

# Analysis of an IT Team Seeking Business Expansion and Support of Health Institution

Karina Aparecida da Cruz PINTO  
Information Systems, Faculdade Barretos  
Barretos, São Paulo, Brasil 14.780-320

and

Maria Ludovina Aparecida QUINTANS  
Information Systems, Faculdade Barretos  
Barretos, São Paulo, Brasil 14.780-320

## ABSTRACT

Information technology plays an essential role in the implementation of business strategy in companies, especially when it comes to a health institution, where technological developments stand out in search of the improvement of medical procedures. It is important to the aid of IT to improve the quality of care with speed and agility in information records. This study seeks to understand the tools and techniques for gathering requirements used in the institution to identify whether they are effective for the business expansion of the health institution. The methodology of this work is carried out through literature review and a structured questionnaire on IT staff. In summary, the results of the tools used by the team indicate a knowledge commensurate with the position and responsibilities of each member and master the techniques of requirements elicitation and brainstorming interview. It is concluded that the techniques and tools used by IT staff of the health institution of this study are effective in improving the help of services rendered, since the team is successful in the technique of brainstorming, getting lots of ideas in design and in Microsoft Visio tool using it in data modeling, flowcharts, organization charts, among others.

**Keywords:** Business Expansion in health, Health Institution, Requirements elicitation, Information Technology, IT Staff.

to a health facility for large, in which technological change has been highlighted in the search enhancement medical procedures. New technologies change the ways of working, facilitating, for example, diagnostic and surgical procedures with speed and reduced costs.

The health care study conducted last year approximately 594,104 visits in 1527 97,630 patients from municipalities and districts. The institution has more than 1,600 employees and 160 physicians exclusive, given around 2800 queries per day, has cataloged 78,641 patients through the system.

Because of these numbers is important to have the help of information technology to improve the quality of care with speed and agility in the records of information through the system. The staff of this institution is part of the administrative processes, it aims to meet the needs and particularities of the institution that legacy systems were failing. The industry works on the integration of information between sectors to ensure that every institution has the same information, also providing the research within the institution.

The aim of this study is to analyze the requirements elicitation techniques and tools used by staff of the institution, to improve the methodology used to expand the scope of the quality and number of visits of the institution.

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## 1. INTRODUCTION

The IT department has a key role in implementing the business strategy of companies, especially when it comes

## 2. METHODS

The methodology of this work is carried out through literature review and a structured questionnaire in the IT team, where team members are divided into groups: business analysts, systems analysts, programmers and analysts. The questionnaire is used because it is a requirements elicitation technique that allows measurement of the performance of the answers, or can be distributed, collected and tabulated, with greater flexibility in the process and guaranteeing anonymity. It analyzes the degree of knowledge of the members of staff in terms of technical skills of tools, knowledge of requirements elicitation techniques, knowledge of the sectors of the institution. For blood sampling of the first requirements of this study is a questionnaire containing closed eighteen (18) questions to the developers of the institution. The analysis of the questionnaires are held in the IBM software Statical Package for Social Science - Statistics for Windows (SPSS) version 19 and later generation of graphics.

## 3. DISCUSSIONS

For IT staff can meet the needs of each sector to better process the information, you must use good techniques to obtain the requirements for further implementation in the system. The requirements gathering is the process that gathers information about the proposed system and existing for the user requirements and system based on this information [1]. The sources of information during the acquisition phase of requirements, including documentation, system stakeholders and specifications of similar systems.

As a rule, the requirements can be functional or nonfunctional [2]. A functional requirement is directly related to a process that the system must perform or the information it needs to contain. Functional requirements flow directly into the next stages of analysis (use cases, process models and data model) which define the functions the system must possess.

Non-functional requirements refer to the behavioral properties that the system should have as performance and usability. Non-functional requirements can influence the rest of the review process, but often do so only indirectly. Non-functional requirements are mainly used in the design phase, when decisions are made on the user interface, hardware and software and the underlying architecture of the system.

Developers play an important role in defining and creating a new product [3]. Developers are software engineers, but every engineer can specialize in a specific area of development. The interaction with stakeholders occurs through interviews and observations, can be used scenarios, prototypes to assist in requirements gathering.

Other ways to obtain requirements are: ethnography, seminar, research, brainstorming, questioning, among others. The questionnaires are also used as a technique to assist the techniques of interviews and meetings. It is stated [4] or the team involved in the project must establish more than one technique of data collection in order to succeed in the project as a whole, since most of the time this activity is designed intuitively and without methodology. For the survey of requirements related to the expertise of this study, the technique is used a structured questionnaire, as it allows the performance measurement of the responses, or may be distributed, collected and tabulated, with greater flexibility in the process and guaranteeing the anonymity.

The questionnaire is provided in a document form for data collection allowed, since it can be distributed, collected and measured later, where it is important to pay attention at the time of preparation, to achieve objectives [4]. Its construction should start from a critical or reflective face to the perception of meanings, reflecting the deliberate and conscious manifest through analysis, comparison, differentiation, synthesis and judgment.

Typically, the questionnaire is used as a structured interview plan, as it is completed earlier, and then supplemented by interviews. In this case, the questionnaire is designed so that all respondents to submit the exact same issues with the use of the same words, in the same order.

Presented by J. Lee Cronbach in 1951, the Cronbach  $\alpha$  coefficient is an estimate of the reliability of a questionnaire that applies in a search. Cronbach's alpha is defined as:

$$\alpha = \frac{K}{K-1} \left( 1 - \frac{\sum_{i=1}^K \sigma_{Yi}^2}{\sigma_X^2} \right) \quad (1)$$

In the scientific literature [5] there is no consensus among researchers for the interpretation of the reliability of a questionnaire through the coefficient value, but in general it is considered a satisfactory survey of the value  $\alpha \geq 0.70$ . This suggests the classification of reliability by calculating Cronbach's coefficient  $\alpha$  according to Table 1 [5].

**Table 1** Classification of reliability from the coefficient  $\alpha$  Cronbach

Source: Freitas (2005)

| Confiabilidade    | Muito Baixa        | Baixa                     | Moderada                  | Alta                      | Muito Alta      |
|-------------------|--------------------|---------------------------|---------------------------|---------------------------|-----------------|
| Valor de $\alpha$ | $\alpha \leq 0,30$ | $0,30 < \alpha \leq 0,60$ | $0,60 < \alpha \leq 0,75$ | $0,75 < \alpha \leq 0,90$ | $\alpha > 0,90$ |

According to Table 1, it can be considered as satisfactory questionnaires that present value of  $\alpha > 0.60$  for this project [5]. However, higher values of alpha may indicate degrees of reliability and even better decision about the minimum reliability of a questionnaire at the discretion of the investigator.

The process is sequential and unique set of actions that aim to achieve a goal. It is used to create, invent, design, transform, produce, manage, maintain and use products or systems [6]. In software engineering process is a set of partially ordered steps, whose goal is to reach a goal: to deliver a software product in an efficient, predictable and reach the needs of business [6]. Usually includes requirements analysis, programming, testing and other tasks.

The process improvement is not just deploy new methods, tools, or some process model already employed elsewhere. The improvement must come from a specific need of the organization to achieve the expected results of a project. Process change involves making changes to existing process and should make the goals for process improvement.

#### 4. RESULTS

For blood sampling of the first requirements of this study is a questionnaire containing closed eighteen (18) questions with the staff, with the purpose of obtaining information on the technical knowledge and the departments of the institution of each group of developers. Table 2 totals the number of professionals surveyed in this study, except the manager who participated only in the unstructured interviews.

**Table 2** Professionals surveyed in the institution

Fonte: Author

| Role               | Quantity  |
|--------------------|-----------|
| Manager IT         | 1         |
| Business Analyst   | 4         |
| Systems Analyst    | 3         |
| Analyst Programmer | 2         |
| <b>Total</b>       | <b>10</b> |

In the health of this study are the techniques used: interviews, prototyping, questionnaires and brainstorming. The interview is used in all projects of the institution, seeking to involve all project stakeholders with a view of each. The prototype is made only from the screens of the interface with the user seeking their approval.

The questionnaire technique is applied only when the business analyst and system analyst has technical expertise in the area which is part of the project. With this knowledge is drawn questions directed at defining the requirements. The brainstorming technique is used when a project involves several areas of the institution with different user profiles. First a survey is made prior to each

area and then a meeting is made jointly where the business analyst asking questions leads to a dynamic point of view on the same subject. There are four tools deemed necessary software applications to perform specific tasks, such as Microsoft Visio, Oracle Designer, Microsoft Project and Oracle Forms and Reports.

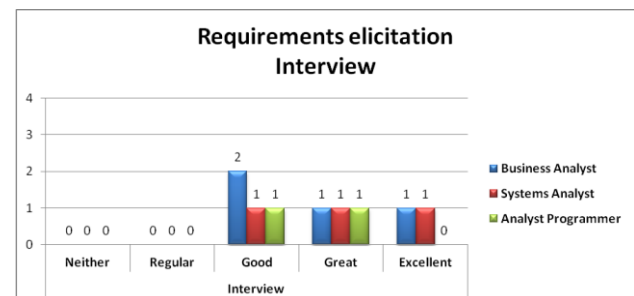
The results of the questionnaire are demonstrated in comparative graphs which are identified that business analysts do not have any knowledge in Oracle Designer and Oracle Forms and Reports, they are only tools used by analysts programmers and systems analysts of the institution. The software application Microsoft Visio is known with a considerable degree by all developers, which is evaluated as a favorable factor for the team. Microsoft Project is dominated by systems analysts and with regard to technique and Entity Relationship Model, systems analysts are at the highest level of knowledge, because it meets its responsibilities to the standards of the institution. All members have an appropriate level in the business rules of the institution, seen in Figure 1.



**Figure 1** Graphic Business Rules

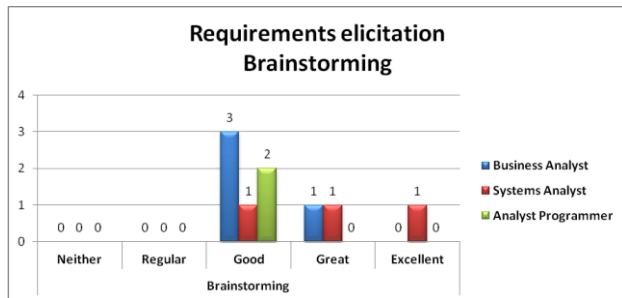
Source: Author

The requirements gathering phase is the responsibility of business analysts, where the graph depicts the area in interview techniques and brainstorming. Prototyping is well known for systems analysts. The graphics generated from the questionnaire in relation to the requirements elicitation techniques are shown in Figure 2, Figure 3, Figure 4 and Figure 5.

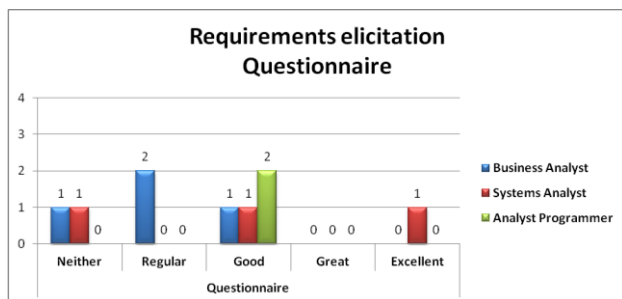


**Figure 2** Graphic Interview

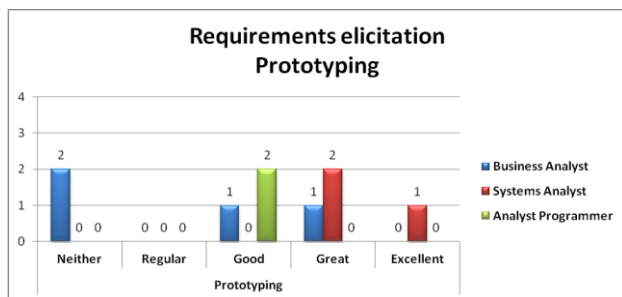
Source: Author



**Figure 3** Graphic Brainstorming  
Source: Author



**Figure 4** Graphic Questionnaire  
Source: Author



**Figure 5** Graphic Prototyping  
Source: Author

In summary, the results of the tools used by staff indicates a knowledge commensurate with the position and responsibilities of each member.

The questionnaire for the assessment of the skills of team members appears to be satisfactory, because the value obtained from Cronbach's alpha coefficient using the SPSS 19 is 0.812, shown in Figure 6.

## Scale: ALL VARIABLES

### Case Processing Summary

|       |                       | N | %     |
|-------|-----------------------|---|-------|
| Cases | Valid                 | 9 | 100,0 |
|       | Excluded <sup>a</sup> | 0 | ,0    |
|       | Total                 | 9 | 100,0 |

a. Listwise deletion based on all variables in the procedure.

### Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| ,812             | 18         |

**Figure 6** Alpha de Cronbach

Source: Author

With the purpose of confirm that the questionnaire is really satisfactory, the test is performed to exclude an item of the questionnaire, where the lower value of Cronbach's alpha coefficient is 0.774 and the highest is .839, highlighted in Figure 7 . Both represent a satisfactory degree in accordance with Table 1.

| Item-Total Statistics                                                                                                                      |                            |                                |                                  |                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------------------|----------------------------------|----------------------------------|
|                                                                                                                                            | Scale Mean if Item Deleted | Scale Variance if Item Deleted | Corrected Item-Total Correlation | Cronbach's Alpha if Item Deleted |
| Microsof Visio                                                                                                                             | 32,333                     | 102,500                        | ,594                             | ,798                             |
| Oracle Designer                                                                                                                            | 32,889                     | 83,111                         | ,737                             | ,774                             |
| Microsoft Project                                                                                                                          | 33,222                     | 91,944                         | ,761                             | ,780                             |
| Oracle Forms and Reports                                                                                                                   | 32,778                     | 83,194                         | ,712                             | ,777                             |
| UML                                                                                                                                        | 33,222                     | 94,944                         | ,694                             | ,786                             |
| MER                                                                                                                                        | 32,333                     | 91,250                         | ,552                             | ,792                             |
| Regras de Negócio                                                                                                                          | 32,111                     | 103,111                        | ,533                             | ,800                             |
| Levantamento de Requisitos - Entrevista                                                                                                    | 31,889                     | 105,861                        | ,288                             | ,809                             |
| Levantamento de Requisitos - Brainstorming                                                                                                 | 32,222                     | 102,444                        | ,580                             | ,798                             |
| Levantamento de Requisitos - Questionário                                                                                                  | 33,111                     | 91,111                         | ,799                             | ,777                             |
| Levantamento de Requisitos - Prototipagem                                                                                                  | 32,556                     | 93,778                         | ,600                             | ,789                             |
| Contabilidade (RM)                                                                                                                         | 33,333                     | 111,000                        | -,032                            | ,826                             |
| Controle de Estoque (Almoxarifado, Farmácia, Nutrição e Bazar)                                                                             | 32,222                     | 103,444                        | ,406                             | ,803                             |
| Área Médica (Internação, Recepção Setoriais, Atendimento Ambulatorial, Laboratório, Patologia, Radiologia, Medicina Nuclear, entre outros) | 32,000                     | 110,000                        | ,067                             | ,816                             |
| Ensino e Pesquisa                                                                                                                          | 33,556                     | 104,528                        | ,538                             | ,802                             |
| Patrimônio (RM)                                                                                                                            | 33,556                     | 115,528                        | -,207                            | ,838                             |
| Compras                                                                                                                                    | 32,667                     | 107,000                        | ,118                             | ,819                             |
| Financeiro (RM)                                                                                                                            | 33,333                     | 115,250                        | -,194                            | ,839                             |

**Figure 7** Alpha de Cronbach IF item deleted

Source: Author

## 5. CONCLUSION

With the proposal to improve the processes for developing and maintaining systems of the institution is suggested the addition of two processes in the data stream that will serve as documents to improve the efficiency of future projects. The processes are: feasibility analysis and analysis of lessons learned. To improve team dynamics according to the general and individual knowledge of each group is suggested to the divisions of tasks and responsibilities to attend to the process flow and demand of requests for new features in the system, aiming at the growth of the institution.

For best performance of the IT team in requirements gathering, suggested training requirements elicitation, it is known that these techniques are critical to the success of the projects according to the graphs drawn from the questionnaire that had been applied. It is recommended that you always asked for feedback from all involved to understand the project as a whole is effective, so you can verify that the methodology used by staff to meet the needs of the institution providing a quality of information and consequently a increase in attendance and efficiency in information exchange.

In the work of Freitas (2005) [5] entitled "Assessing the reliability of questionnaires: an analysis using Cronbach's alpha", it appears that the methodology gets highlighted because of its practical application, low cost and limited influence and that the procedure used to check the reliability of the questionnaire has different reliabilities, unlike this study where even if a questionnaire item is deleted, it continues to deliver reliable.

It is concluded that the techniques and tools used by IT staff of the health institution of this study are effective in improving the help of services rendered, since the team is successful in the technique of brainstorming, getting several ideas and projects in the tool Microsoft Visio using it in data modeling, flowcharts, organization charts, among others.

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