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FACULTY OF BUSINESS ECONOMICS

Master of Management: Management Information Systems

Masterproef

Business Process Improvement of Kogeka's Inventory System

Promotor :
Prof. dr. Koenraad VANHOOF

Tamara Sharaf

*Master Thesis nominated to obtain the degree of Master of Management , specialization
Management Information Systems*

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Preface

This is a research of putting the methodologies and steps of the (Handbook for business process improvement, 1996) in real life practice. Kogeka School was the subject for this practice because of the complications in their inventory system. Kogeka also suggested a master's student from the University of Hasselt to help with the situation.

Here is a look at the scope of the thesis:

Chapter one, research goal, talks about managing the inventory of Kogeka and the problems their inventory was suffering from. Also the methods and programs used to achieve the goals.

Chapter Two, describes the Business Process Improvement steps, which steps were chosen for this research, and which steps were excluded.

Chapter Three, process improvement of St Joseph's inventory system, it talks about what is business process improvement, how it benefits the organization, it also gives a further description for the inventory problems.

Chapter Four, the applied methodology, talks about the steps talking in improving the processes according the handbook.

Chapter Five, the results, gives specific details on the agreed solutions that were suggested to fix the inventory problem, the results of implementing the methodology and the final Bizagi models.

Chapter Six, the conclusions, shows the lessons learned in putting the handbook in practice, also the lessons learned while dealing with team work.

Summary

Business Process Improvement (BPI) focuses on "doing things right" .BPI attempts to reduce variation or waste in processes, so that the desired outcome can be achieved with better utilization of resources.

This thesis is about using BPI for reducing waste and completing projects on time in St Joseph's institute, and helping their inventory system

Using the handbook of BPI, a team was chosen to complete the steps in improving a chosen process. This process is (take an item from the warehouse to a project).

The steps in clued:

- 1) Selecting a process
- 2) Organize the right team
- 3) Defining a process using a flow chart and simplify process by removing unnecessary activity
- 4) Identify root causes for lack of capability
- 5) Plan to implement the process change

After completing these steps, the team finds the ideal solution for the processes and lays it out on a final flowchart.

The flowchart is ready to be drawn in Bizagi program for more accuracy. Bizagi is Business Process Management software that makes business process modeling easier and clearer.

Acknowledgements

This thesis is the fruit of my hard work, efforts and determinations. I wouldn't have been able to write it without the help and support of some great people and I would like to use this opportunity to thank each and everyone who was part of it;

Professor Koen Vanhoof, my supervisor, for his constant care, his helpful guidelines and his endless patience.

I extend my appreciation to Hasselt University and Princess Sumaya University for Technology's professors, staff and fellow students for their help and motivation.

Special thanks to Kogeka School and their wonderful team for devoting their time and efforts to work along with me.

With love and gratefulness I would like to dedicate this thesis to my grandmother, my beloved parents, family and friends who were always supporting me and believing in my potential.

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List of Abbreviations

(BPM)	Business Process Management
(BPI)	Business Process Improvement
(TA)	Technical Advisor
(PDCA)	The Plan Do Check Act
(BPMN)	Business Process Management Notation

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Chapter One

Research Goals

Chapter One: Research Goals

1.1: Managing the inventory of a school

Kogeka, is a community of six secondary schools in Geel, these institutes offer general, technical and vocational education to students aged 12-19.

St Joseph Institute, is the focus of this thesis, St Joseph Institute is one of Kogeka's schools. It is a school that consists of five departments, mechanics, woodwork, catering, agriculture and part-time education, with a number of 250 teachers and 1600 students.

1.2: The problems with St Joseph's Institute's inventory system. (This will be discussed in details in chapter 2)

1.2.1: Not completing projects on time

This problem is caused by bad management of inventory which is occurred when there is miscommunication between technical advisors and the warehouse.

Thus the goal is to complete projects on time.

1.2.2: Waste of products and money by the end of the year.

This problem occurs when the program they use Count-e doesn't have the ability to link the orders out of the warehouse and also does not have the ability to link warehouse to finance.

Thus the goal is to reduce waste.

1.3: Method used to achieve those goals

Business process improvement, What is process improvement?

Process improvement means making things better. It means putting aside the expected. It is a way of looking at how to do work better.

When taking a problem-solving approach or simply trying to fix what's broken, this may never show or recognize the real root cause of the difficulty. But, when engaging

in true process improvement, it is a must to learn what causes things to happen in a process and to use this knowledge to reduce differences, remove unnecessary activities that has no value to the product or service produced.

A team examines all of the factors affecting the process: the materials used in the process, the methods and machines used to transform the materials into a product or service, and the people who perform the work. (Handbook for business process improvement,1996)

The research goal is testing a methodology of (Handbook for business process improvement) on St Joseph's institute. Putting this handbook in real life practice and observing the results along the way of implementing the steps in the book.

1.4: The program used to achieve those goals

Bizagi, Business Process Management (BPM) software makes business process modeling, execution (workflow) and improvement easy for everyone, for a small organization or a big corporation.

Although it is not required to use this program but it is a new efficient way to draw out the processes.

This program makes the job of drawing flowcharts more accurate and clear.

Chapter Two

Business Process

Improvement

Chapter Two: Business Process Improvement

2.1 What is a process?

A process is a collection of interrelated work tasks such as a *collection of actions, activities, steps or tasks make up a business process* initiated in response to an event that achieves a specific result for the customer of the process. Everything we do in our lives involves processes and lots of them.

There are three types of business processes:

1. Management processes, the processes that direct the operation of a system.
2. Operational processes, processes that form the core business and create the primary value stream.
3. Supporting processes, which support the core processes.

2.2 How does BPI benefit the organization?

A process improvement methodology allows the organization to look at how they perform work. When all of the major players are involved in process improvement, they can collectively focus on eliminating waste of money, people, materials, time, and opportunities. The ideal outcome is that jobs can be done cheaper, quicker, easier, and most importantly safer.

2.3 How does an organization get started on process improvement?

The first step in getting started on process improvement is for the senior leader to make it a *command priority*. The importance of process improvement must be communicated from the top.

This thesis will be based on the handbook which is developed to provide teams with a step-by-step approach for their process improvement efforts.

The focus is on improving a process over the long term. To get started on process improvement, leaders should start thinking in these terms:

What process should we select for improvement?

What resources are required for the improvement effort?

Who are the right people to improve the selected process?

What's the best way to learn about the process?

How do we go about improving the process?

Those questions will be answered and covered in Chapter Four The Applied Methodology and Chapter Five The Results.

2.4 What's in the Basic Process Improvement Model according to the (Handbook of Business Process Improvement)?

Step 1: Select the process to be improved and establish a well-defined process improvement objective.

Step 2: Organize a team to improve the process. This involves selecting the "right" people to serve on the team.

Step 3: Define the current process using a flowchart.

Step 4: Simplify the process by removing redundant or unnecessary activities. This can be a real eye-opener.

Step 5: Develop a plan for collecting data and collect baseline data.

Step 6: Assess whether the process is stable.

Step 7: Assess whether the process is capable.

Step 8: Identify the root causes which prevent the process from meeting the objective.

Step 9: Develop a plan for implementing a change based on the possible reasons for the process's inability to meet the objective set for it.

Step 10: Modify the data collection plan developed in Step 5, if necessary.

Step 11: Test the changed process and collect data.

Step 12: Assess whether the changed process is stable

Step 13: Assess whether the change improved the process.

Step 14: Determine whether additional process improvements are feasible.

Those were the exact steps from the handbook, but were they all put in practice for St Joseph's Institute?

2.5 What are the steps that were put in practice for this research?

The months spent on practicing this handbook on St Joseph's Institute were only 7 to 8 months, which meant that some steps had to be excluded and tailored to fit the time span.

A summarized look on the "tailored" steps would be as follows:

- 1- Select a process
- 2- Organize the "right" team
- 3- Define a process using a flow chart
- 4- Simplify process by using unnecessary activity
- 5- Identify root causes for lack of capability
- 6- Plan to implement the process change
- 7- Laying out the new and improved process using (Bizagi)

The steps will be explained in more detail during Chapter Four the Applied Methodology

2.6 What was excluded?

The steps in the handbook were tailored to fit the time span of St Joseph's Institute, but what were the most important steps that were excluded?

The Plan-Do-Check-Act PDCA cycle was the one of the most important steps in the handbook. This research practiced only first step of the cycle, which is the "Plan" and it will be more discussed in Chapter Four.

2.6.1 What is the PDCA?

1. **Plan.** Recognize an opportunity and plan a change.
2. **Do.** Test the change. Carry out a small-scale study.
3. **Check.** Review the test, analyze the results and identify what you've learned.
4. **Act.** Take action based on what you learned in the study step: If the change did not work, go through the cycle again with a different plan. If you were successful, incorporate what you learned from the test into wider changes. Use what you learned to plan new improvements, beginning the cycle again.

Chapter Three

Process Improvement of St Joseph's Inventory System

Chapter Three: Business Process Improvement of St. Joseph's Inventory System

3.1: Business Process Improvement (BPI)

3.1.1: What is BPI?

BPI is an approach to increase the effectiveness and efficiency of business processes that provide output to internal and external customers (Harrington, 1991). Or it can be like this; BPI is making things better, when taking a problem-solving approach or simply trying to fix what's broken, this will result in not discovering or understanding the root cause of the difficulty. Process improvement means seeking to learn what causes things to happen in a process and to use this knowledge to reduce variation, remove activities that contribute no value to the product or service produced, and improves customer satisfaction.

3.1.2: Why "business process improvement"?

BPI works by:

- Defining the organization's strategic goals and purposes (*Who are we, what do we do, and why do we do it?*)
- Determining the organization's customers (or stakeholders) (*Who do we serve?*)
- Aligning the business processes to realize the organization's goals (*How do we do it better?*)

3.2: St. Joseph's Institute's inventory

As explained earlier, Kogeka consists of six different schools, St Joseph's institute is one of them.

Here is why this school is the main focus to this thesis, and why it is the subject to practice on the handbook of business process improvement.

3.2.1: Warehouses

The school consists of five departments, mechanics-electricity, woodwork-construction, catering, agriculture and part time education. This makes five different warehouses. The most warehouses that are susceptible to difficulties are the mechanics and woodworks, because you can never determine the right quantities for a certain project.

Fille Exelmans, the warehouse manager, was interviewed. He was questioned about the circumstances in the warehouse environment, along with other things. (Interview in appendix A)

The conclusions after studying the interview were as follows:

- 1- Fille was overwhelmed.
- 2- Doesn't agree with the voucher being written on paper.
- 3- Fille felt like he could finish his job in less time if the system worked better
- 4- Had difficulties dealing with teachers
- 5- The accounting program they used (count e) was insufficient
- 6- Fille was lost, in the matter of not knowing who took the materials from the warehouse and in the matter of following up with the inventory levels

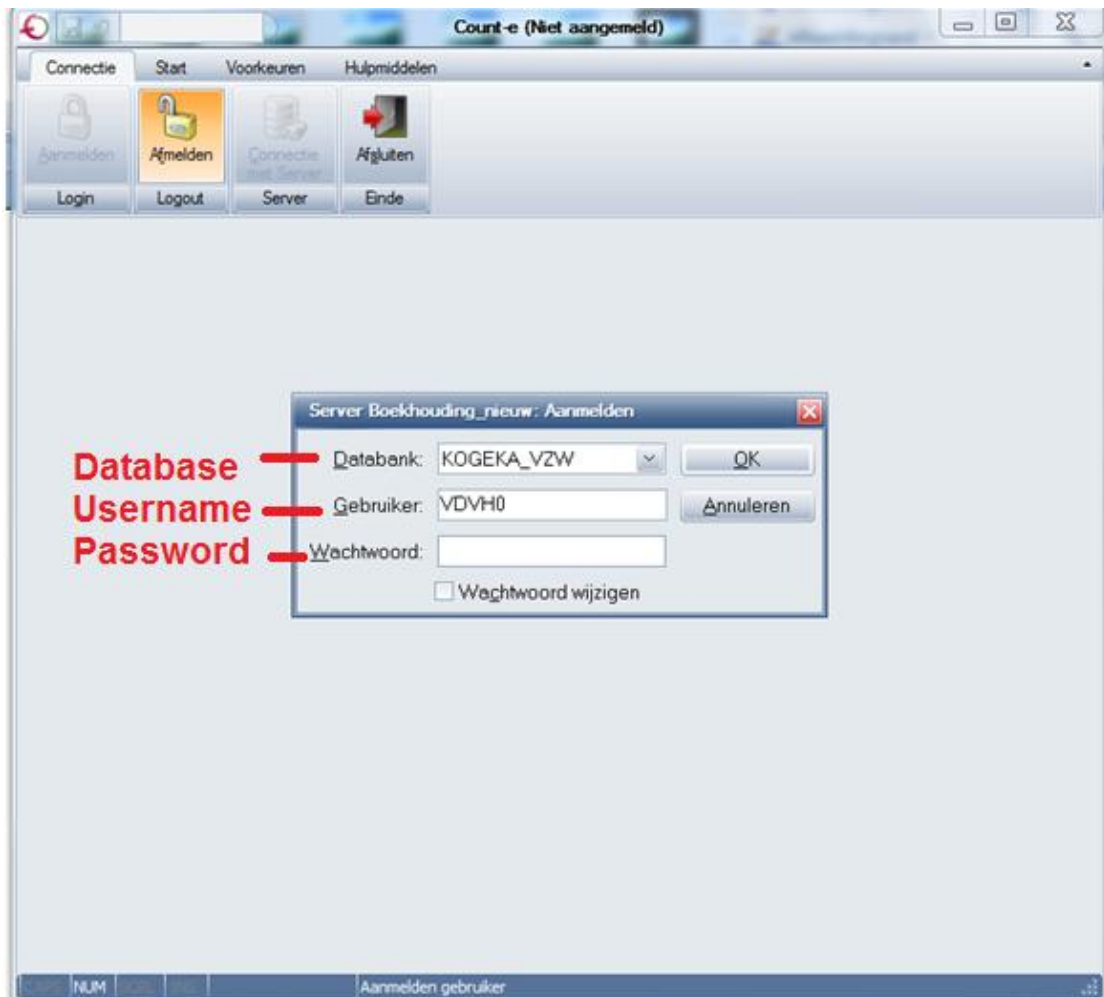
3.2.2: Software used, faults

The accounting software the school uses is called (count-e)

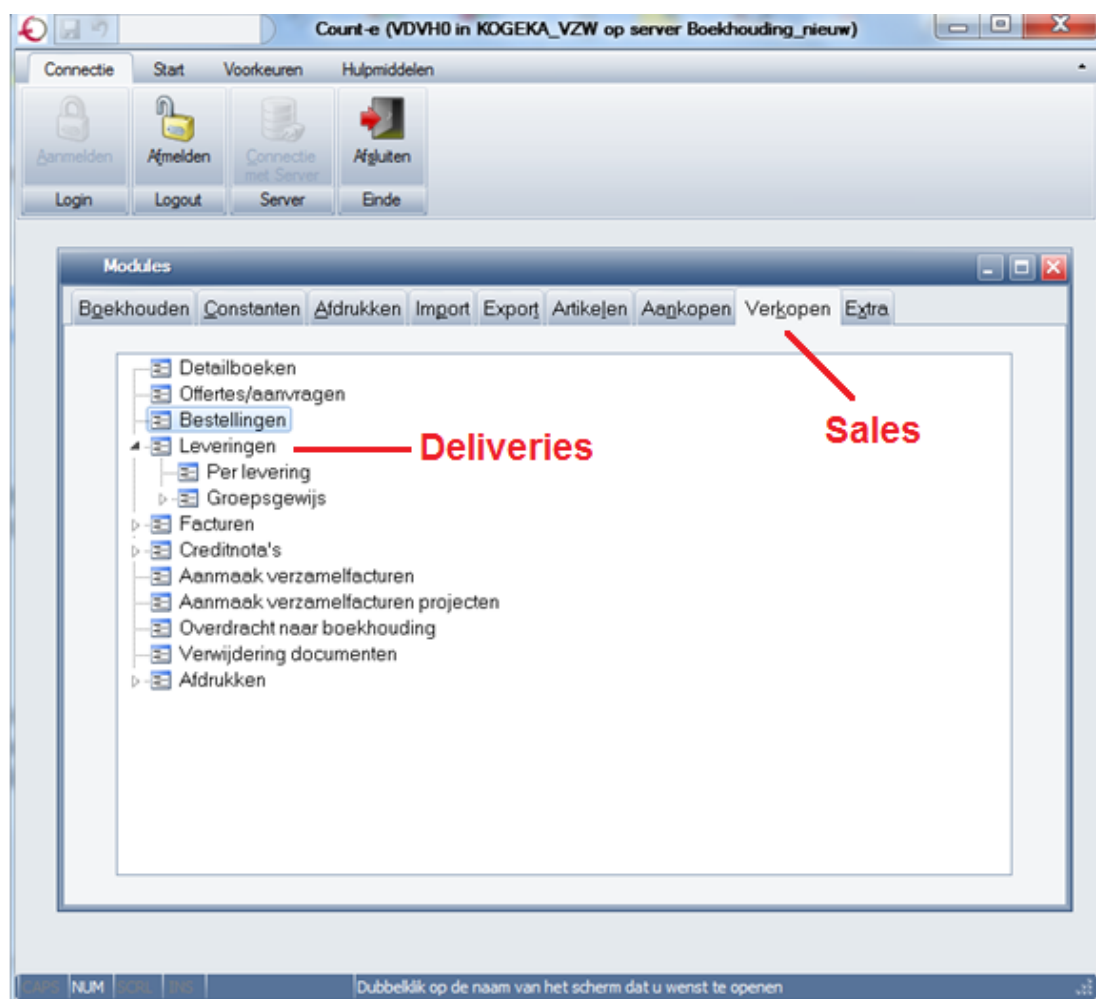
It is easy to use, and adds a lot of benefits, but there are some faults to this software, which are:

- 1- It is shown in picture 2.1, to enter the program, you need a user name and password. At this point, only technical advisors and senior management can enter this program. So none of the teachers can actually make a use of it.
- 2- Any other program cannot be linked to count-e system, for example, for St Joseph's institute decided to buy a software that helps with warehousing, this warehousing software cannot be linked to count-e, and automatically registers the transfers or ordering or delivery transactions.

- 3- If the school decided to implement a bar-code scanning system, this also cannot be linked to count-e.
- 4- Hilde Van de Vliet contacted the programmers behind count-e, the company itself, and asked for updating their program to accept the bar-coding scanning system, but they have denied this request due to their other client's demands.
- 5- Picture 4.2 shows the sales transactions, where the delivery section (leveringen-per levering/groepsgewijs) is in the program but it is not active, it is not put to use because it is not linked to the warehouse, whatever purchase transaction that happens in the warehouse is not directly recorded in the count-e system.



Picture 3.1 (The opening page of count-e)



Picture 3.2 (inactive count-e delivery section)

3.2.3: The material Voucher

It is a document on paper, which gives all the information about the destination of an item picked up or delivered from the warehouse to a project.

This is a source of errors because it is written on paper, sometimes when teachers use it, they don't know how to fill the right information or they leave some blank sells.

Appendix C, shows a material voucher (materiaalbon) that is used by St Joseph's staff.

Chapter Four

The Applied Methodology

Chapter Four: The Applied Methodology

4.1: Selecting a process

Selecting a process is a crucial step. To know which process to focus on, broaden the knowledge for the whole perspective, derive the error and then find the probable solutions to those errors.

4.1.1: What is the process chosen to improve?

The process chosen to improve is; taking the materials out of the warehouse to a project.

4.1.2: Why was this process chosen?

This process was chosen because it was found to be the most crucial one, with the widest range of errors, if this process can be improved, other processes can be easily improved after that.

4.2: Organize the “right” team

Organizing a team to work with, this is important for deciding and acknowledging the actual actions and steps the team must take to improve the process.

4.2.1: Who are the team members?

- ▶ Engelen Mit, ICT manager
- ▶ Van de Vliet Hilde, financial director
- ▶ Exelmans Fille, warehouse manager
- ▶ Van Hout Leslie, Finance
- ▶ Van Vaerenbergh Rein, Technical advisor coordinator
- ▶ S'jegers Marc, Director
- ▶ Mertens Rob. Technical Advisor
- ▶ Martens Marc

4.2.2: Why were they selected?

The reason those employees and employers were selected to improve the selected process, is that they had crucial roles in the whole process, they have a wider look on things more than other employees or teachers;

A technical advisor is the person responsible for setting which materials are needed for a project. A technical advisor is the one who looks over the teacher's work. There are particular TAs for particular warehouses, for example Arnauts Joris is the TA responsible for Agriculture department and also Cornelis Jim is the TA for the electric department.

Rob Mertens was selected to be on the team because he is the TA for the wood department, which is the most difficult one, because it is almost hard to know the exact amount that is needed for a single project, since students can make errors or in sometimes there can be excess wood or a shortage of wood. On the other it is also hard to record the quantities of wood on count-e.

Mit, was chosen for the IT factors in the process improvement, what software's are available for the improvement process, what are the errors in the software that is being used for financial statement, orders, delivery, vouchers... etc. Mit can give new IT suggestions for bar-coding, electronic voucher and password solutions.

Hilde the financial director and Leslie also in the finance, have the general idea of the finances, accounting, the losses, the mistakes and the errors that happen when vouchers are written in an insufficient way. The major problem that has to be tackled is that the school is trying to minimizing the losses at the end of the year.

Fille, the warehouse manager, is the person who sees everything first hand, everything that comes and goes out of the warehouse he has to be aware of. In other words, he is the first witness to all the warehouse problems and needs, therefore, he will be in on every step through this process improvement methodology.

Marc Mertens, the head of the purchasing department, so basically Marc oversees all aspects of her company's purchasing operations.

And finally, Marc the school's director, chosen for approving and disapproving the steps taken, giving general opinions and ideas needed.

4.3: Defining a process using a flow chart and simplify process by removing unnecessary activity.



Picture 4.1 (The team defining a process using flowcharts)

4.3.1: Defining a process using a flow chart

The team was put on a task, after agreeing on which process to improve, they had to each draw a flowchart, showing what they overall see the activities taken to achieve this process. This is used as an eye opener, to really see and grasp what goes wrong, and what needs to be taken down or put up.

The flowchart did not have to be perfect, they were just used to see the employee's prospective on how things really worked.

Fille was asked to draw his flowchart and be shown in front of the rest of the team, Fille, being the warehouse manager, is an important part of this whole processes. He came up with this chart;

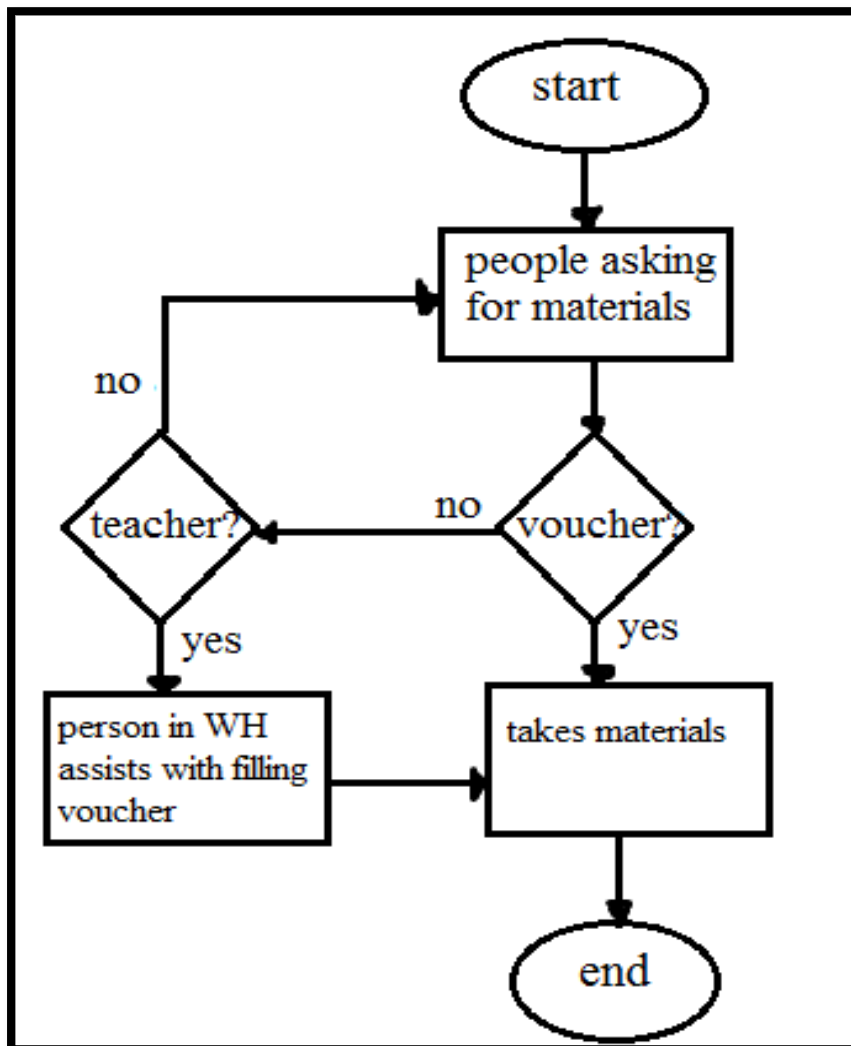


Figure 4.1 (Fille's flowchart)

Fille's flowchart was drawn roughly, but it clearly shows his prospective on how this processes works.

It shows that the start of the whole process is that people come to the warehouse and ask for materials. If they already have a voucher then they take the material from the warehouse and process ends. But if they don't

have a material and it is a teacher, then they ask for assistance for filling up the voucher and take the material, otherwise they don't take anything.

Now for Hilde's flowchart, it looked as the following;

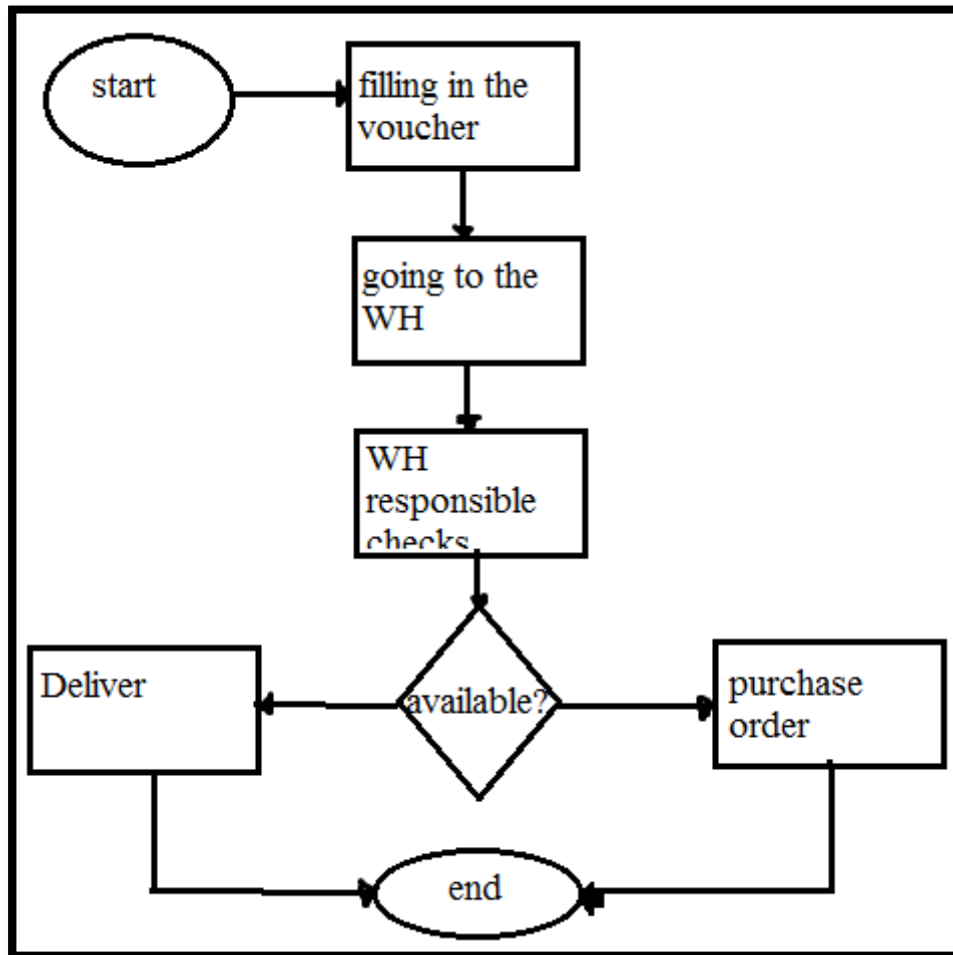


Figure 4.2 (Hilde's flowchart)

Hilde's flowchart was also roughly drawn, but shows her prospective, it is clearly shown that her flowchart is completely different from Fille's flowchart.

Hilde's flowchart already starts with filling in a voucher, unlike Fille's. Then the voucher goes to the warehouse, the person responsible for the warehouse checks if the material is available, if it is available then the material is delivered. If it isn't available, the warehouse manager or the responsible sends a purchase order.

4.3.2: Simplify process by removing unnecessary activity.

Calling this step as an eye opener is correct, because there were some unclear and inaccurate activities in those flowcharts.

Fille's chart, there were some unclear points, which were;

- 1- A person arriving with an incomplete voucher
- 2- A person arriving with no voucher
- 3- Filling in the voucher was troublesome to the teachers, by not knowing how to fill an article number, the quantity (units), for which projects/ destination and there was no approval of TA.

Hilde's chart was acceptable, that is how she really saw the activity goes, but does it really work this way? A lot of the team members disagreed, this was the perfect way of doing things, but the truth is that the voucher almost always arrives to the warehouse incomplete and sometimes they arrive with no voucher at all.

4.4: Identify root causes for lack of capability

To improve the process, the team must find what causes the product or service to be insufficient. The team should brainstorm causes that may be affecting the ability of the process to meet the process improvement objective using a cause and effect diagram.

4.4.1: Which type of cause and effect diagram was chosen.

There is more than one type of "cause and effect" diagram, the most popular one is the fishbone shape, there is the also the star shaped one. But the diagram chosen for this team was the (Events and Consequences)

Cause and Effect: Events and Consequences

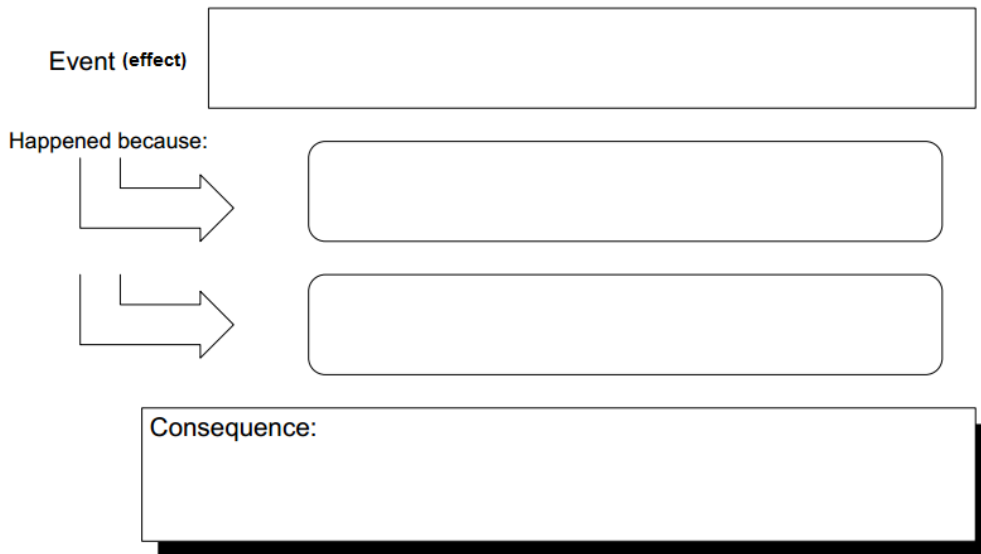


Figure 4.3 (Cause and Effect, Events and Consequences Diagram)

The team agreed on the one most important problem this process is facing, which is an incomplete voucher, this showed up on Fille's diagram, an incomplete voucher means that the teachers or any other person has the difficulties in filling up the order, not knowing the item number or quantity, or forgets to write the name of the person ordering the item.

Cause and Effect: Events and Consequences

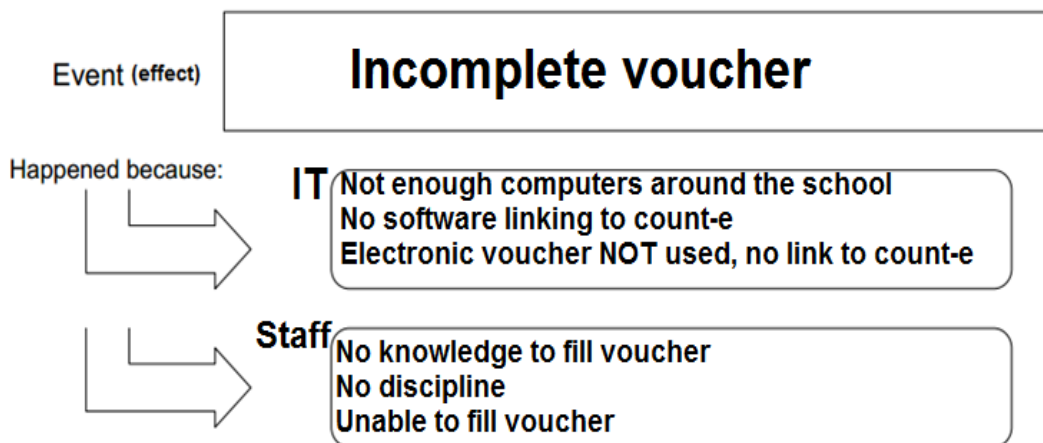


Figure 4.4 (Cause and Effect diagram of the process, filled by the team)

The Event, shown in figure 4.4, is an incomplete voucher. An incomplete voucher obviously occurs because it is all written on papers, but why is it such a difficulty to use electronic vouchers? This is because:

- 1- There isn't enough computers around the school. If there computers were more available, the teachers would not find it hard to use a computer and order something using the electronic voucher, some teachers have trouble leaving the students in the classroom alone and go to another place for finding a computer. Also sometimes the teacher would be with a certain project like painting the walls of the school, outside the building, the teacher has to face the fact of sending a student to do the ordering for him.
- 2- There is no software that can be linked to count-e, the school can buy an easy software, but after buying it, there is no way to link it to count-e
- 3- There is an electronic voucher, an excel sheet, but it cannot be linked to the main accounting program, which is count-e.

The staff also has a big impact on why the vouchers are arriving in an incomplete way, the reasons are:

- 1- They have no knowledge of the quantity needed, the item's name or number
- 2- They haven't the responsibility to fill the order in the right way.
- 3- The staff are not trained enough to fill in the blanks in the voucher when needing to order.

Of course the conclusion is obvious, that at the end of the year the finance department of the school discovers;

- 1) The warehouse is having a lot of missing items without knowing the reason of the loss
- 2) A lot of projects are taking a longer time to be complete for needing to wait on an item to arrive, or be in stock.

4.5: Plan to implement the process change

So far, the team has detected the problem and errors in the process, they have planned a change in the process that either removes or reduces the effect of the root cause identified earlier. The next step for the team is to plan to implement the changes on the process.

To make it more clear, Figure 3.5 is a flowchart that illustrates the steps the team should go on with.

They have to plan a change in the process that either removes or reduces the effect of the root cause identified earlier.

And also they have to modify the flowchart to reflect the new process (This will be discussed in more depth in chapter four: the results)

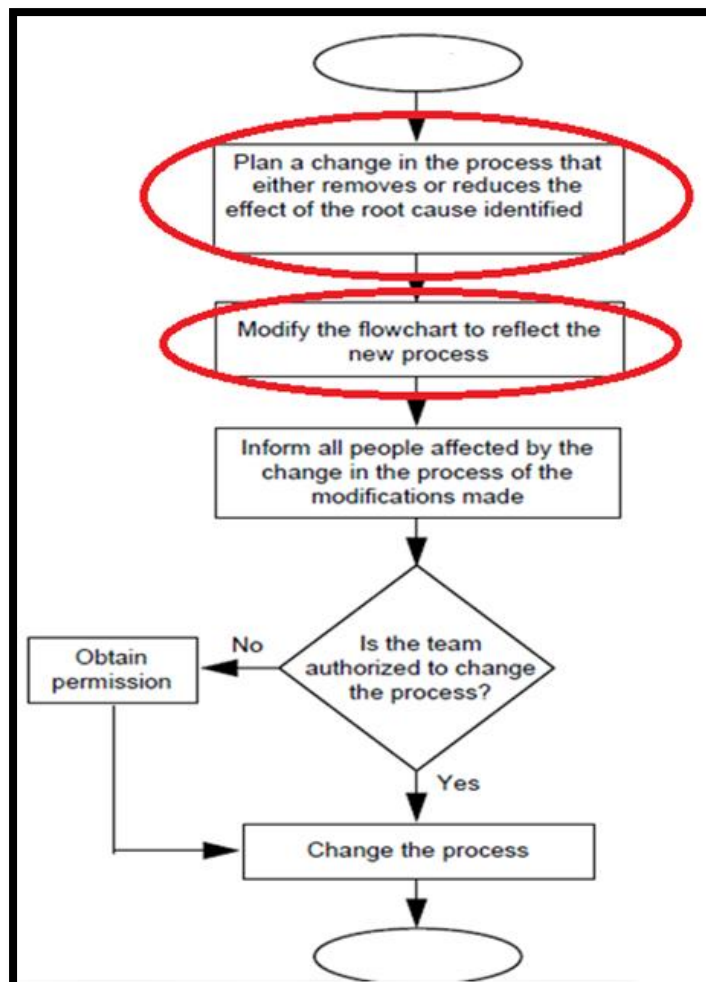


Figure 4.5(Flow chart of steps taken by the team to improve process)

Going through implementation will require a lot of planning, according to the (Handbook for Basic Process Improvement). Planning to implement the process change, the team can use the following list of questions as a guide in developing the plan:

- 1- What steps in the process will be changed?

There are a lot of steps that has to be changed, but the team should focus on the one that makes the most errors, which is writing the material vouchers on paper. This has to be changed with a digital version to avoid mistakes.

- 2- Are there any risks associated with the proposed change?

There are some risks, because there might be confusions when it comes to projects that cannot be predicted, like in the maintenance department.

- 3- What will the change cost? The cost includes not only money, but time, number of people, materials used, and other factors.

The change will cost, but there is a saying, you have to spend money to make money, in St Joseph's situation, the team has to think what is right for the school. Even if it will cost time to put the e-voucher in use, but at the end, it is for the benefit of the school.

- 4- What workers will be affected by the change?

Almost all workers will be affected in the change of the process. Teachers should be trained on how to use the e-voucher, otherwise there is no change, the team discussed the training of the teachers should start at the beginning of the school year. The TA's have the biggest impact on the whole process, so they must be fully know ledged and trained about what is going to change. (Appendix B shows the minutes meeting of a meeting with the TAs)

- 5- Who is responsible for implementing the change?

The main responsibility is the senior head, but the team should be responsible on spreading the word throughout the school

- 6- What has to be done to implement the change?

Test of e-voucher and see if it works fully with no errors. Training for teachers and TAs on how to use the e-voucher.

Chapter Five

The Results

Chapter Five: The Results

5.1: Mutually agreed solution(s)

The final solution is to make use of a digital material request voucher, which can be sent to the warehouse. This will give Fille the opportunity to prepare the order in advance.

5.1.1: Electronic voucher

The electronic voucher is an easy to use, drop down list on an excel sheet.

There is a drop down list of all the materials on the right side, and another drop down list for the cost of each quantity.

There is also the signature of the teacher, and a place for the TA's approval for the request order.

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Figure 5.1 (Digital Material Request Voucher)

5.1.2: What is the plan for implementation?

The plan is to make it possible for teachers to use this e-voucher instead of filling in the paper version.

This is only for the projects that can be planned a head of time.

One of the problems they are facing is that some of the teachers do not know how to use this voucher, but a simple training can be a solution to this problem.

There aren't enough computers to go around the school, there should be a plan to spread out computers across the school campus.

Another crucial problem they are facing, is the signature, there is no system that supports the electronic signature for teachers. Instead, there are some ideas to use a personal password for each teacher. This idea is under development, it is easy to implement not costly, unlike the electronic signature.

5.1.3: Results of e-voucher

The results of the electronic voucher are still pending. The plan to start implementing is on the beginning of the year.

5.2: Laying out the new process using (Bizagi)

The team gathered for laying out the process on the flowchart, to later on be drawn in Bizagi program, but before looking at the results, here are more points to understand why Bizagi was used:

5.2.1 What is Bizagi?

Bizagi Process Modeler is a freeware application used to diagram and document processes using the Business Process Modeling Notation (BPMN) standard notation.

There is another Bizagi product, which is called **Bizagi BPM Suite** is a Business Process Management and Workflow solution that enables organizations to automate processes/workflows.

The program or product used for this research is Bizagi Process Modeler.

5.2.2 What are BPM and BPMN?

BPM is a set of methods, tools, and technologies used to design, enact, analyze, and control operational business processes.

The BPM architecture looks like this

Business architecture: The overall structure of the goals and objectives of the organization's customers and stakeholders, and the strategies, roles, and responsibilities needed to achieve them.

Process architecture: The methods, practices, and procedures by which the people in the enterprise transform available resources and capital to add value for the customers and stakeholders and achieve the business goals and objectives.

Management architecture: How the actions and behaviors of people and systems, as well as the flow of information over time, are directed in exercising the processes to achieve the business goals.

BPMN is a graphical representation for specifying business processes in a business process model. It is based on a flowcharting technique modified for creating graphical models of business process operations.

Flow objects



Events, there are three types of events, *Start*, *Intermediate*, and *End*



Activity, there are two types of activities, *Task* and *Sub-Process*



Gateway, it determines traditional decisions, as well as the forking, merging, and joining of paths.

Connecting objects



Sequence flow, is used to show the sequence and the order that activities will be performed in a process.



Message flow, is used to show the flow of messages between two separate process roles.



Association flow, is used to associate data, text, and other Artifacts with flow objects

Swimlanes



A pool is a representation of a participant in the process.



A lane is used to organize and categorize activities.

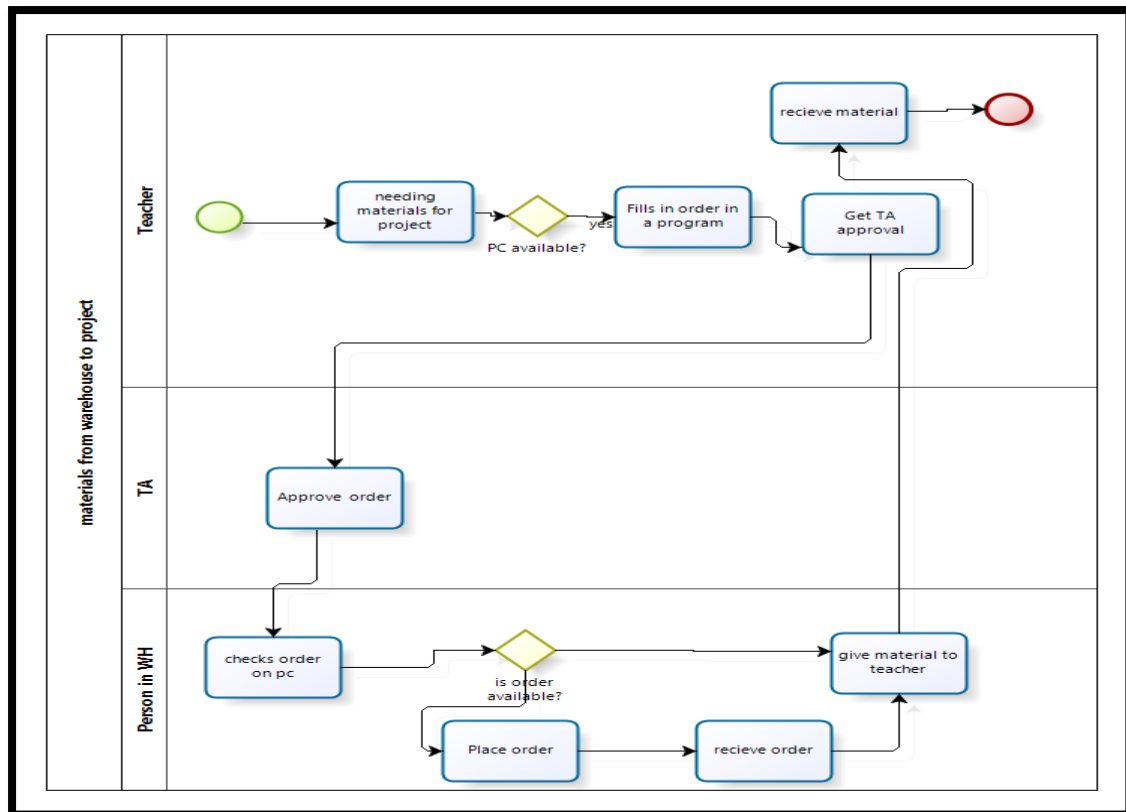


Figure 5.2 (Bizagi First Draft)

5.2.3 Explanation of Bizagi model, in figure 5.2

- 1) Starts with a teacher needing some materials for a project
- 2) The question comes up, is there a computer available? If yes, then he/she proceeds
- 3) The teacher fills in the digital voucher on the computer, fills in the materials needed, the quantity needed.
- 4) The voucher is seen by the TA and gets the approval
- 5) The TA approves the order request.
- 6) Then it is shown on the computer in the warehouse, the person in the warehouse checks if the item available in the warehouse.
- 7) If it is available, then the responsible in the warehouse places and order , receives the order and then gives the material to the teacher.

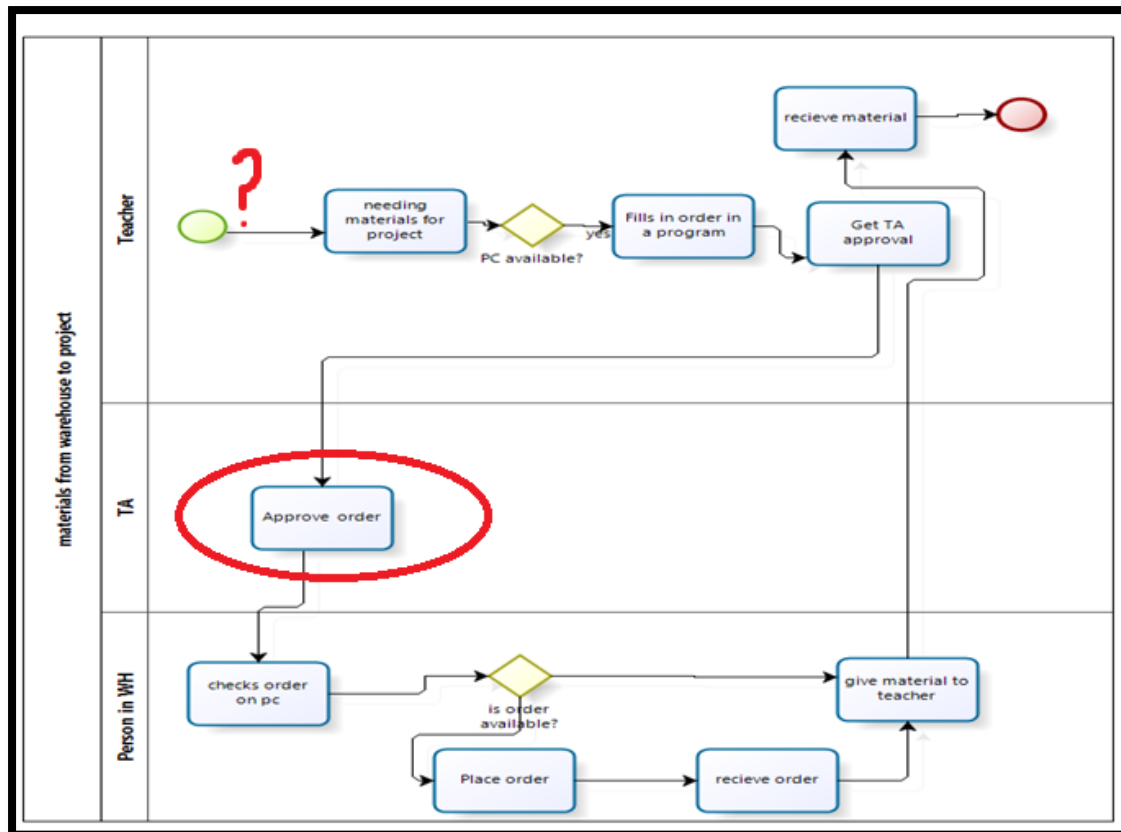


Figure 5.3 (Faults found in Bizagi First Draft)

5.2.4 Does the team agree?

After thoroughly reading and looking through the first draft of Bizagi model, the teach discovered a lot of deadlocks and unreasonable activities in the process, figure 5.3 shows the team's remarks, some of them are as the following:

- 1) The process cannot start with a teacher needing materials, before knowing the project number, so the TA is responsible to add a number to the project and the materials needed for it. As said earlier, this is only for the projects that can be planned a head of time.
- 2) There is no need for the question of (is there a PC available?) because computers should be available around the school by the time of the implementation.
- 3) The voucher cannot always be seen by the TA and gets the approval, it is not an easy job to do for the TA, so starting the project and giving it a number from is like an approval from the beginning

4) There are times that a student might have to fill in the voucher instead of the teacher because the teacher might be busy watching other students or has his attention on a project. So it is more reasonable to include a student as a role in the process.

5.3: Modification of the process (Final layout of process improvement)

5.3.1: Explanation of final improvement

- 1) The process starts with a TA starting a project and giving it a number
- 2) If it is school related then the TA enters it in the system
- 3) If it is not school related it is sent to the person in the warehouse and enters it in the system.
- 4) The teacher receives the numbered project, needs materials for the numbered project
- 5) The teachers enters username and password to the electronic voucher, makes the order, it can also be a student that fills the voucher, but the password has to be put by the teacher.
- 6) If the material he/she ordered is available in the warehouse, then the person in the warehouse gives the student or teacher the materials. Otherwise, the person in the warehouse has to make an order for the supplier about the missing materials in the warehouse.

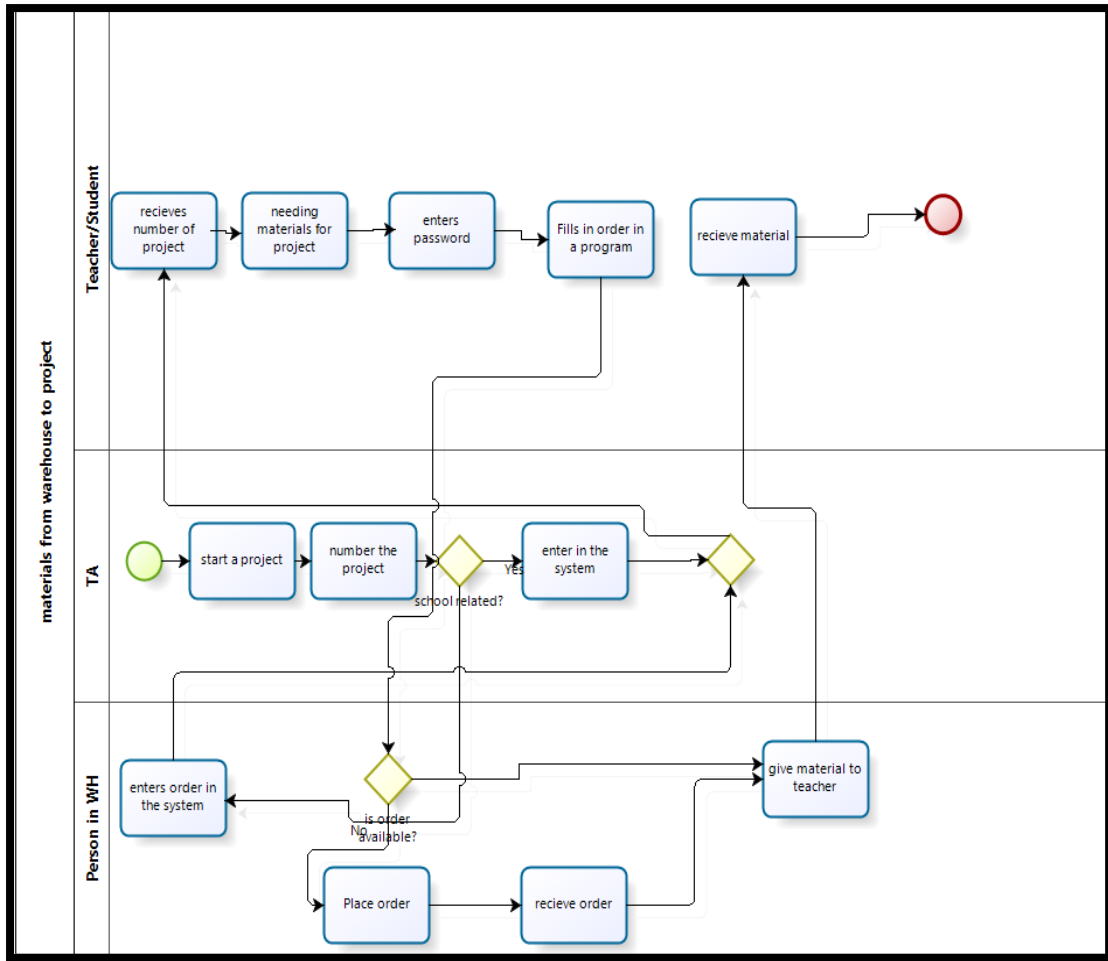


Figure 5.4 (Bizagi Final Draft)

Chapter Six

Conclusions

Chapter Six: Conclusions

6.1 Lessons learned

6.1.2 The handbook for BPI

The lesson learned from using this handbook and putting it in practice are the following:

- 1) All the steps in this handbook cannot be used, it has to be modified, and choose the ideal steps for the required organization. For this thesis the main focus was a school, it is not a simple organization like a company. So plenty of steps had to be modified, for example there was a step called (Develop a data collection plan and collect baseline data) not necessarily was ignored because it didn't work with a school system, but because simply there was no time.
- 2) The PDCA cycle was brought up during the meetings, it was important to go through it, but because it is a school, the year is short, starts with September and ends with June.
(See Appendix C for a picture in a meeting discussing PDCA)

6.1.2 Team work

Almost all of the work, on process improvement, was team work. But what are the pros and cons of team work when it comes to process improvement?

- 1) Especially in process improvement, there is a lot of brainstorming activities, because of the selecting the process and modifying it. The advantage of team work here is that they can listen to more than one point of view. The disadvantage is that there is a lot of clashes between team members' ideas, at the end of the day "one" idea or solution has to be picked. So if someone doesn't agree on this "one" solution, this will cause clashes.
- 2) Team work is costly; not money wise, but time wise, because there is always a difficulty gathering all team members in one meeting, most of the time there was one or two absences.

References

- 1) (Handbook for Business Process Improvement, 1996)
- 2) (Business Process Improvement, The breakthrough strategy for total quality, productivity, and competitiveness) H. James Harrington, 1991
- 3) <http://www.kogeka.be/v1/school/6/sint-jozefinstituut>
- 4) <http://www.bizagi.com>
- 5) http://en.wikipedia.org/wiki/Business_process_improvement

Appendix A

An interview with Fille Exelmans, the warehouse manager.

What is the title to your job?

I'm the warehouse manager.

And you manage everything that goes in and out of the warehouse?

Yes.

What else?

If anyone knows what piece they need for a certain project, they come to me, like TAs wanting to know about a certain item for a project.

Do you want to add something?

People have a lot of requests, when they have a problem with a machine, they come and ask for it, what is the cost for repairing it? Asking for details about an order... Etc.

So it's mostly questions about products?

Yes.

What are the major problems you face?

People ask for something, and they want it immediately. Which is not always possible. Let's say they want some type of steel, which isn't in stock yet, so they have to wait for it. I cannot say that I can order it as soon as possible, because I can't just order one piece, it has to be in bulk for it to be cheaper.

So, how can they ask for something that is not in stock?

It's ok if they ask for something, but you can't always find everything in stock. They have a problem waiting for the item.

But this will create problems, yes?

Yes! It creates problems, so it is a matter of planning, they have to plan things a head of time. But I also understand when there is an emergency (to repair something), and they need something to be fixed, I order that item immediately. I can order the same day, and I will get it fast, but of course, you will have to pay for delivery and fast service, which is costly.

Who records that a delivery was made?

I order everything, when I order something, it goes into a chart.

On paper?

Yes on paper.

What are the problems that occur when you order on paper?

For example, when people order something, we get a delivery, and on the delivery sheet, there is no name of who order it, then we have to find out where these goods have to go to.

Do you think it will be much easier if the delivery is on computers, instead of papers?

It is a matter of discipline, if they write the vouchers correctly, then there is no need for computers

What do you think of a barcode system?

Barcode is perfect for me! But we don't have a barcode system. I tried to introduce the system a few years ago, because it will be a big help for us. Or actually a good software system would help with things.

What about count e?

The program is very complicated, it would be much helpful if it is connected to our warehouses, to save information about the stock amounts, but it doesn't work.

What about the control over the warehouse?

The access to the warehouse is with a key, but a lot of people have this key, there is no control who goes in, what do they take.

What do you think is the solution to this?

I have asked a friend to make a price for it, but they always say its too expensive, because what we need is an access code, that shows who took an item, because it is hard for me to face a person telling him "I think" you took this from the warehouse, because simply there is no proof.

Who says its expensive? Who is responsible for budgeting for the school? Is it the financial department?

Yes. I always tell them that this is the system on how I have to order everything, this takes incredibly a lot of my time, because when I have to order something... "Sighs" the system doesn't work! Everything is on paper paper paper! If I have to order let's say a big amount of steel, this takes me at least one hour or one hour and a half to make one order, and if the system works, it should take me just five minutes. I have seven different ways of ordering things, and there should only be one way of ordering.

Appendix B

Meeting minute's sheet

Date of meeting: September 14th 2012

Time of meeting: 09:30

Attendances: Engelen Mit, Van de Vliet Hilde, Exelmans Fille, Van Hout Leslie, Van Vaerenbergh Rein, Mertens Rob, Martens Marc and The TAs.

Absence: S'jegers Mar,

Purpose of meeting: TA meeting, introducing them to the new process plan.

Discussions:

1. Not realistic to get an approval every time from the TA, it is replaced with a check up at the end of the process.
2. Eliminate and block unreasonable orders, orders that don't make sense.
3. Some teachers might face difficulties using a computer software.
4. Student *still* can get the material from the warehouse, but with signature from the teacher.
5. There is not enough training for the personnel on how to get the materials properly.
6. Ideal solution is (fill in excel sheet, excel pops up in warehouse, admin makes an order)

Next meeting: September 21st morning.

Appendix C



Discussing the PDCA cycle with the team members

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Richting: **Master of Management-Management Information Systems**
Jaar: **2013**

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Voor akkoord,

Sharaf, Tamara

Datum: **14/01/2013**