

The question was answered by 29 participants and five possible answers were provided. The options ranged from "very frequent" to "not very frequent". When analysing the responses, the options were assigned a numerical value in ascending order; "very frequent" (1), "frequent" (2), "not at all" (3), "not frequent" (4) and "not very frequent" (5).

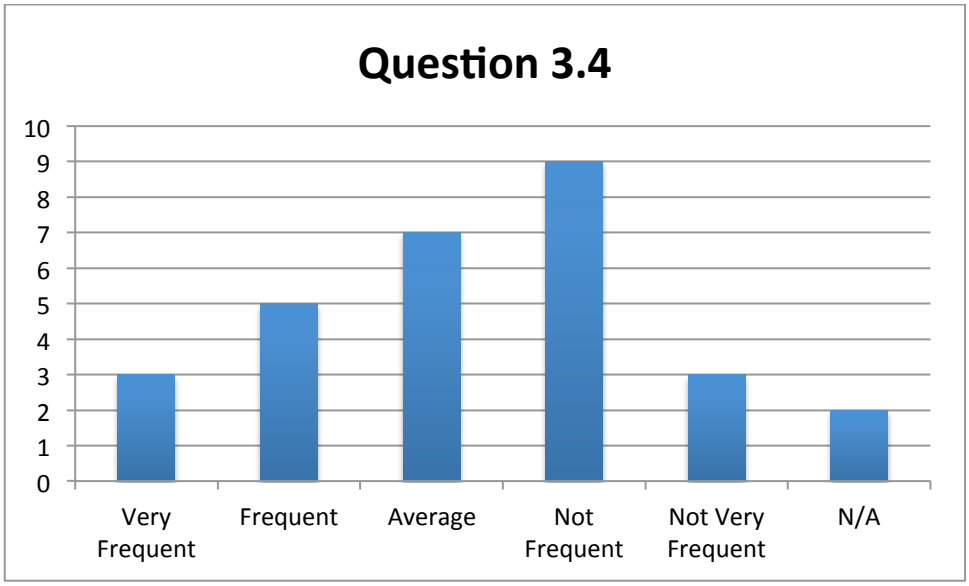
10 respondents classified IT training and resources for Professors as "not frequent", 5 of the respondents answered "not very frequent" and another 5 respondents answered "frequent". 4 participants answered "average", 3 answered "very frequent" and only 2 respondents did not answer.



Q. 3.4. Out-dated Technology (software and hardware)

The question was answered by 29 participants and 5 five possible answers were provided. The answers ranged from "very frequent" being the highest to "not very frequent" being the lowest possible score. When analysing the responses, answers were assigned a numerical value in ascending order, from "very frequent" (1), to "frequent" (2), to "not at all" (3), to "not frequent" (4) and finally to "not very frequent" (5).

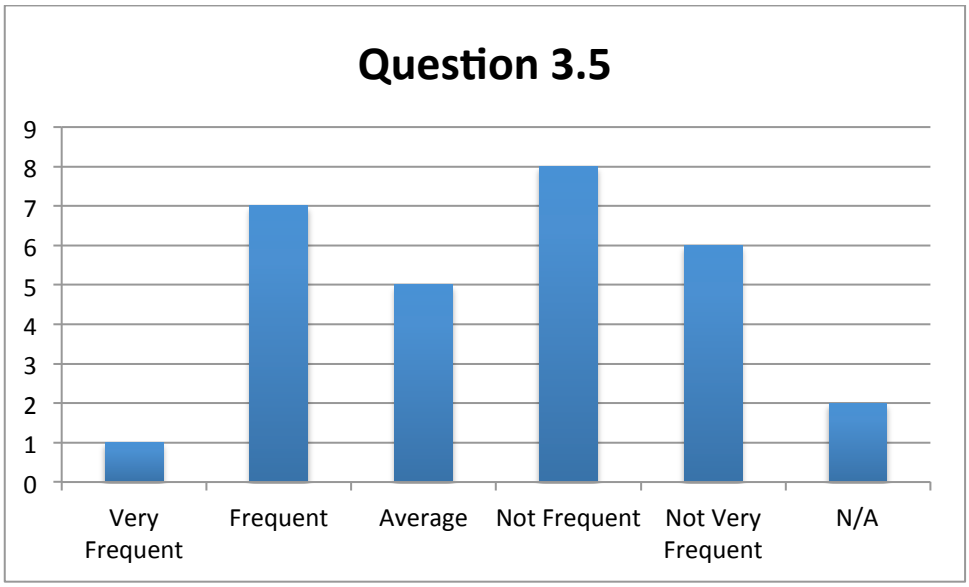
9 respondents experienced problems related to out-dated technology (software and hardware) on a "not frequent" basis, 7 respondents experienced "average" problems and 5 respondents experienced "frequent" problems. 3 participants experienced problems "very frequent"-ly and 3 "not very frequent"-ly. 2 people did not answer this question.



Q. 3.5. Please rate the frequency with which you experience the following issue:

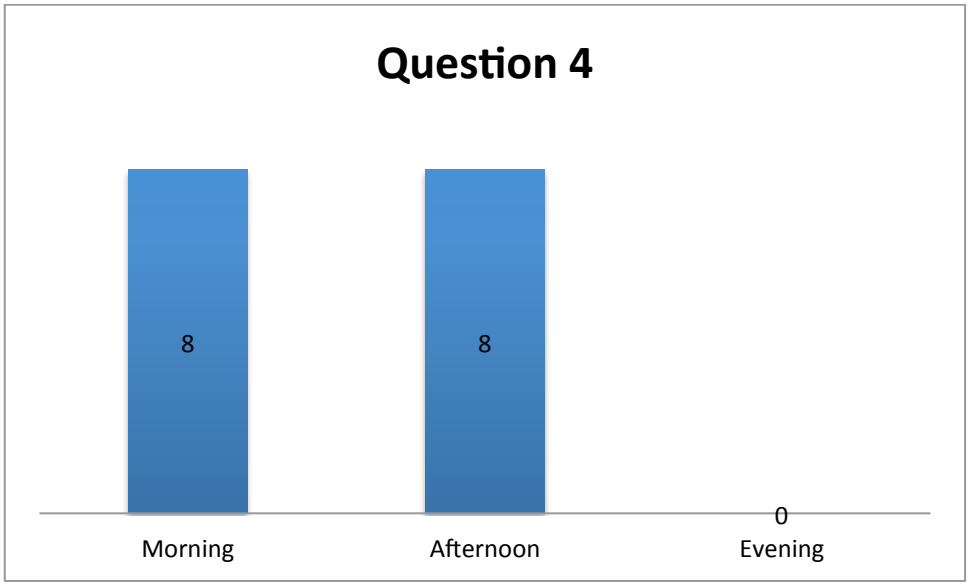
Responsiveness and Assistance from the IT Department

The question was answered by 29 respondents and 5 options were provided. Two respondents did not answer the question. As the chart shows, it is possible to observe that “not frequent” represents almost 30% of the responses and this is closely followed by “frequent”. For this question it would be useful to investigate if there is a third factor causing this ambiguity.



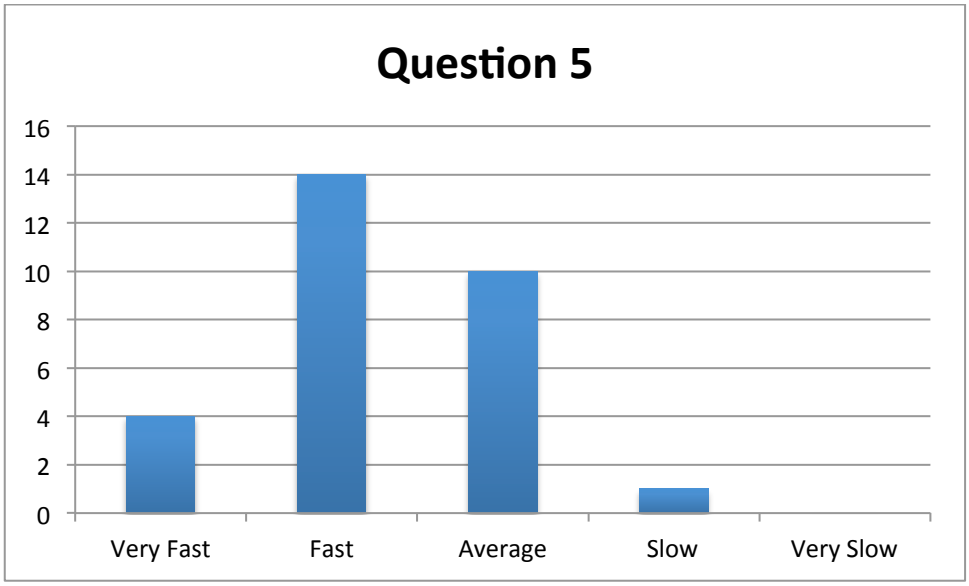
Q.4: At what time do you experience the most difficulties with connectivity and/or with the equipment?

The question was answered by 29 respondents and 3 options were provided; “morning”, “afternoon” and “evening”. 8 respondents answered that the time they experience the most difficulties was in the morning. 8 respondents claimed that the most difficulties happen in the afternoon and there was no response for evening. 13 of the respondents chose not to answer this question. According to the data received, it can be concluded that faculty experience most of the problems in the morning and afternoon time.



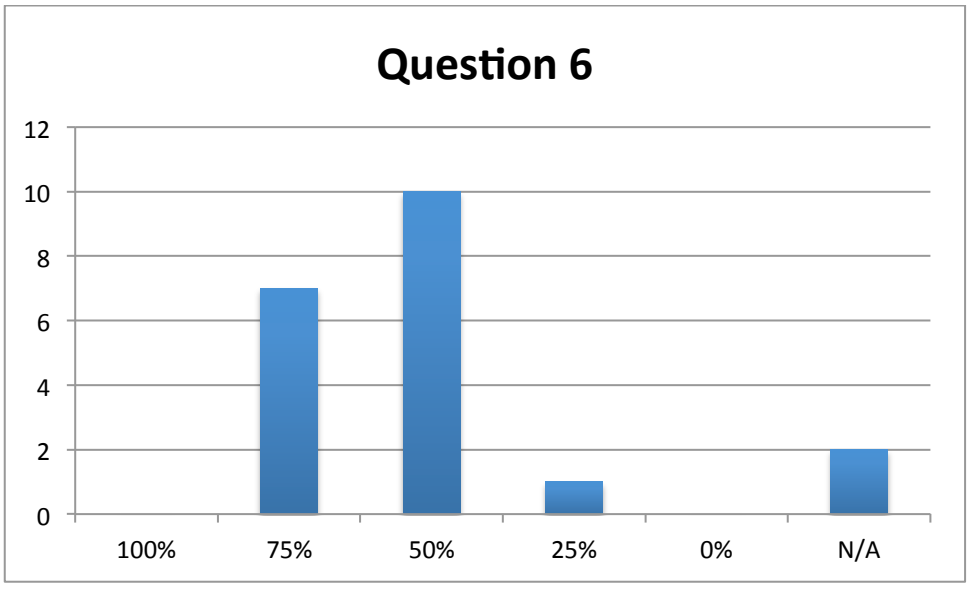
Q. 5: How would you classify IT’s response time on a scale from 1 (very fast) to 5 (very slow)?

The question was answered by 29 participants and 5 options were provided. Options were assigned a numerical value in ascending order; “very fast” (1), followed by “fast” (2), “average” (3), “slow” (4) and “very slow” (5). 14 respondents classified IT’s response time as “fast”, 10 responses were “average”, and 4 responses were “very fast”. Only 1 participant thought that IT’s response time is “slow”. The overall result varied between fast and average and this implies that faculty classify IT’s response time as medium to fast.



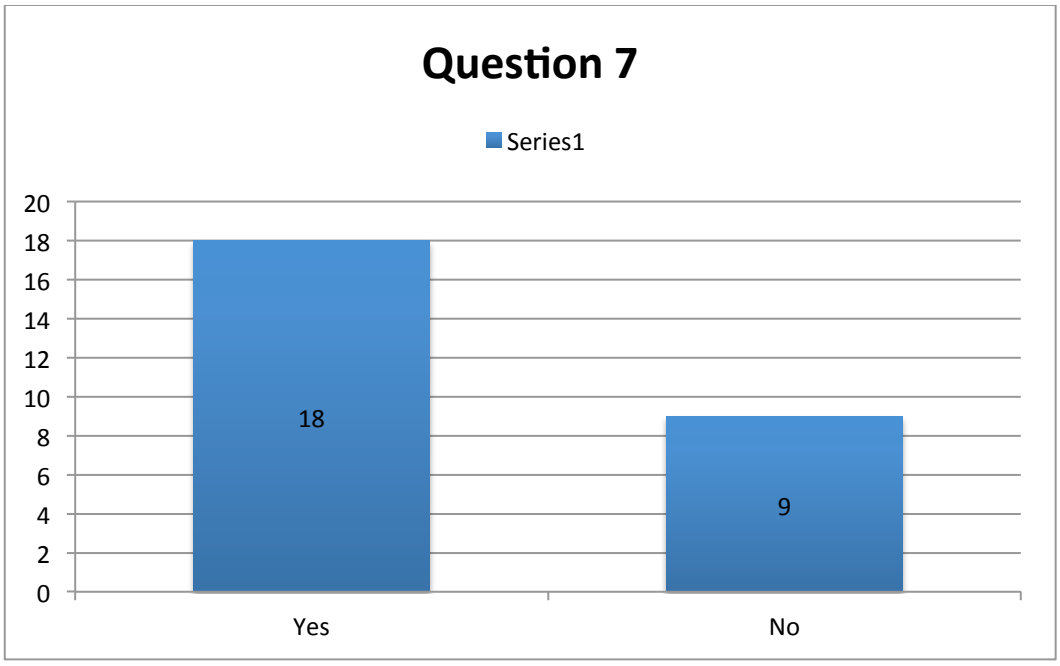
Q. 6: To what extent is IT able to offer you solutions for your IT issues? Please rate your response on a scale from 100% (always provide solutions) to 0% (never provide solutions).

The question was answered by 29 respondents and 5 options were provided. The maximum number of the answers was 50%, which showed that there is a balance between the times the IT Department provides and does not provide solutions for Faculty's issues. At the same time it was observed that none of the respondents agreed that the IT department provides 100% solutions. There were two respondents who did not have a specific answer for the question.



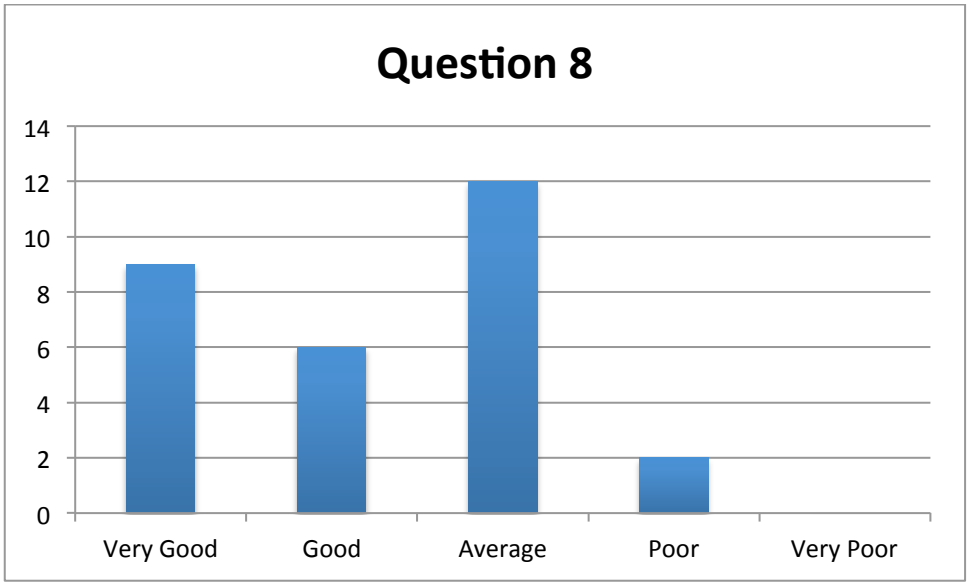
Q. 7: Do you think that IT is adequately staffed to meet the needs of Professors?

The question was answered by 29 respondents and 2 options were provided. The answers ranged from 1 to 2, where 1 denoted "Yes" and 2 denoted "No". 18 of the participants agreed that IT is adequately staffed to meet the needs of Professors and 9 respondents answered that IT cannot adequately meet the needs of Professors. 2 respondents preferred not to answer this question. Overall, 67 % of the Faculty agreed that the IT Department is adequately staffed to meet the needs of professors.



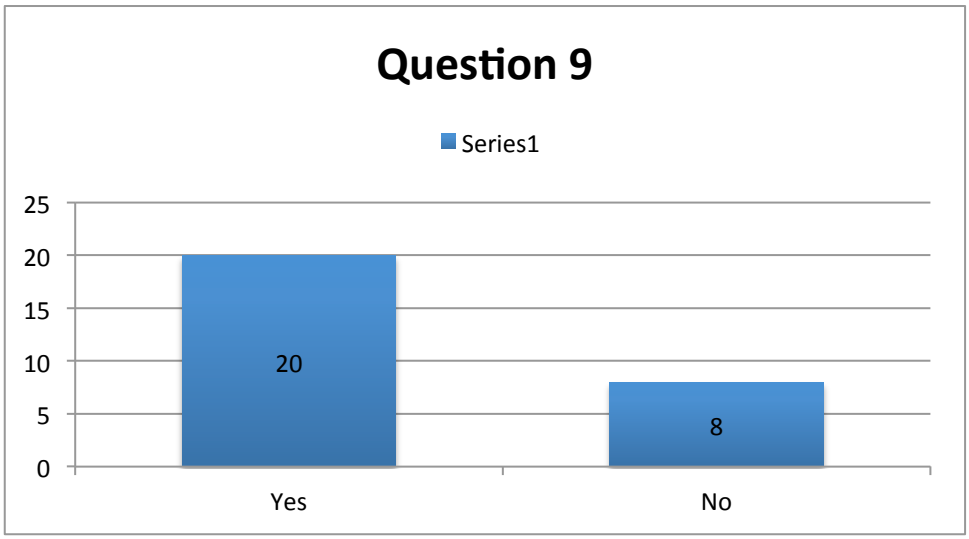
Q. 8: Please rate your IT experience on a scale from 1 (very good) to 5 (very poor).

This question was answered by 29 respondents and 5 options were provided. It is observed from the responses that majority of the respondents' experience with the IT Department is average, which means that the respondents considered their IT experience as neither very poor nor very good.



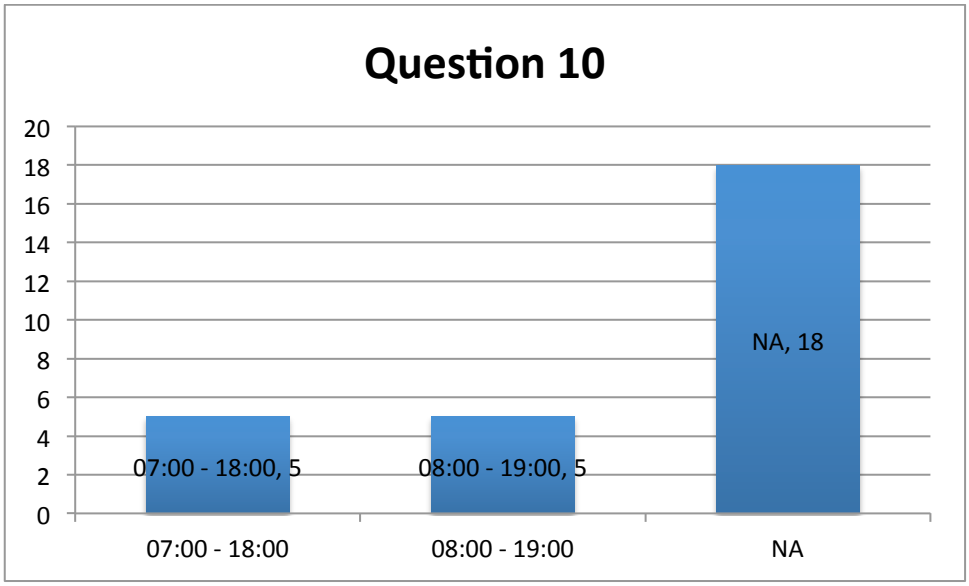
Q. 9: Are you satisfied with IT's working hours?

The question was answered by 28 respondents and 2 options were provided - Yes (denoted by 1) or No (2). 20 respondents answered that they were satisfied with IT's working hours whereas 8 respondents were not satisfied with the working hours. Overall, 71 % of respondents were satisfied with IT's working hours.



Q. 10: If no, which of the following hours would you prefer?

The question was answered by 29 respondents and 3 options were provided. Specific time intervals of 07:00 -18.00, 08:00-19:00 and an option for other were provided. 5 respondents selected 07:00 - 18:00 and 5 selected 08:00 - 19:00. 18 respondents preferred not to answer this question.



Q. 11: Do you have any specific needs that you would like I.T. to meet?

The specific needs that faculty would like from IT are training and communication. The main issues raised included the inability to provide support for MAC computers and the opening hours of the department. Faculty expects that the IT department should be knowledgeable and should be able to assist them with any problems that may occur during their time on campus.

Q. 12: How would you quantify what you lose when you do not receive adequate support for your IT needs?

In general, majority of the responses indicated that they lose time when they do not receive adequate support from the IT department. About half of the respondents did not answer the question.

Q. 13: Do you have any suggestions on how the IT department can enhance your IT experience and improve your productivity?

The recommendations that were made are: the IT department needs to have more training and should be able to train the faculty on how to use the different facilities in the classrooms and offices. Also the IT department should be more flexible when it comes to time and dealing with problems.

4.3 Description of Spider Incident System (IT's ticketing system)

The Spider Incident System is a professional help desk solution provided by the Brainware Group. It assists IT service providers manage service level agreements and escalations, and empowers administrators to coordinate with customers/users and IT experts to make it easier to deliver great service. This automated system structures workflows (includes an automatic escalation feature that is activated based on performance or timeframe limits), assures problem processing and is integrated with other Columbus modules that Les Roches uses (The Brainware Group, 2012).

4.4 Spider Incident Report

The report that was generated from IT's Spider Incident System was a modified version and provided us with the top 14 categories of the most encountered problems, gave an average resolution time for each and the percentage of total tickets that each category makes up.

Table 1: Data

Category	Average Effort (in minutes)	Percentage of Total Tickets
Lotus Notes	32.36666667	22%
Software	24.11764706	20%
Password Issues	14.70588235	5%
New Employee	79.52380952	-
Printer Toner	18.57142857	3%
Maintenance	37.91666667	-
Phone Blackberry	23.18181818	-
Change Password	22.5	-
Hardware	37	13%
New Software Requirements	22.5	-
New Computer	108.2	3%
Backup Tapes Repl.		-
Create/Change Group	13.33333333	-
Installation	41.11111111	-

New computer, new employee and installations require the most time but do not occur on a day-to-day basis. In terms of the percentage of tickets, IT receives the most requests for Lotus Notes, Software and Hardware issues. Out of these, hardware issues on average take the most time and this can be explained by the need to send these cases to external service providers in majority of the cases. The percentages of total tickets were estimates and as a result only describe approximately 70% of all ticket records. The Spider Incident system was introduced about a year ago, and as a result the data generated was from tickets created during this period.

4.5 Limitations

As identified in the Project Charter in the Define stage of the process, there were a couple of constraints that the team faced during the data collection phase. The Rocailles Team's reliance on the information gathered from the VOC responses did not help give clear direction as to what questions should have been asked and what methods the team should have adopted in the data collection phase, as was originally planned. As a result, the team needed to rethink the process and alter its approach relatively late in the day.

During the course of the team's initial approach to observation, the members realized that following Professors to determine where they face the most IT issues would not be practical: The team selected two team members to follow three professors over a period of a week, but noticed that either schedules clashed with those of the selected professors, or no IT issues occurred, and/or the team was limited to the information it could gather in terms of only being able to observe Professors in the classrooms. As a result, the Rocailles team resorted to using data from IT's Spider Incident Ticketing System to guide it in the direction of where the most defects occur and the time involved in solving them.

In general, the Rocailles team faced the following constraints:

- The members of the team had little or no practical personal experience with Six Sigma prior to the Six Sigma course, and as a result had to rely on hands-on learning
- A lack of timely clarity on whether the original approach to collecting data in the field was the most suitable
- Time and schedule limitations, and an action plan that fell short
- Faculty's misunderstanding of the purpose of the project due to communication issues
- Limited access to the project Sponsor and the IT Director due to various constraints

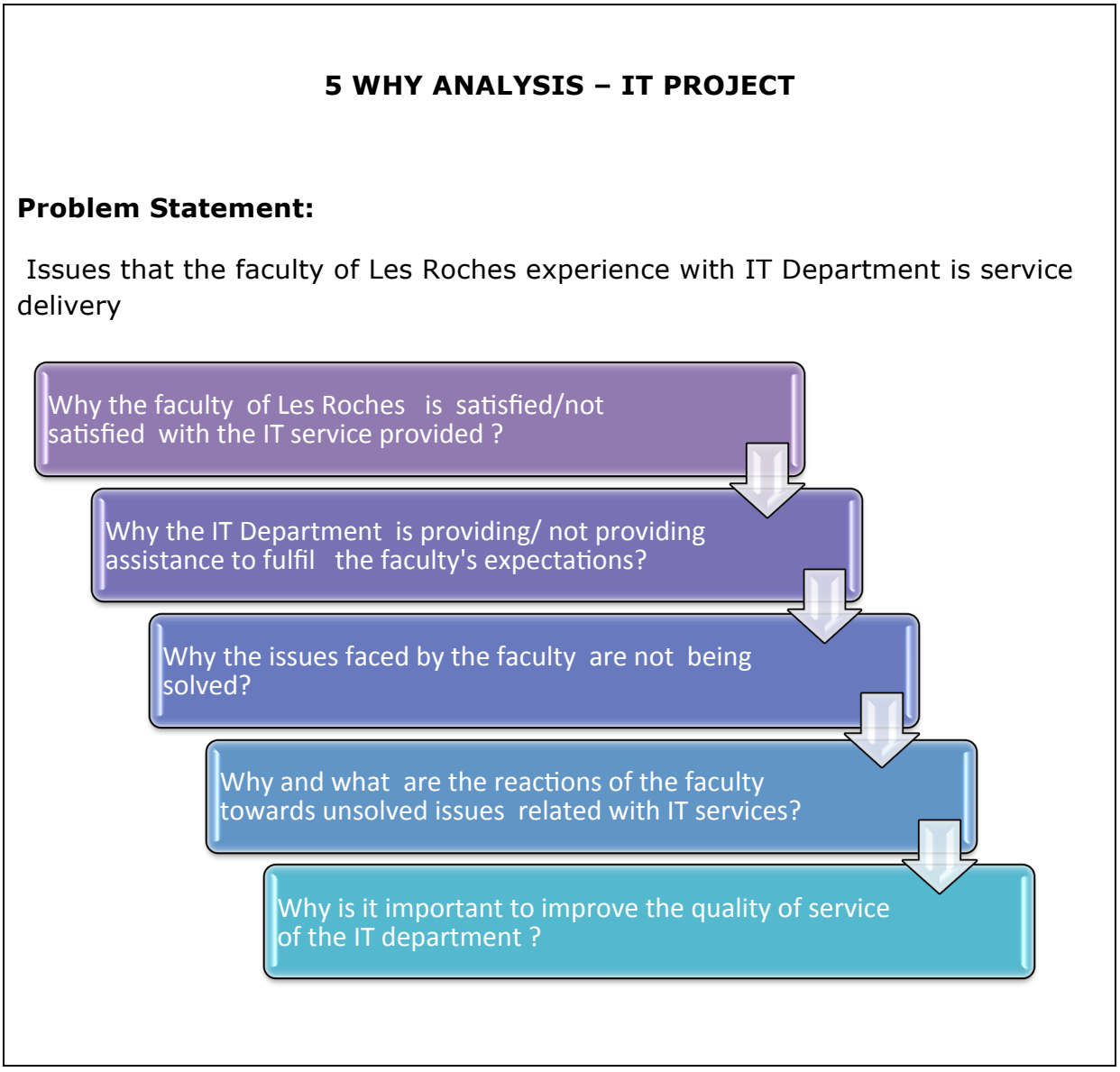
- The team was restricted to the fields that are set in the Spider Incident system and categorized the problem areas accordingly

Section 5: Analysis

5.1 5 Whys

Invented in the 1930's by Toyota Founder Kiichiro Toyoda's father Sakichi and made popular in the 1970s by the Toyota Production System, the 5 Whys strategy involves looking at any problem and asking: "Why?" and "What caused this problem?" Six Sigma, a Quality Management System (QMS), uses "5 Whys" in the Analyse phase of the Six Sigma Define, Measure, Analyse, Design and Verify (DMADV) process.

Figure 6:



5.2 Comparison of Data to VOC

According with the VOC obtained from the survey conducted during the past weeks and in comparison with the data generated from the Spider Incident report the following can be concluded:

- Les Roches has a policy of replacing Faculty's computers every 3 years (5 years for Language Professors etc.).
- 75% of the Professors are satisfied with the IT department support but they rate their experience as average.
- Internet connectivity is one of the constraints faced by Professors with almost 50% of them experiencing issues frequently. The VPN service is outsourced and this limits the department's control on service quality. Most of the issues are caused during the morning and afternoon, which exactly matches with the schedule of the professors.
- There is inconclusiveness in Professors answers regarding problems with in-classroom equipment, since frequent and not very frequent got the same score. Based on Mr. Aston's interview, this may be caused because classrooms need maintenance staff to check their equipment and sometimes the staff are not enough to check all the classrooms resulting in the inconsistent answers. Another issue is that the in classroom equipment need some periodic care that is not being religiously adhered to at the moment.
- About training for Professors, most of the interviewees disagree with the level of training they are receiving. Mr. Aston posits that the IT department provides training two times a year for faculty with a high average attendance according with the records, indicating a shortfall in the current training program.
- About IT Department's response time, the interviewees rate the services as "fast". According to the data provided by Mr. Aston, IT currently adopts three ways of solving faculty issues - one of them is an online remote access that offers a very fast solution to minor issues.
- According to the interviewees, IT is able to solve 50% of the issues they face, and as Mr. Aston confirms, IT has to send some major issues to external providers to resolve.
- The current opening hours of the IT Department were determined through research on demand. 8 out of 28 respondents explained that they are dissatisfied with the current working hours. Mr. Aston explained that Professors always have access to the Help Desk Technicians, irrespective of the hours posted on the door, and can contact the department via email, phone or in person.

Overall, the Rocailles team identified a number of cases where there was contradicting information provided by the participants.

Section 6: COPQ

6.1 Analysis

Cost of Poor Quality highlights the potential financial benefits a company can achieve in its quality improvement programs. Some of the instances of poor quality at Les Roches' IT department are loss of time by the faculty and staff in fixing up an issue. The table below analyses the Cost of Poor Quality with regards to the issues that occur. It is observed that most of the issues are due to a lack of training and could be avoided if more regular training can be given to Faculty by IT. Due to inadequate training and communication, the individuals using the facilities are not adequately capable or engaged to use the tools correctly and/or effectively. The usage of IT tools has been observed and determinations on the difficulty to configure have been established due to their frequent occurrence in class. Timeless was impaired by performance problems, causing delays in resolving requests. Timeless refers to tracking delays and lateness of the deliverable.

Table 2: Cost of Poor Quality

Activity Resulting in Poor Quality	Cost Location	Cost Centre	Average Efforts in Minutes	Total No. of Tickets per Month	Percentage of Total Tickets (%)	Total Cost for Activity (Man Hours) per Month	Total Cost for Activity (CHF) per Month
Break Down - Lotus Notes	Time	Training	32.36	33	22	17.798	2180.3
Software	Documents, Time	Capex	24.12	30	20	12.06	1477.4
Password Issues	Time	Training	14.71	7.5	5	1.83875	225.2
Printer Toner	Time	Purchase Budget	18.47	4.5	3	1.38525	169.7
Hardware	Time, data	Capex	37	19.5	13	12.025	1473.1
New Computer	Time	Training	108.2	4.5	3	8.115	994.1
Miscellaneous Issues	Time, Data, Documents	Miscellaneous	20	51	34	17	2082.5

Average Salary: CHF 122.50 per Hour

The Cost of Poor Quality is not only restricted to time loss and the associated loss of wages (Faculty) involved, but can be extended beyond this to what is lost from the student(s)'s perspective (fees and knowledge), or the cost of involving a third party in finding a solution. This tool helps emphasize the severity of the losses incurred by the defects in IT's current system for dealing with Faculty issues.

Section 7: Design

7.1 Suggestions for Improvement

The Rocailles team would like to implement solutions that will eliminate the defects and prevent them from occurring. According to the feedback of the interviewed Professors, the team has identified a number of issues that are centred around training. The team recommends that the IT Department provide training before the semester starts and makes it mandatory for all faculty. Increased attention to visiting Faculty is important. For example, when the new printing system was implemented, visiting Lecturers were not trained on how to use the new printing system and encountered difficulties with these facilities.

- Before arrival, the visiting Professor should be sent instructions on the necessary system(s) and a short practical training should be provided upon arrival.
- Training should be offered on how to use different facilities in the classrooms and some additional equipment should be available on stand-by for the rooms that have the least facilities and where the most problems are likely to occur.

Many defects with the printing system happen on the weekends. Some of the Professors are on campus during the weekends and it causes difficulties for work progress when the printing system is down. Due to the limited number of IT staff, the team understands the constraints involved in suggesting a change in working hours or hiring additional staff. However, this problem can be approached from a different perspective, and this viewpoint will guide the following options:

- Existing staff to work on weekend shifts or recruit an additional IT person for weekend duties to check the system each morning to make sure everything is working.
- Have an integrated system that signals IT when there is a defect and have someone on-call if its an urgent issue.
- To have a system where Professors can schedule ahead if they require support over the weekends.
- Create a live chat/Q&A feature that can be accessed online. Live support is a web service that allows users to communicate or chat in real time with Faculty. Live support applications are commonly used to provide immediate customer support and information to clients and customers.

Another improvement would be to provide support for MAC computers. Half of the students and faculty are users of MAC. It would be very useful if IT supports MAC computers.

7.1.1 Further Analysis of Suggestions Using TRIZ

TRIZ is an inventive problem solving methodology that has helped solve numerous engineering problems. Historically, the focus of TRIZ has been on addressing complex physical problems in the engineering domain. There have been a number of instances where TRIZ has been applied to problems in other domains, including IT.

TRIZ is beneficial in both the improvement of existing products, services, and processes, and the creation of new products, services, and processes (Domb, 2001). In order to search for possible options to eliminate measurement (e.g. create a common database) or at least reduce the complexity of the problem, the following are suggestions for improvement based on TRIZ principles:

Principle 1 Segmentation

Further sub segmentation of issues classified under Lotus Notes in the IT Spider Incident ticketing system to allow IT to better track issues with the software. Decentralization of the current decision-making process to allow IT to monitor performance on a more regular basis.

Principle 5 and 13: Merging and the Other Way Round

Rethinking the current issue of IT being understaffed, the IT Department can consider the possibility of hiring a student on a part-time basis to solve issues on the weekends and after hours.

The principle of merging comes into play from the perspective of using the existing human resource opportunities without the level of cost that would be involved in hiring a professional.

Principle 6 Universality

Training the IT staff to support both MAC and PC's to perform multiple functions, thereby eliminating the need to involve third parties, and broadening the knowledge-base of IT staff.

Principle 7 Russian Dolls

Integrating automated checks and balances within the current system to automatically notify IT staff of defects.

Principle 20 Continuity of Useful Action

Make available on-going online training videos accessible through the Intranet and provide IT handbooks and manuals to faculty. The induction process for new hires needs to be further fine-tuned to adequately provide new Professors with the technical training they require.

Principle 23 Feedback

In addition to depending on IT staff, to close tickets when issues are resolved (in the Spider Incident System), IT can also consider collecting feedback from customers (faculty) to determine the level of satisfaction with the service provided. This will help to determine if quick or lasting solutions are provided and will help to improve customer relations.

7.1.2 Restrictions: Force Field Analysis

Force Field Analyses show the relationships between factors that help promote a change and those that oppose or create resistance to it.

1. Objective: Providing sufficient training to the resident and visiting Faculty:

Driving Forces	Restraining Forces
Build better skills and get knowledge	Lack of time for all professors to devote to training
Provide additional equipment to facilitate training	Technical problems + budget of IT

2. Objective: Extend opening hours to cover weekends:

Driving Forces	Restraining Forces
Extend working hours/weekends based on shifts to include weekends	Limited number of staff available
To control and resolve existing problems with defects like when the printing system goes down	Some problems cannot be resolved by staff and need to be referred to a 3rd party – the manufacturer
Check IT systems every morning	Problems may occur during the day and IT staff would have left by then
	Difficulties with recruiting

3. Objective: Create a live chat/ Q&A feature that Faculty can utilize when they need assistance outside of IT's business hours:

Driving Forces	Restraining Forces
To improve customer satisfaction	Costly
To improve efficiency	Time and human resource constraints

4. Objective: Provide remote access that can signal the IT representative on duty when there is a defect:

Driving Forces	Restraining Forces
To solve weekend problems	Costly
To resolve problems in a timely manner	Time and human resource restraints

5. Objective: Ability to provide support to MAC users:

Driving Forces	Restraining Forces
Resolve MAC issues successfully	**No specialisation in MAC computers**
Customer satisfaction	Cost of additional training and the supporting equipment requirements
Specialise in MAC support	Time and human resource restraints

7.2 Considerations

Manpower: Manpower Planning which is also called Human Resource Planning consists of putting the right number of people, the right kind of people at the right place, right time, doing the right things for which they are suited for the achievement of goals of the organization.

The following are considerations with the suggestions made during the Design phase of DMADV:

Financial: A Project feasibility financial cost estimate may be required to determine whether or not to proceed with development of a project initiation.

- For the first suggestion made (hiring a new member in the staff), there will be an additional cost to the IT Department and that will affect the department's monthly budget; at the moment that amount is unknown to the team.

- Existing system capabilities can be built on to create a live chat/ Q&A and other integrated monitoring systems. This will help lower the cost involved as compared to adopting completely new systems.

- Staff Training to Work with Apple Products: Apple provides a service named "one to one" membership, which allows Mac users to get access to unlimited lessons on how to use and program Mac computers, the cost of the membership is $99.00 US Dollars. Also there will be a need to acquire a Mac computer(s), which depending on the model may vary from $ 1,000.00 to $1,500.00.

Time: Cost of extra time in this case will depend on the amount of time each stage will take. Training and implementation take different amounts of time, therefore measures for both will vary.

Summary

The purpose of this paper was to apply Six Sigma to IT's current service delivery process using a measure of Cost of Poor Quality to justify why the number of defects should be either reduced, eliminated and/or prevented from reoccurring. The Rocailles Team that consists of seven members was split up into seven roles as required by this project, and worked in partnership with the Project Sponsor – Professor Wood and the Project Client: the IT Department. The project was initially approached using the Design Measure, Analyse, Improve and Control methodology, but this was eventually substituted with the Define, Measure, Analyse, Design and Verify system, as the team realized that it needed to suggest and verify the feasibility of the recommendations made. The different phases of the DMADV process took place over a two month period during which the Project Charter was defined, Voice of Customer information was collected using paper surveys, data was collected using IT's ticketing system, an analysis was carried out to determine where the root causes lie, and tools like TRIZ were applied to design improvements that were verified against what Faculty's IT needs are.

The main areas for improvement that Faculty identified in the surveys include the following:

- 75% of the Professors are satisfied with current IT support but they rate their experience as average.
- Internet connectivity is one of the constraints faced by Professors with almost 50% of them experiencing issues frequently.
- The team was unable to conclude on the level of training and whether it is sufficient since there were contradictory answers. This compared with IT's current training indicates that there is a shortfall in the current training program.
- According to the interviewees, IT is able to solve 50% of the issues they face.
- 8 out of 28 respondents explained that they are dissatisfied with the current working hours.

To address these issues the following suggestions have been made:

- Schedule more frequent training sessions or provide more tools during each semester for both resident and visiting Professors.
- Add an additional IT technician to cover weekend duties.
- Integrate systems and remote access that can signal IT when there are defects.
- Provide an online chat option or live support to allow IT to communicate with Faculty, in real time and outside of working hours.

- Provide support for MAC computers.

The justification behind the need for these improvements stemmed from an analysis of the Cost of Poor Quality that was valued at approximately CHF 8,602.00 loss in wages per month and an average of 70 hours lost per month (for Faculty alone). The Cost of Poor Quality was evaluated from the perspective of lost time and wages, however this can be extended even further to investigate what is lost from the student(s)'s perspective e.g. class time, fees and knowledge, and/or the cost of involving third parties in finding solutions.

This project provided the Rocailles Six Sigma team with hands-on training on how to apply Six Sigma and the essence of the lessons that were learned from this project include the importance of clearly distinguishing between Voice of Customer and data and choosing the appropriate measures and methods for observation during the Define phase; and not jumping to conclusions prematurely and as a result, basing suggestions for improvement solely on data and not opinion. For future research, a checklist (please see appendix 3) can be used to collect data from the field and issues that are currently being classified under one broad heading in IT's ticketing system – Lotus Notes, can be further segmented so that IT can determine where the exact root causes lie and can make improvements where necessary.

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Appendix

Appendix 1: Timeline of Meetings and Actions Taken

February 09 2012

- First meeting
- Overall discussion on the project

February 16 2012

- Dr. Woods met with us and we discuss the process.

February 21 2012

- Revised charter
- We had a skype meeting with Dr. Woods to discuss the direction we are heading in

February 28 2012

- We work on the process that was approved by Dr. Woods

March 01 2012

- We made recommendations on how to approach the faculty

March 06 2012

- Dr. Woods give us feedback

March 15 2012

- Show Mr. Aston the charter and questionnaire

March 19 2012

- Analyze data and started to work on the final document

March 20 2012

- Continue to work on the final document

Appendix 2: Sample of Information Gathered During Observation Phase

Observation No.	Place of Observation	Date & Time of Observation	Situation	Subject
1	Room No. 309, Les Roches International School of Hotel Management	Thursday 2nd February, 12.50 to 14.35pm	When the professor started her lecture, the connection with the projector was lost. Even after several attempts by students in class the problem was not solved. As a result a considerable amount of time was lost and the professor continued her class with the connection.	Dr. Marianna Sigala.
2	Room No.EW-6, Les Roches International School of Hotel Management	Thursday, 15th February, 10.05am to 12.45pm	Dr. Sigala faced yet another connection problem the projector. Although unlike previous session the connection restored after sometime. This is her second problem.	Dr. Marianna Sigala.