Hospital Information Systems in Greece: users’ perspectives

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Abstract

Hospital Information Systems (HIS) are considering a significant aspect for supporting health care professionals in their work. However, a large number of them are often poor to provide the needed information for accomplishing various work activities in the oriented environment. The aim of this research is to address users’-Administrators and Clinicians- perceptions in order to gain a deeper knowledge about problems they encounter with daily work performed through IS. Additionally, the scope is extended into formulating suggestions through the employment of Soft System Methodology (SSM) that could bring improvements. A qualitative interpretive method with an inductive analysis was followed. Data collection completed through focus group interview sessions and the adoption of SSM three activities in order to acquire the complexity of the problem situation.

Research findings revealed that despite IS Lisora serves as a tool for supporting users work operations, it causes significant problems in their daily operations since the information flow are not feasible. Thus, the research study suggests five feasible and desirable improvements that could improve the overall processes followed by the hospital’s users and bring improvements. In all, SSM was proved to be very efficient in identifying problems that exist. In this way proposed solutions to the problems were enlightened. The general hospital of Preveza shall benefit from the higher efficiency offered by the system, which in turn shall improve the quality of health-care services offered.

Keywords: Information Systems (IS), Hospital Information System (HIS), Health Care, Greece, Rich Pictures, Focus Groups, Soft System Methodology (SSM), IS Lisora.
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“Whatever you can do or dream you can, begin it. Boldness has genius, power and magic in it!”

Johann Wolfgang von Goethe

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List of Abbreviations

CM  Conceptual Model
GNHS  Greek National Health System
HIS  Hospital Information System
IHIS  Intergraded Hospital Information System
NHS  National Health Systems
SSM  Soft System Methodology
IS  Information System
ICTs  Information and Communication Technologies
IT  Information Technology
ITI  Information Technology Infrastructure


1. Introduction

1.1 Background and Problem Area

Information Systems provide support to health professionals work of all kinds and are identified in health care organizations, at Administration and Clinical Level (Gardner et al., 2009). They are used in order to optimize operations, mainly as far as access, storage, retrieval and use of data providing several benefits to health care (Mettler and Raptis, 2012). In health care IS helps in providing valuable know-how within the organization that can lead to greater efficiency in various processes. The culture of information and communication in health environments, typically are interrelated with the procedures of processing data (Thompson and Matthew, 2009). Design and development of IS are very challenging especially in the complex conditions of health care (Giuse & Kuhn, 2003). Most of health care organizations face difficulties in acquiring and processing information for contributing to a better performance of health professional’s activities (Ministry of Health and Social Affairs, 2010). Interaction of health professionals with IS is not very satisfactory, it leads to communication difficulties and causes barriers in delivering efficient patient services. Too often important information’s are incompletely captured and become unavailable for clinical and research purposes (Giuse & Kuhn, 2003). Cibulski and Hiawalyer (2002, p.752), state that

“information in healthcare needs, the delivery of services, and the availability and use of resource is important to all health organizations”.

It is important to reform health care organizations through exploitation of IS opportunities to increase the number of quality of services they offer, as well as revise their performance criteria and requirements (Ministry of Health and Social Affairs, 2010; Giuse & Kuhn, 2003). In Greece the financial Crisis has affected many sectors, such as the Greek National Health System (GNHS), mainly as far as hospitals are concerned. Reduction in financial resources and technological infrastructure has caused significant changes in the operation of hospitals, characterized by lack of adequate and poor IS operation and services (Simou and Koutsogeorgou, 2014). Most of the Greek hospital IS are characterized as problematic. Greek hospitals operate traditional IS that do not meet their users’ requirements on working places, thereby seriously undermining their efficiency (Economou et al., 2014). This constitutes a significant factor to identify IS problematic situations and understand complex circumstances in health care activity environments. Researches and development experiences raised an amount of important points. These, need extension of existent methodologies and techniques to overcome problem-structuring situations and provide solutions. There are various approaches that contribute to the development of IS and enable users to play a key role, such as “soft” tools (Jackson, 2000). Such tools reflect on what is ought to be done in stakeholder’s involvement and learning by providing more typical suggestions in order to come up with possible solutions (ibid, 2000). Design and restructuring of IS should involve various stakeholders. Additionally, it is important to identify the system relevant to interested groups (Lippeveld, Sauerborn and Bodart, 2000).

General hospital of Preveza has been using an IS, named Lisora that was introduced within the Administrative level for supporting essential information flow, but without
being able to support primary operational activities of employees and departments. As Wagner (1993), also states that autonomy of departments’ IS are the core obstacle for health professionals that cause barriers in developing a culture of cooperation in delivering efficient work. In this study, an important step in trying to address this complexity was the employment of Soft System Methodology. In this case, SSM developed by Checkland (2000), is chosen for the IS problematic health care environment. Soft problems are often detected in information storage, access and sharing process where the professional employees’ processes and activities are concerned (Checkland, 2000).

Specifically, the aim of the study is to elicit users’ perceptions regarding the use of IS Lisora to provide information about problems they encounter and propose possible and feasible suggestions to improve these. To achieve this the study is conducted in a natural setting of a hospital in Greece, the general hospital of Preveza. There are various investigations that have been conducted with the employment of problem-structuring approaches in health care, such as SSM. However, some of these focus on health care management (Checkland and Scholes, 1990), health organizational policy formulation (Kalim, Carson and Cramp, 2004) or in a combination with simulation within healthcare (Kotiadis, 2006, Holm and Dahl, 2011). The restructuring and development process of health IS should involve all stakeholders in order to gain insight to information problem. Such an involvement is illustrated in Checkland and Poulter (2006) where SSM were used to discover organizational structure and process activities of professionals, through constructing review meetings in order to provide ground for modifications for further CIS development.

Furthermore, Scandura Hägglund and Koch (2007) presents a study where SSM approach combined with multi-disciplinary thematic seminars was used in an Old Home project to address the gaps of cooperative work of professionals in home care Institutions. To eliciting professional users’ needs only first steps of Checkland’s activity theory based SSM (1) finding out and (2) expressing problem situation were applied in order to create the basis for system development. Outcomes, revealed limited access to information flow and advocate the virtual heath record (VHR) adapted to the specific needs of coordination and communication between healthcare professionals. Similar, Macia-Chapula, (1995) use SSM to assess the impact of information on quality of health coordinators in a health institution in Mexico to identify benefits of “value” information resources in performing their activities. Considering the use of SSM as a way to identify system activities, Torlak and Müceldill (2013), present a study that aims at identifying health care issue problems in a private health institution in Turkey through a “Two strands model” SSM project. Findings, revealed new way of thinking to tackle problem issues and designing solutions through debate.

Following suit to previous researches, the findings revealed that SSM provided a ground for modifications of internal work practices and services at the health strategic level. Despite the amount of studies conducted in the international Health sector, in Greece there is only one study that combined SSM elements in IS health care environments. Darzentas and Spyrou (1993), provide an account of a study to determine vital elements of Aegean health care PHC system’s behavior in relation to professional’s activities and organizational structure. The study aims to provide conceptualization of the activities that the future IS will serve. SSM was proved to be
effective in identifying important subsystems within the primary health care system that satisfy the prevention plans of practitioners.

1.2 Purpose Statement and Research Questions

The purpose of this study is to explore Administrators’ and Clinicians’ use of IS Lisora in order to gain a deeper understanding of the problems they encounter in their daily work. Furthermore, SSM is employed to analyze the current situation and propose suggestions that could enhance the use of IS Lisora or bring improvements to it.

The research questions are:

- How does the current IS support Clinicians and Administrators with their daily work? What are the problems they encounter?
- What are the needs and expectations of Administrators and Clinicians, regarding the IS, in order to improve their daily work accomplished through it?

I consider that this study will contribute to the wider understanding of the broad area of IS development in health care, providing challenges that can be addressed through SSM. Greek health care organizations could be benefited from proposed ideas for improvement and apply them according to their organizational settings. Furthermore, the implication of qualitative techniques within the SSM consists an additional contribution. The employment of this two approaches assures richness of data and enables the better understanding of the problematic situation under investigation. Additionally, a novelty that the study will bring is the fact that it consists the second effort in Greece aiming to enhance the IS development in Greek health care sector through the employment of SSM.

1.3 Topic Justification

In health care organizations, IS provides a ground for modifications through which health care professionals with different objectives perform work activities. Herland, Khoshgoftaar, and Wald (2014), point out that HIS operating deficiencies are a crucial factor for structural weaknesses in internal processes in National Health Systems. Today, hospital services depend in a wide extent on systems that consider the cultural and social dimensions that exist in the environment. Since, there are many health professions affected from its use, the development process requires the involvements of all of them.

My personal interest on the health care IS, raised through my previous internship working experience in a health care organization in Greece. Since I became experienced with the Preveza’s hospital IS I was sure that I should choose to deal with a topic that ameliorates the situation in health sector and offers new perspectives. Motivated by these things, I choose to investigate general hospital of Preveza’s IS. Specifically, the study aims to explore user’s perception on IS Lisora utilization in order to gain a deeper understanding on problems they encounter to accomplish work duties and suggest solutions based on the findings. Emphasis is mainly given on the analysis and the improvements followed by the hospital’s users on their daily work tasks rather than the
technical aspects of the IS. In addition, the fact that the research revealed findings from multiple views increased the significance of the research.

1.4 Scope and Limitations

The research was conducted with the involvement of IS users, Clinicians and Administrators, regarding the utilization of IS Lisora of general Hospital of Preveza. The scope was to obtain richer insight into problems they encounter in performing work routines through IS Lisora. Furthermore, based on the user’s desires, SSM is applied to propose suggestions of IS to bring improvement to their work. SSM was appropriate to ensure the richness of data and guide the formulation of suggestions that could improve the complexity of the situation.

As it happens with any academic research, this research is also subjected to certain limitations. One of the study limitations is its concentration on Clinicians’ and Administrators’ perceptions, as main users of the IS. As such, my presence in the research may have biased participants’ responses, at least up to a point. Moreover, the research was held for the specific case of the general hospital of Preveza. Additionally, another limitation is the study’s concentration on users, who are directly affected and involved with at least one year of experience in IS. The last limitation is related to SSM application. Even though, SSM is a methodology that is applied in various empirical cases. Lastly, it is out of the scope of this study to implement suggestions.

1.5 Thesis Structure

The rest of the thesis is structured in the following way:

*Chapter 2:* outlines and analyses the theoretical framework on which this study is based. Specifically, Information Systems (IS) in context of socio-technical aspect, IS in healthcare and user’s involvement in hospital IS development process and challenges are reviewed.

*Chapter 3:* outlines the philosophical tradition (qualitative interpretive) and describes the research methodology of the employment of SSM for conducting this research by a thorough justification of their selection. Finally, limitations and ethical considerations are explicated.

*Chapter 4:* presents the findings of the research in a combination of analysis SSM, activities one, two and three.

*Chapter 5:* discusses research findings and compares them with existing academic literature regarding the research subject.

*Chapter 6:* this chapter summarizes the findings of the research, along with the most important conclusions. Furthermore, contribution and personal reflections of conducting this thesis are outlined.
2. Literature Review

This chapter firstly starts with analysing Information Systems and their socio-technical aspects. Then, IS basic principles of Information System in health care and challenges within the context are presented. Additionally, the importance of user involvement in IS health development within the context of health care is analysed. This literature review consists the base that guides the research.

2.1 Information Systems in Health-Care

Information Systems are designed to face precise organizational purposes and improve the working processes for delivering efficient operations. According to Suchmann (2011), the concept “information systems” brings very distinct things under the same point of view. The largest health organizations, with or without computers as well as the smallest artifact, where information is used can be understood better viewed as information systems (Suchmann, 2011). The notion of "information system", as it was defined by Boerje Langeford in the 1960, was a social concept including the organization using the data system, interpreting this data and turning them into information (Dahlbom, 1996, p.34).

IS in health care encompasses aspects and functions as well, such as the organization, storage and retrieval of information, as well as data exchange (Dalrymple, 2011). According to Kostagiolas and Kaitelidou (2009), the effective management of information and data is valuable in a health care organization, as various administrative, nursing and clinical actions are supported by information resources. In this way, different departments and professionals shall stop acting autonomously. This undermines the diagnoses and treatments of patients, thus negatively affecting their satisfaction (Ministry of Health and Social Affairs, 2010; Harno, 2009). In addition, Haux (2006), points out that more integrated and sophisticated hospital IS are expanding against simple and local hospital IS, due to user needs for processing, storing, and retrieving data and knowledge, with all of which resulting in the provision of health care of high quality.

Health professionals consist the prior component to the use of IS in the health care internal operations. Clinicians, Nurses and Administrators work are relating with administrative, laboratory routines and general provision of patient care needs. The combination of IS, documents and devices can be considered significant elements for health work (Berg, 1999). According to Fichman, Kohli and Krishnan (2011, p.20),

“the use of advanced IS in health care institutions results in health care provision, enhancing the exchanging of information among health care practitioners and Administrators, so as to improve their working activities”.

The roles and responsibilities in health care professionals are intertwined with each other, since tasks of current roles have been changed significantly. These aspects provide specific characteristics only as part of system. Administrators, for instance are connected to record systems which operate under the IS. Without Administrators the record system would not exist and operate in a precise manner. Due to the bond among these aspects in a network, the integration of any new element can affect health care
work and transform them as well. In addition, the development of big data analysis, IS in health care environments have entered their most exciting era (Berg, 1999). An era of tremendous growth of potential derived from the unlimited amount of information available to healthcare professionals (Herland Khoshgoftaar and Wald, 2014). This unlimited amount of information has offered crucial help in providing better operations.

Since, health care demands providing more services with limited sources, IS helps organizations by performing more operations with less human, financial and other types of resources. Dalrymple (2011), and Yasnoff et al. (2000), note that in 21st century IS principles are occupied with how data is transformed into information, and then into knowledge within the context of health care. For Dalrymple (2011), the development of IS is not important only in terms of health care work activities. Rather, it has come as a result of individuals’ desires to deal with their needs in their social environments. Additionally, research in Scandinavian tradition has outlined the contribution of system development in organizational change (Kensing and Greenbaum, 2012). According to Kensing and Greenbaum (2012, p.23),

Most computer programs were custom designed for huge mainframe computers. System analysis and design, was strongly influenced by management principles that controlled the flow of how programs were designed”.

European Commission (2003), as a core driver in developing IS in healthcare, is focusing on the importance of adopting modern ways within an international context, in order to deal with the effective use of information to reinforce the evolution of HIS.

2.2 User’s Involvement in Hospital System Development Process

The success of today’s hospitals depends upon IS to a large extent in terms of assisting support of administration and electronic processing for delivering advanced health quality services (Lippeveld, Sauerborn and Bodart, 2000). Thus, a profitable IS integration in health care organizations has to match with the data workflow, technology introduction and user’s motivation and participation on system utilization. Participation rooted in Scandinavian tradition emphasizes in including users in system design oriented on working together for creating knowledge of current work practices (Bodker, Kensing and Simonsen, 2004; Elovaara, Igira and Mörtberg, 2006). According to Elovaara, Igira & Mörtberg (2006, p.113), the participation has to be negotiate and adapted to the local settings. In IS user’s involvement in the developing cycle is associated with the participation of people in the design and implementation and considered to be a critical factor which undertakes systems requirements in a real world complex situation (Heeks, Mundy and Salazar,1999). According to Franz and Robey (1986) as cited on Sun (2013), user participation in the system development is absolutely related to user’s attitude to “system usefulness” and thesis a sense of control over the final output, by generating advantages, such as an increasing enthusiasm of utilizing the IS.

It is evident, that users tent to have a greater control over the identification of requirements with the future system, since they can be considered “experts” of the current system (Stowell and West, 1994). Additionally, their implication helps in directing the investigation of IS design, as they facilitate the analysis of problematic
areas and propose possible solutions by specifying their own requirements and needs regarding the value of the utilization in the future IS, as mentioned above (Gasson, Susan, 2003). The interactions with the stakeholders by using the Information Systems results in the production of self reports, which help to understand the needs and finally contribute to the design process. The direct relationship between design and use in social technologies opens up new ways in which participants can have ownership and control over the design, as the shape of design can emerge through their use (Hagen & Robertson, 2010).

In health environments the existence of multiple professional’s viewpoints may be confusing. What is required at this point is to capture the multiple perspectives of people involved in the situation and convey these viewpoints to produce meaningful outcomes (ibid. 2010). Adding to this, the time spent in defining a problematic situation in IS environment can be related to the time spent on the technical specification for the system. For the system development cycle changes occur by the appreciation of the situation in which they are involved in. Meaningfully, the final control of the solution can be completed by appreciating the amount to which the changes are desirable, long before the implementation phase (Sun, 1993; Stowell and West, 2013). The maintenance of user's involvement in the system development may have several benefits. Some of them are the following:

- User participation is data gathering driven.
- Identifying current work problems and environment understanding by combining the underlined different real world-views.
- Improve conflicts between user and data flow.
- Users can deliver feedback by finding imbalances between current work system and future requirements.
- Develop understanding of underlined issues that exist in the organization by involving different categories of professionals.
- Enhancing motivation of stakeholders by utilizing the IS.

This argument will lead to increased understanding of system behaviour and provide significant knowledge for further IS development. In this way, quality of services shall be definitely improved, given that health care organizations quality services.

2.3 Challenges for Hospital Information Systems

Despite the huge investments in IS that have taken place within a global context in health care organizations, their use and development is still problematic (Kivinen and Lammintakanen, 2013). Thus IS are often not up-to-date, given the developments in the sector worldwide. Additionally, emphasis regarding IS is mostly placed on their clinical aspects and less on the management of data resources needs. In health care institutions, mainly those operating in developing economies, such as Greece, information received through IS is not of the interest of their managers (Simou and Koutsogeorgou, 2014). While in many cases it is inaccurate, unreliable, incomplete and not consistent with the needs of health care professionals. In other words, instead of being action-oriented, many HIS are data-oriented. Lippeveld, Sauerborn and Bodart (2000), refer to a chaotic status and inefficiency of many HIS. To overcome professional worker’s weaknesses, Kivinen and Lammintakanen (2013, p.93) suggest that,
“HIS need to be designed and operate in a way consistent with the strategic objectives of health organizations”.

Managing health information is important not only for improving daily efficiency in organizations, but also for managing the organizations in general. DeLone and McLean (1992), have developed six dimensions that provide challenge and enhance the success of IS. These dimensions are: system quality, information quality, usage, user satisfaction, individual impact and organizational impact. Taking system quality first into consideration, this dimension refers to the extent to which IS is flexible, responsive in terms of time, and able to integrate information from various sources within the organization. As far as information quality is concerned, this refers to the extent to which the information is stored, retrieved and exchanged within an IS. It depends on how the use is useful, reliable, and available in an understandable and workable form. Usage refers to how information is used (ibid, 1992). While user satisfaction refers to the extent to which the information provided through an IS satisfies the users of the system in terms of the job processes they have to perform through it. In turn, this user satisfaction determines whether the design and implementation of an IS has a positive impact on both individual employees and the organization as a whole (Lippeveld et al., 2000).

This further adds to the strategic role of IS in organizations in general, and health care organizations in specific (ibid, 2013). The authors advocate that, in order to meet the above challenges, it is essential for health care organizations to occupy best practices in terms of the socio-technical dynamics of the sector. Towards this, it is necessary for such organizations to occupy a system’s approach. Whereby emphasis is given on the importance of the interaction among people, processes, and technology. Yasnoff et al., (2000), suggest that IS embody a more systematic approach of applying information science and technology in improving health care systems and human health in general. Specifically, through the design and implementation of IS, users also have the opportunity to be informed about health issues. As well as connect with health care professionals and institutions and take advantage of features. Modern IS shall process information and include elements and functions that are combined in a way where information becomes a real “resource” for solving health problems at all levels of a health service system (Lippeveld et al., 2000, p.35).

“Information in healthcare organizations needs to be generated and disseminated in a way that supports management, rather than blocking it”.

This is what shall foster innovation that is necessary for maintaining the necessary improvements in the quality of healthcare (Ravitz et al., 2013). For Heeks, Mundy and Salazar (1999), there is no single definition of IS success and failure. Such an evaluation must be held in terms of situation-specific factors every time. Sagiroglu and Ozturan (2006), have defined some difficulties that a hospital may face during the integration of an HIS:

- Ignorance of Administrative and Clinical need
- Harmony between departments and active users
- Available infrastructure
Inaccuracy of data processing

Based on the above, the authors conclude in that the successful implementation of IS requires the development of reality-oriented techniques, i.e. techniques that are based on the real needs of organizations and the users of IT. They also advocate that the involvement of users in the design and evaluation of IS is crucial for the reality gap to be eliminated (Heeks, Mundy and Salazar, 1999).

3. Paradigm, methodology and methods

This chapter conveys the philosophical tradition along with the methodological approach that was followed for this study. It presents an extensively adoption of Soft System Methodology (SSM) adapted to the settings of the specific situation as well as the detailed processes for data collection and analysis. Finally, the research ethics issues that were applicable to the research of this thesis, also take place.

3.1 Philosophical Tradition

The present research followed a qualitative interpretive methodological approach in order to study the social technological and cultural context of the general hospital of Preveza in Greece. Interpretive analysis focuses on users’ subjective experience and interpretation of the context that surrounds them (Jackson, 2000). According to Meyers and Avison (2002, p.68),

“interpretive research can help IS researchers to understand human thought and action in social and organizational contexts”. Meyers and Avison (2002, p.64) also highlight that, “interpretive research aims at understanding how members of a social group, through their participation in social processes, enact their particular realities and endow them with meaning”.

With the interpretivist tradition this study aimed to gain a deeper understanding of users’ subjective experience about the IS utilization. It enabled to access the real world environment through the meaning individuals assign to the environment that surrounds them (Jackson, 2000). Into this context, the study focused to analyse the complexity of users work activities with the IS, in order to become more knowledgeable about how it facilitates and enables information flow into the organization. The analysis was further extended into the engagement of interpretivist by coming up with feasible and desirable suggestions that could improve users work routines through IS Lisora.

3.2 Methodological Approach

In the international literature the most common classification of research methods is categorized into three types and depends on the philosophical assumption on the researcher. The qualitative, the quantitative and the mixed methods. In the present research, the method of qualitative research was followed. Specifically, as the situation is problematic and the scope of the research is to gain users perceptions and examine the social and cultural situation, a qualitative interpretivist approach was applied. Since qualitative research is appropriate for studying social and cultural complex phenomena,
it enables the elicitation of a large number of subjective beliefs within a real world environment (Creswell, 2009). Qualitative strategy of enquiry aims to study social and cultural phenomena and understand the concept of this context (Meyers and Avison, 2002). According to Denzin and Lincoln (2005, p.3),

“studying social and cultural phenomena" consisting of interpretive material practices that makes the world visible”.

Since the scope of the study was to gain understanding of stakeholder’s worldviews, problem structuring was chosen through Soft System Methodology. As a qualitative interpretivist approach SSM was appropriate to investigate and understand users’ subjective perceptions in the ill-defined situation (Checkland and Poulter, 2006). In the next section SSM is thoroughly presented with an explanation for choosing it as a methodology.

### 3.2.1 Soft System Methodology (SSM)

In System Thinking, every system consists of a subsystem of a bigger system and they are all related to each other, which means that the change of one part will affect all levels in the hierarchy of the system (Jackson, 2002). According to Jackson (2002, p.211), Soft System Thinking "give pride of place to people rather than technology" by determining human being intentions and points of view. SSM is a methodology that is applied for identifying and changing problem situations, studying them from different perspectives. Checkland and Scholes (1990), state that these changes have to be desirable and achievable for an organization.

SSM was developed in 1969 in the United Kingdom from Peter Checkland and his team in a research project program that aimed to undertake management deficiencies by using Jenkins engineering methodology. Soft Systems Methodology (SSM) was developed in response to the constraints of the hard systems engineering approaches which were focused on: the definition of the system of concern, the definition the system’s objectives and next to engineer this system to meet its objectives (Checkland, 2000). Hard systems approach is a goal-seeking model of organization and management where the study starts with the explanation that the desirable goal has to be achieved (Checkland, 2000). On the contrary, SSM considers that goal-seeking is an insufficient model to depict and resolve human activities in messy situations and comprise multiple approaches and perspectives (Mirijamdotter, 1998).

Checkland and Poulter (2006), recognized the need for using a system by trying to accomplish the purpose of action and to define its targets. Moreover, they focused on the complexity of real-world situations and the need for developing goal-seeking models of human behaviours and interactions. As a cyclic learning process, SSM uses system models in order to understand the social context outside the self. These models firstly were formulated in certain SSM stages, and then used in the real world, reflecting different views of the world and fostering interaction among individuals, who are engaged in discussing these views (Jackson, 2002). The success of SSM is based on its scope in gaining a deeper understanding of the problem situation and on its path on building knowledge and setting up agreeable among stakeholders.
In order to organize the activities to a problem situation in social systems, Checkland highlight the following SSM stages 1 to 7 as guidelines (Checkland and Scholes, 2006; Checkland and Poulter, 2006; Jackson 2000). The cycle learning process of SSM through the seven stages of the model is represented in Figure 1.

**Stage 1 and 2 - Finding out:** The aims of this two stages are to presenting the initial situation, on making a picture that entails the characteristics of the situation and the relationships on creating a base for discussion (Checkland and Poulter, 2006b). According to Checkland and Poulter (2006b, p.209), users would say: “*this is how we see the situation*”. Additionally, the three types of analysis, namely the intervention, social and political roles express the context under investigation.

**Stage 3 - Formulating Root Definitions:** At the third stage, the modelling phase begins, embodying the Root Definitions, which constitutes a models of activity used as a basis for structuring the real world situation. As statements, Root Definitions have to be shaped by PQR that answers the questions What, Why, How. In order to answer this question, all elements that are important for the situation need to be analysed, namely Customers, Actors, Transformation process, World View, Owner, and Environmental constraints (CATWOE).

**Stage 4 - Building Conceptual Models:** Conceptual Models represent their comparable system is doing and relates to Root Definitions by describing the transformation process in detail. The Conceptual Model include monitoring and control subsystems, which determine if the system is adaptable to the changing environment. Furthermore, effectiveness, efficiency and efficacy of the system are expressed in order to determine if the system produce the intended outcomes (efficacy) can reach high results with changes (effectiveness) by a minimum value of resources (efficiency).

**Stage 5 - Comparing Conceptual Models with reality:** Comparison of Conceptual Models with reality aims to facilitate understanding of real world problems and describe ways to improve them through the parallel examination of Rich Pictures and Conceptual Models by concerned stakeholders. The scope of the comparison is to build an argument aided for a proposed feasible and culturally change.

**Stage 6 - Defining “Feasible and Desirable” changes:** The sixth stage uses the findings of the comparison in order to generate ideas for changes which are desirable. Discussion should be generated with individuals in the problem situation. To achieve change, it is important to bear in mind the social, political and cultural feasibility, since they are never static.

**Stage 7 - Implementing “Feasible and Desirable” Changes:** The implementation of changes can be accomplished, once the changes have been decided. The implementation aims to alter the original problem situation and improve inabilities that may surface.
Apart the classical approach as presented above, Checkland (2000), highlights a modern version of SSM flexible approach,” Thirty Year Retrospective section”, by conveying the formulation of “two streams” and “our main activities”. Nevertheless, in the latest formulation (Checkland and Poulter, 2006), SSM include a fifth activity, namely “critical reflection” and ensures the lesson is learned. The fifth activity is a separate activity guarantees “the meaning of experience”. In Figure 2 it is illustrated in colour the aspects the study concentrates on.
However, the present research followed the recent version of SSM, with the five activities. Nevertheless, in this case only the three first activities were applied, since the research didn’t aim to take action and reflect critically. More specifically, the application of the latest version of SSM five activities aided in eliciting the declared individual worldviews regarding the use of IS Lisora. SSM consist a learning cycle that facilitate collaboration among stakeholders and enables to define suggestions for future changes. In addition, it’s flexibility guide the research of understanding the social and cultural context of general hospitals’ stakeholder work environment.

The use of SSM depends on the requirements of the particular situation and can be extended enough in order to accommodate stakeholder’s problem and provide solutions, as Checkland (2000, p.38) also states,

“the use of methodology is always user-dependent and depend upon the way it is used by the practitioner”.

This assumption comes to fill in the exegesis of existing SSM rules in 1997. Holwell as cited in Checkland (2000), find this SSM rules “too loose and not extensive enough” and propose three elements on which SSM can be defined: the taken as given assumptions, the process of inquiry and the elements used within that process (Checkland, 2000, p.38). Based on this basis SSM should be oriented into practice and situation driven in order to enable discussion and share a holistic work done by a small group, as in this case under discussion. In this way the flexibility of SSM allowed the study to adapt its fundamental according to the needs of the problem situation.
3.3 Research Settings

In this research the general hospital of Preveza in Greece is included. The scope of this study is to explore users’, Administrators’ and Clinicians’, perceptions on the utilization of IS Lisora in order to gain a deeper knowledge on the problems they encounter during the performance of their work duties. Furthermore, based on these insights multiple conflicting group concerns helped this research in collecting rich data, while SSM was employed to propose suggestions for improvements.

3.3.1 General Hospital of Preveza

The general hospital of Preveza is a public entity that is incorporated in the National Health system and aims to provide health care equally to all the citizens regardless of economic, social and professional status (Preveza Hospital, 2015). The services of the Hospital are divided into three levels Clinical, Nursing and Administrative level. Since 2006, the hospital introduced an IS for supporting users work activities in the Administrative level, named "Lisora" which consists of modules with the same structure (see Appendix VI). Both Administrators and Clinicians are the main users of the HIS. The two user groups don't have the same rights on the system. The system allows the archiving and registration of data only by employees of the administration. Instead Clinicians have the right only to search and read information from the data recorded in the system as the most of the Clinicians recording routines proceed manually on paper forms. Additionally, most of the users, especially the Clinicians are not well engaged with the use of Lisora modules. The lack of resources as mentioned above, doesn’t allow the Hospital to offer educational seminar to their users.

Lisora is an archiving program that works on locally and networked environment and offers connectivity to a limited number of users, in our case the Clinicians and Administrators and is separated in modules. Lisora Modules handling in vitro biochemical, hematologic and microbiology results and consist of 5 sections: Patient Archiving, Patient Registration, Patient Results, Printing Program and Patient history. The main scope of the IS is to meet employees’ needs and help them accomplishing their daily work by serving assistance and facilitating several tasks that were undertaken by them.

To understand the overall workflow that take place in the hospital and how the users are engaged in using the HIS, a description of their work duties are presented: Administration is open to the public from 7:00 am to 15:00 pm, trying to serve patients by giving priority to those who are using ticket. Administrators used to work as receptionist, coordinators of outpatient appointments and deal with documentation procedures and patient information recording routines. They are issuing clinical reports, preparing referral prescription, confirm insurance charges and expenses and imprint the statistics of regular traffic and emergency cases. After 15:00 there is a lack of administrative staff, forcing Clinicians to undertake Administrators’ responsibilities manually such as recording patient data.

3.4 Data Collection
The research aims to address users’ views and desires about the use IS Lisora provides in order to get a comprehensive view of the impact in users’ work. In more details, two different focus group interviews, a group of Clinicians and a group of Administrators were held in order to answer the research questions. At the end of the focus group interview sessions, each group drewled a Rich Picture. Participants’ samples, selected by specific characteristics, which included users with at least one (1) year of experience on IS Lisora. Users with a complete acquired knowledge, at least one year, considerate adequate time expressing concerns. In this way the study ensured to select individuals that would contribute to our scope of research by including high levels of expertise. Both focus groups revealed similar perspectives about the problem situation as expressed in the Rich Pictures.

The data from focus group discussions were analysed through thematic analysis, which revealed specific “themes”, while Rich Pictures were interpreted. Findings, from focus group interview sessions were integrated into SSM application, in order to create a ground for producing Rich Pictures and express suggestions for improvements, related to users work activities through IS Lisora. Once the data were analysed and the themes came up, the participants were called in a second (2nd) focus group session to discuss the initial results. The main scope was to discuss the thematic issues that was formulated based on group stakeholders’ perceptions and agree of the nominated recommendation.

3.4.1 Focus group interviews

1st Focus group - Data collection

The data were collected through semi-structured focus group interview process. Focus groups are used to generate a maximum number of different ideas from a specific population focused on a given topic. It is important to understand peoples working environment and their thoughts about certain matters at working places. According to Crang & Cook (2007, p.56),

“focus groups are hence a key means through which researchers can study these kinds of processes by setting up a situation in which groups of people meet to discuss their experiences and thoughts about specific topics.

As the researcher of the study, I provided the conduction of a conversation between the participants, managed to capture contradictions and leaving space for personal reflection (Grudens-Schuck, Allen and Larson. 2004). In order to avoid the participants broken into one-on-one discussions, since some member interrupted by another, I tried to keep the groups somehow on track. Additionally, I tried to get participants react to what others said and engage those who were reluctant to speak. In this case I prompted the discussion with a question such as “what do you feel about that?” in order to encourage the participants to develop interesting points (Crang & Cook, 2007).

There are several techniques that enable us to learn the meaning being behind the facts. While observation methods are waiting for things to occur and individual interviews capture separate individual attitudes, focus groups elicit multiplicity view by promoting a relatively free exchange of ideas in a short period of time. The technique was chosen in order to generate data based on the synergy of group participants about issues that
affect their working environment (Krueger, 2002). For this reason, this method was more appropriate for this research.

The focus group interviews were conducted from March 27th to December 3rd. Two (2) semi-structured interview templates for each group were prepared with the objective to describe IS users’ experience and understand the barriers that complicate their workflow. Interview were conducted in Greek and were later transmitted into English language. After receiving permission from the Director (Appendix I), I began to plan the focus group discussions by inviting the participants to becoming volunteers in this research study. It was difficult to accommodate all the participants, since the different working hours, however it was managed to gather the most of them synchronously. The Administrators were informed about the ongoing research during their working hours, while the Clinicians were asked to participate through the staff meeting held one's a week. Eight (8) persons were volunteered to participate, a group of four (4) persons with Clinicians and a group of four (4) persons with Administrators. The focus groups with the Administrators were held in the Administrators meeting room, while Clinicians focus group were held in their office in order to feel confident in a more formal environment (Krueger, 2002). In order to produce a convenient atmosphere each session group were served coffee and juice. The focus group collection method lasted forty (50) to (60) minutes for the Administrators and forty (40) minutes for the Clinicians, while at the end of the session was given to them forty-five (45) minutes to draw SSM Rich Picture. More specifically, the interviewees were the following:

Clinicians:
- Surgeon Clinician
- Practice Clinician
- 2 General Practitioners

Administrators:
- Preparing Referral Prescription
- Recording routines
- 2 General Tasks (receptionist, insurance charges, appointment coordination etc.)

For developing an open friendly environment of discussion, the participants were welcomed and informed with details about the scope and objective of research. Additionally, with the aim to guide the conversation between the participants, an interview guide was followed (Appendix IV).

The study started with a presentation of the scope and the methodology that were used. The questions were formulated according to the theoretical framework on which this study was based. Opening questions (1-3) were formulated to develop a relaxed atmosphere and captured participant’s viewpoints about their status at the current work regarding the IS, while focused questions (4-15) relied on theory presented in chapter 2. In order to avoid missing fundamental information, the interview session discussions were recorded with the Informed Consent Form of participants (Appendix III). Additionally, in case of failing recording equipment, handwritten notes of unfamiliar things were kept to help me in the data analysis process.

During the semi-structure focus group sessions, it was able to extract participants experience and worldviews with the Lisora modules which revealed many adequacies
In specific domain. In this way a ground for developing an interesting discussion about problems and desires were set up.

2nd Focus group - Discussion

The second focus group session were arranged to discuss the empirical findings that came up along with the discussion on their comparison to reality. In this session summaries of the first meeting were made in order to help lay the basis for a discussion. The main scope was to validate the thematic issues that were formulated according to user’s insights, extracted from focus group interview sessions and discuss which Conceptual Model could be feasible in comparison to reality. From the two focus group only six individuals were interested in participating, due to inconvenience working hours and time schedule.

At the beginning of the discussion, participant’s attention was driven towards changes that could improve their own working situation in the organization. Thereafter, the examination of Root Definitions and Conceptual Models that specifies that will create took place. All the transformation activities were carefully reviewed and related to real world situation. The participants felt pleasant and agreed with the proposed suggestions for changes without expressing the need for modifications. It was probably the lack of time and the fact that they had already expressed their desires on the Rich Pictures.

Table 1: Focus group interviews

<table>
<thead>
<tr>
<th>Focus group session</th>
<th>Participants</th>
<th>Dates of sessions</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st Focus group session</td>
<td>Administrators</td>
<td>27 March 2015</td>
<td>60 minutes</td>
</tr>
<tr>
<td>1st Focus group - Data collection</td>
<td>Clinicians</td>
<td>29 March 2015</td>
<td>40 minutes</td>
</tr>
<tr>
<td>2nd Focus group - Discussion</td>
<td>Administrators and Clinicians</td>
<td>3 December 2015</td>
<td>80 minutes</td>
</tr>
</tbody>
</table>

3.4.2 SSM Rich Pictures

At the end of the focus group interview sessions Soft System Methodology were applied. The performed discussion set the atmosphere for producing SSM rich pictures and encouraged the participants to illustrate barriers they encounter utilizing IS Lisora, and listing their expectation for an improved IS which facilitate information channel. As the participants were not aware of the SSM rich picture technique, I briefly informed and explained to the them the procedure by showing some examples from Checkland and Poulter (2006) and explained them how to use the technique. For the rich picture creation, participants were given pencils and papers. Administrators continuously painted and threw away their version until completing the final version, while Clinicians were more highly organizational and shared out their roles by copying the final picture into new clear one. Each individual had equal probability of being selected and was informed about the details of the conversation meeting and the SSM process (Walsham, 1995). Finally, it is worth mentioning that the use of SSM rich picture doesn't give the reader the insight perspective to the problematic situation, but was value tool for the research to elicit the data in order to present the findings to the reader.
3.5 Data Analysis

The data analysis in this study, completed through thematic analysis and three activities of SSM. Thematic analysis was adopted to analyse the qualitative data “in rich detail” (Braun and Clarke, 2006). Afterwards, the determined Rich Picture representation of both groups, Administrators and Clinicians extended the definition of the problem situation and guided the analysis, in constructing Root Definitions and Conceptual Models. Finally, a comparison with the reality facilitate information flow through IS Lisora.

The theoretical framework set the context on which the collected data analysed and categorized to become meaningful. Regarding the nature of research, the induction was chosen as the themes derives from the data collection (data-driven) and not from pre-existing theories according to deductive analysis. In more detail the thesis aimed to examine stakeholder’s problems, concerns and desires concerning an improved utilization of hospital IS, by following a data driven approach. The analysis of both created the base for proposing suggestions.

3.5.1 Analysis of Focus Group Interviews

After the interview sessions, participants’ answers were interpreted and summarized carefully through thematic analysis. By examine this data, themes were identified to get knowledge on user’s perceptions, problems and desires of Preveza’s’ hospital IS. At first the data collected through focus group interview sessions, analysed, by examine the patterns of data and identifying themes. In this way the 1st research question answered: “How does the current IS support Clinicians and Administrators with their daily work and what are the problems they encounter?”

According to Braun and Clark (2006, p.79),

“Thematic analysis offers a flexible and easy way to answer the research questions, in other words "to organize and describe data in rich detail".

Through the focus group analysis themes emerge through "reading and rereading of the data". More specifically, in the thematic analysis the following phases as described in Braun and Clarke (2006. p.78-80), were followed:

1. Reading throughout the text in order to mark initial ideas.
2. Generating initial codes by identifying important sections across the data that helps understand the problem situation.
3. Evolvement of themes where the overall themes are created.
4. Checking the potential themes
5. Establishing of overall themes.
6. Writing up the report and evaluating the emerged themes.

So, after the interview conduction, the analysis began with transcribing the interview conversation with a media player. Additionally, each focus group session was translated into English language, as the collected data were in Greek language. Since the
participant’s language was in Greek native, it was demand to be more careful with the translation of the language. Meanwhile, the transcriptions of focus group interviews were read several times to determine similarities and assure differentiation in order to establish initial codes for the general themes (see Appendix IX). Finally, the potential themes were reviewed again to achieve accepted themes, as it is exposed in chapter 4.

3.5.2 Analysis of SSM Rich Picture

Once the findings from focus group interviews were identified, Rich Pictures were also interpreted in order to extract users’ general consistent perspectives and their desires for an improved hospital IS. In this way, an extension of the problem definition was achieved. In other words, the participant’s viewpoints depicted in Rich Pictures together with focus groups pilot the construction of root definitions and conceptual models. A comparison of these to real world were followed in order to propose feasible suggestions for improvement concerning the improved utilization of hospital’s IS. Rich pictures consist an exceptional way to represent complex human situations as a whole (Checkland and Poulter, 2006). According to Avison as stated in Malcolm (1999, p.92), the potential strength of Rich Picture technique is that indicate worries about stakeholders and come up with potential problems themes:

"It can be used to identify problem themes, conflicts, and absence of communication lines. Through debate within the organization, it is possible to identify relevant systems, which may relieve problem themes".

Finally, the initial produced Greek Rich Pictures were recreated in English version by the researcher and analysed into a textual description (see Appendix VIII).

3.6 Validity

Qualitative validity means that the researcher controls the accuracy of research findings by adopting significant strategic activities. According to Creswell (2009), there are eight primary strategies that are used to enhance the research ability to assess accuracy of findings. Triangulation, member checking, use of rich descriptions, clarification of bias, presentation of negative or discrepant information, per debriefing, use of external auditor and spending prolonged time in the field. In the specific research study, validity has been ensured by using some of these strategies. For instance, triangulation of data was achieved by employing different collection methods. With focus group and SSM application a deep understanding of users’ different worldviews and was achieved. However, throughout the study it was given main attention in remaining unbiased from personal prejudice. Member checking of data findings was also a significant factor that increased the accuracy of the study. The initially focus group interview sessions were followed by a second focus group session to review and validate the findings. Furthermore, a detailed and rich description of research settings, methodology (SSM) and data collection and analysis were followed to ensure the richness of study. This also offers a realistic view about the ability to transfer the research in another settings and provide insights for future research. Finally, In the qualitative interpretive research, the researchers’ knowledge on the field may influence the process of analysis, which means that the analysis follows also a subjective unplanned process. Gathering the exposed
users’ perceptions and the pre-existing knowledge the study tried not to influence the data interpretation.

3.7 Ethical Consideration

In this research we were confronted with Ethical issues by collecting and analysing the appropriate data. The research followed Hart's (2005) recommendations showing respect to participants and avoiding stressful situations. Walsham (2006), highlight four main areas of ethical concerns, which I tried to avoid throughout the research time: harm the participants, lack of informed consent, invasion of privacy and deception. To secure the confidentiality of the collected information, a statement form was conducted that include our personal agreement of ensuring that data would not become public (Appendix II). Additionally, permission was obtained from the director of the hospital in order to interview the employees of Administrative level who were the users of the examined system. In this context all the participants were invited to obtain a prepared consent form (Appendix III) before inviting them at the research point, including information about the purpose and their role in the research. These actions will ensure voluntary participation, individuals’ interest and agreement and ensure their value on the study.

More specifically, the main concern was the willingness of target groups to participate actively in the study due to privacy considerations. However, the research intention was to prevent any harm and keep anonymous the interviewers’ identity, by using the data only for the scope of the research study. It was also important to keep participant’s identity private by using anonymity and not specifying their position in the Hospital. There were not any economic or political risks.

Furthermore, due to my internship experience work in the specific hospital level, I was very anxious regarding the protection of participants and my personal perceptions and prepared a Statement of Confidentiality that was given to the Director of the hospital (Appendix I). Having completed my six months’ internship in the Hospital, I had built a good relationship with the employees of the examined environment and became experienced over their problems in general. Taking into account this situation, it was hard to keep a balance through the discussion sessions. Finally, the recorded interview conversations had to be carefully translated from Greek language to English, without changing the meaning and ensuring the value information of participants. However, the recorded sessions allowed transcribing sentence by sentence the conversation. In all, the above arguments were included in the written Consent Form and given to participants as the results will be presented to them.
4. Empirical Findings and Soft System Methodology Application

This chapter starts with presenting the findings of focus group interviews which are analysed through thematic analysis. Then, the Soft System Methodology’s first three activities are applied. Within SSM section, Rich Picture illustration In the second activity, purpose activity models and Conceptual Models are constructed. The third action consist of the comparison of describing the transformation processes of Conceptual Model and the suggestion of possible recommendations for change.

4.1 Focus Group Interview Findings

The thematic analysis of focus group sessions that was held led to the development of six main themes:

1. Deficiency in recording patient information from users
2. Inexperienced users in using the HIS Lisora Modules
3. Absence of sharing information between Administrators and Clinicians
4. Lack of inputting information using common data coding
5. Absence of user-identification (personal account)
6. Administrators shortages

The revealed themes contain the viewpoints of both Clinicians and Administrators. More specifically:

1st Theme: Deficiency in recording patient information from users

Both Administrators and Clinicians strongly confirmed that they are facing difficulties in recording patient information. Due to lack of time, because of their excessive work overload, Clinicians fail to fill in all the fields of paper cards and referrals, a problem that get worse, as there are no specific guidelines regarding the exact process of data input to be followed. Administrators indicated the abovementioned problem prevents them from doing a good job, since they have to do input data regarding patients’ information and their health status twice. The response of Clinician B was very representative when saying:

“… I don't know which data is mandatory to fill in“. We need instructions to facilitate Administrators work tasks”.

Clinician R added that: “You can't deliver value information if you don't know which specific information you have to capture”.

As far as Administrators are concerned, Administrator E said:

“… The most of the Records lacks in important information (Phone, Address etc.... “If Clinicians followed recording guidelines they would become more motivated to use the IHIS Module” “The use of unique rules would be of great help for them”.

2nd Theme: Inexperienced users in using the HIS Lisora Modules
Both Administrators and Clinicians are not really experienced in using the current HIS of the general hospital of Preveza. Administrators claim that they have not worked in the past with similar IS and they lack the necessary knowledge when it comes to accomplish specific tasks by using the Lisora Modules. They made a lot of suggestions regarding their experience: Workshops, Educational Seminars etc. Administrators indicated that is necessary to be familiarized with the HIS, in order to be able to accomplish their work tasks. Administrator A said that “In order to use the HIS Lisora Modules some initial knowledge is needed”, while clinician R said:

“…Yes I have worked in the past with other HIS, but I don’t receive value guidelines for using Lisora Module…”.

Administration C added “…that no matter his experience with previous HIS, not all HIS are the same, so he needs to be trained more in how to use this system”.

3rd Theme: Absence of sharing information between Administrators and Clinicians

Absence of interconnection was the biggest theme encountered in the analysis. Electronic communication and the possibility distribution of electronic information between authorized users of Lisora Modules cause problems in accomplishing their work. Administrators claimed that it is not possible to access and share the same patient information simultaneously, as the HIS Modules are separated and not interconnected with each other. Administrator D said:

“… We want all the information at once...We are not able to handle the work overload until 15:00…” As such, we need to share data with Clinicians in real time, in order to do the job more quickly…”.

Administrator G added: “…The interconnection would improve the information exchange workflow”. “Documents need to be transferred in paper forms from us to Clinicians and from Clinicians to us in order to prescribe the Final Referrals...”.

Clinicians underlined that it is difficult to have access to patient historical reports, which are now available only from Administrators. They also complained about the procedure of the prescription of Referrals. Also, they said that they are not able to see in the system the reasons that patients had been hospitalized in the past, or which test they had undergone. Clinician D imagined that this must result in increased costs for the Hospital. Clinician E said:

“... We can’t check which Laboratory test the patients made or for which disease he was invited in the Hospital”.

Clinician B said: “… We spent a lot of time asking patients the same questions (Family history, allergic, etc.) each time...”. “We will be able to retrieve the information we want and save time by asking the same question...this will help serving more patients in same time”.

4th Theme: Lack of inputting information using common data coding
At the current situation, both Clinicians and Administrators stated that they have to record the same patient information for serving the needs for their work. However, a main problem that employees at both levels face is that there is not a standard model of codifying and inputting data in the system, thereby making their work and communication between the two levels very difficult and time-consuming. The response of Administrator A is very representative when saying:

“...Employees even of the same office enter patient names in Latin, while others in Greek....”. “This results in searching problems: (Search: 'K', Results:"0") ...”

Administrator B added:
“...It is possible for both Administrators and Clinicians to input the same information without understanding that we do so”. It is because of the different coding we use…”

Clinician C stated:
“...Administrators want the information in certain coding...”. “But we use our own clinical words, which Administrators cannot understand, because they say that they are too scientific for them...”.

5th Theme: Absence of user-identification (personal account)

The two target groups indicated that the current HIS Lisora Modules are not identical to all types of users, specifically to Clinicians. They highlight the need to have their own accounts that enables them to create, proceed information, regarding clinical reports, insurance charges and reviewing historical patient data. Administrators expressed the need that Clinicians can access their own Personal Account in order to record patients’ information after 15:00 pm. Additionally, they propose Clinicians to record patients’ information in permanent "closed taps", in order to control themselves the electronic records next day and ensure the validity of information. Both target groups of users also agreed that this action would help to identify the users that make a record. Finally, since there are a lot of data errors included in the IS Lisora, the personalization would also help in identifying which user needs to attend at an education workshop.

Administrator A noted:
“...it is difficult for Administrators to find which clinician recorded the missing data and contact them for clarifications”.

Clinicin D added:
“...I am definitely satisfied with the current structure of the Lisora modules...” “...they have to be reformed with functions that include “review of historical data” or “processing of data” options...”

Clinicians E added: “...It would be better that each user has their own account through Lisora module. In this way we could facilitate knowledge sharing among our colleagues.”
Administrator N also said: “...We need a usable system with usable functions”. Clinician D said: “During rush hours in the hospital I don't have time for hand-written actions”.

6th Theme: Administrators shortages

Both Administrators and clinicians expressed their concerns about the lack of an adequate number of Administrators, especially after 15:00 pm. They claimed that additional staff would facilitate a lot of their daily activities and would improve the patient services. The Administrators underlined that they are overloaded with recording clinicians’ Paper-Cards information into Lisora Modules, sending e-mails, and serving the patients’ needs. Administrator D claim,

“...We wish that colleagues could accomplish some duties of my work....”

Clinician B point out:

“...I refuse to do the Administrators work...” “It is needed that new Administrators are hired".

Clinician C added:

“... It's difficult; we get a lot of negative stress throughout the time we work”.

The above viewpoints expressed by focus group Clinicians and Administrators gave significant remarks for continuing with the next phase with the application of SSM. A summary of produced themes of interview findings with evidence and consequence is illustrated in Table 2. Table 2: Problems identified by Thematic analysis
### Table 2: Problems identified by Thematic analysis

<table>
<thead>
<tr>
<th>Themes</th>
<th>Evidence</th>
<th>Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deficiency in recording patient information</td>
<td>Failure to fill in all the fields of paper cards and Referrals.</td>
<td>Data input processes need to be done twice.</td>
</tr>
<tr>
<td></td>
<td>No specific guidelines regarding the exact process of data input to be followed.</td>
<td></td>
</tr>
<tr>
<td>Lack Lisora’s unique codification system</td>
<td>Some records in Greek, other Latin spelling.</td>
<td>Registration results in errors</td>
</tr>
<tr>
<td></td>
<td>”I don't know which data is mandatory to fill in”.</td>
<td>Lacking Fields, misspellings Time-consuming for proceeding data.</td>
</tr>
<tr>
<td>Absence of systemic interconnection between Lisora Modules</td>
<td>Lack of exchanging same information between users (Clinicians and Administrators)</td>
<td>Knowledge exists in Administrative level but not available when needed.</td>
</tr>
<tr>
<td></td>
<td>Access to historical Patient Data (Access to Laboratory tests)</td>
<td></td>
</tr>
<tr>
<td>Inexperienced Lisora users</td>
<td>No motivation</td>
<td>Fail to deliver value information (Effective organizational IS must be supported by well-motivated and experienced users).</td>
</tr>
<tr>
<td></td>
<td>No previous experience.</td>
<td></td>
</tr>
<tr>
<td>Absence of Personal Account (User Identification)</td>
<td></td>
<td>Clinicians have to perform Administrators’ work duties, thereby delaying in serving patients.</td>
</tr>
<tr>
<td>Administrators’ shortages</td>
<td>15:00a.m to 07:00 pm no patient service Administrators available.</td>
<td>Overload and stressed Administrators.</td>
</tr>
<tr>
<td></td>
<td>Overload with duties: prepare Referrals, signatures, Arrange appointments, etc.</td>
<td>Deficiency in recording procedures</td>
</tr>
</tbody>
</table>
4.2 SSM First Activity - Finding Out about the problem situation

The first activity of SSM aims to define the initial situation in the ill-defined environment and determine the possible and feasible choices that exist for improvements (Checkland, 2000). In order to display the initial situation of the current research, the empirical findings from focus group interviews were analysed. Findings, illustrated user’s worldviews of current IS and the problems for performing effectively work activities by utilizing Preveza’s hospital’s IS. In addition, ideas came up on how a future IS could support users work activities within the hospital. Afterwards, the situation was further defined with participants’ Rich Picture illustrations. The application of this two techniques aided in carrying out analysis one (intervention), two (social) and three (political) and defining the problem situation by helping gaining a deeper knowledge.

4.2.1 Analysis One - The Intervention

In each organization every problematic situation is understood individually accordingly to stakeholder’s viewpoints, the role of each individual who affected from it and act purposefully to improve the situation and propose recommendations for improvement.

For that reason, it is significant to identify the key roles in the situation. Those people who causes the intervention to happen are: “clients”, “practitioners” and “owners”. In the particular case, the users are the Administrators and Clinicians, the ‘issue owners’.

More specifically:

- The client is the person who cause the intervention to happen. In this case, the researchers of the study became aware of existing needs and problem regarding health professional users work settings with the hospital IS Lisora.

- The practitioner is the person who conducts the investigation: The practitioner in this research are the researcher as well the Administrative Level, aiming to find solutions in order to improve the context of problem situation.

- Problem owners refer to the people who affected from the changes in the current situation. In our case people who affected from this research are the Administrators and Clinicians, as main users of IS Lisora. However, in a general sense as owner could be treated the whole Hospital as the health professionals work activities affect the provided services to patients.

4.2.2 Analysis Two - Social

In this analysis the social context is examined through users’ roles, norms and values and settled the importance of the situation. Essentially, analysis two refers to cultural elements that exist in it. In Greece Public Hospitals has hierarchical and rooted laws and provide obstacles and deficiencies in provided services and human activities. This situation results in limiting hospitals overall targets, in our case the Administrative level of general hospital of Preveza.
Users role in the specific situation is culturally characterized as adaptable, since they need to perform task out of their profession. Specifically, Clinicians have to perform Administrators work task for the time period 15:00 am to 07:00 pm, without being able to use IS Lisora. Some Administrators and Clinicians work routines and information demand are supported from the IS while other need manual work. This situation prevents them from completing their activities. Users norm regarding their work is that the IS should enable them to accomplish all their activities through it. Additionally, to that, the Financial Crisis the six last years produced economical, technological reductions such as employee shortages or lack of technological infrastructure.

4.2.3 Analysis Three - Political

The position of power of the Greek hospitals is operating under the funding of the Government and the Ministry of Health. The fact that Greek Government is guarded from the International Monetary Fund create obstacles in the process of getting needed resources and hiring new employees at hospitals. This is also illustrated in the hospital under discussion, where the Administrative employees are overloaded with duties, since there are no personnel to replace them. However, managers of the Administrative level try to make use of current conditions and deliver value services by facilitating activities even though the Economic Crisis.

4.2.4 SSM Rich Pictures

The rationale in SSM is defined by expressing crucial relationships through multiple impressions and viewpoints and consist the basis for discussion in this research (Checkland and Poulter, 2006). Once, the focus group interview session ended, each group were asked (Q15, Q16) to draw a Rich Picture. More specifically they were asked: What might be the characteristics that you wish the HIS to have, in order to improve the workflow of Clinician-Level employees? Would you please draw in a picture your wishes for an improved HIS? The Rich Pictures are illustrated in Figure 3 and Figure 4.

Administrators Rich Picture

The Rich Picture in Fig. 3 is that of Administrators (see Appendix VI original Greek version). These participants creating their Rich Picture by putting themselves at the center of the picture, so as to illustrate that they are focus point of the picture. Then they drew lines, each one showing a process that they accomplished by using the IS of their hospital. The Lisora IS serves as a tool which facilitates their work in organizing data flow. As shown in the Rich Picture of Fig. 2, one of the processes that Administrators perform through the IS is that of inputting patients’ registration information, once patients arrive at the hospital and request for a health service. If patients have already been registered and have come to the hospital to attend a scheduled appointment, Administrators download the associated data, so as to verify the appointments and guide patients about what they have to do next. Administrators also ask from patients to pay for the service they have requested in advance, and print them a detailed invoice, a process also held through the system. The employees of this level of the hospital are also responsible for typing in data provided by Clinicians regarding the results of patients’ examinations and check-ups, while also inputting data,
in case patients have to book a new appointment for a later date. Administrators also check the information provided through clinicians’ paper cards and add any additional information that is necessary. In case patients prefer to book an appointment through the phone, Administrators also have to follow the same booking process. Last but not least, Administrators use the IS of the hospital to print any kind of statistical reports that their supervisors and managers ask, as part of the overall business of the general hospital of Preveza.

As far as problems are concerned, Administrators drew new lines, writing down the problems that they have identified in the processes they had mentioned before. Specifically, Administrators complained about being overloaded with different tasks they had to perform in a limited time, until 15:00 am. In their Rich Picture, the situation gets more complex, since after 15:00 am there is no Administrative staff available to serve the patients. This result, in finding a vast amount of hand-written paper cards, which Clinicians have left since the previous afternoon. In addition, thy frustrated about the missing data they detected on paper-records, when getting back electronic prescriptions that clinicians upload in the system and the paper-based records of patients. Additionally, the absence of a common way of accessing and sharing information between Administrators and clinician were worse as the process of arranging appointments is based on hand-written referrals provided by Clinicians.
WHAT PROBLEMS DO WE HAVE?

- Overload need to do things in minimum time
- There is no unique codification for between doctors and administrator
- Departments need to communicate to each other
- Unique way to access, sharing and processing data
- After 15:00 no available staff

WHAT ARE WE DOING?

- Become familiarized with Lisora modules
- Intercommunication among the users (unique way of accessing and sharing knowledge)
- Each profession shall follow unique codes for recording health information
- Empowering of Administrative employees (during 15:00 pm-07:00 am)

Figure 3: Administrators' Rich Picture
Clinicians Rich Picture

Clinicians followed the same process of illustrating their current situation in their Rich Picture, as presented in Figure 4 (see Appendix VII) original Greek version). They also placed themselves in the center of the picture, but, instead of using lines, they used clouds to illustrate the processes they performed with the system, as well as the problems they encountered regarding their implementation. Taking processes into consideration, as presented at Figure 4, Lisora IS supports Clinicians work in a limited extent. Although Clinicians use the Lisora Modules to insert patient information, they are not able to retrieve the information to other offices and colleagues. Additionally, Clinicians illustrated the process of prescribing Laboratory Referrals, which used to be a handwritten process. Issues of spending time for getting laboratory results are a main problem since the data flow is not passed through the IS Modules. The lack of electronic connection between the Lisora Modules is a serious problem that Clinicians reported that they face, since neither Clinicians, nor Administrators have access to each same source, thereby further delaying their communication and serving patients in time.

As far as the problems, one of them is that after 15:00 there are no available employees at the Administrators’ front desk to serve patients. As a result, doctors need to accomplish Administrators’ work tasks during that time. However, this can only be a handwritten, paper-based, process, by filling the Paper Card Registration Forms. As such, delays identified in serving patients, since Administrators constantly occupy Clinicians. This information has to be entered into Lisora Module by Administrators next day. Moreover, Clinicians wrote that the way they make electronic records is based on their science and is not consistent with what Administrators can understand. They don’t get specific directives on how to input data into Lisora IS, since the functionalities are not well explained to them in a way of training or seminars. Last but not least, Clinicians also noted that the lack of a Personal Account would give them the ability to access data input by Administrators, or edit lacking information.
Overview of Problem Situation

The process of conducting Rich Pictures encouraged participants of each focus group to provide information about the problems they encounter by using the current system, as well their desires for improved processes supported by Lisora Modules.
The fundamental principle is that both Clinicians and Administrators at the current time doesn’t take advantages of the possible potentials of IS, for enhancing their professional working situation and deliver faster and efficient health services. Additionally, the views of both users, Administrators and Clinicians, shared many common characteristics and converge towards changes that needs to be done. They helped to verify if the illustrations are consistent with the data of the interview and also to confirm users view and expectations of the HIS Lisora.

4.3 SSM Second Activity - Building Activity Models

In order to stress the multiple viewpoints of both user groups involved in the problem situation the use of purpose activity model is suggested (Checkland and Poulter, 2006). Taking into consideration users’ needs and desires for an improved HIS, as illustrated in their Rich Pictures, a Root Definitions were suggested. Root Definitions accommodate pure declared worldviews to get a richer outcome of the ill-defined situation under discussion. In this case, the models constructed based on two user’s groups’ perspectives, that were elicit through focus group interviews. The ultimate objective of them is to enhance the use of Lisora and bring improvements to daily work accomplished through it.

4.3.1 Root Definitions

In this research, the Root Definition specify the hospital’s improved system that will have positive impact and will improve the initial IS Lisora, based on the users’ appealed desires through focus group interview session.

To help modelling the activity process there are rules that help creating Root Definitions: The PQR formula, the CATWOE, the three Es, Primary vs Issued-Based tasks. According to the PQR formula: “do P, by Q, in order to achieve R” (Checkland, 2006, p. 39). To forming the RDs, PQR answer the questions:

What is the scope of the system? How does it function in order to achieve the scope? Why this scope is being done? (Checkland and Poulter, 2006, p.39).

The CATWOE is providing a definition where the transformation activities are identified:

(Customers): People that are effected from the activities
(Actors): People to perform activities which make up T
(Transformation): The process that describes the transformation from an input to an output
(Weltanschauung): The worldview that makes the transformation meaningful
(Owner): People which can stop the activities
(Environment): Environment constrains

Since the root definitions are the base for building conceptual model, all the activities have to be monitored in order to have control over activities that have to be taken (Checkland, 2006). The transformation process of the IS Lisora is controlled by the criteria of efficacy, efficiency and effectiveness. More specifically:
Efficacy: which test if the means produce the intended outcomes.
Efficiency: refers in which extend the transformation is achieved by using minimum resources.
Effectiveness: is related with how the improvements will reach high results.

4.3.2 Conceptual Models

After the construction of Root Definitions and the description of the purpose human activity, it is needed to build Conceptual Models that presents detail about the transformation process (Checkland and Poulter, 2006). In this study the construction of the Conceptual Models that described the transformation process and link the activities was followed, by encapsulate the worldviews of HIS Lisora users.

In this case, considering the problems and needs of system users, the following Root Definition were formulated:

4.3.3 First Root Definition and Conceptual Model

RD - Providing interconnection among current IS Lisora modules

A system operated and owned by the Hospital manager, that will interconnect current IS Lisora Modules by improving information exchange among Administrators and Clinicians in order to facilitate knowledge sharing to Administrators and Clinicians work by taking into account current financial and human resources”

PQR

P: A system that will interconnect current IS Lisora Modules
Q: by improving the information exchange between Administrators and Clinicians
R: in order to facilitate knowledge sharing.

CATWOE

(C): User (Clinicians and Administrators)
(A): Hospital manager and IT department
(T): Improve existent interconnection of IS Lisora Modules
  • Input: Need to provide reliable intercommunication of Administrators and Clinicians
  • Output: provide information exchange between Administrators and Clinicians.
(W): Improving existing interconnection is important to enable knowledge sharing.
(O): Hospital Manager
(E): Reductions in financial and human resources and hesitate of hospital management to realize the necessity of this interconnection, in order to ensure the efficiency in supporting users work tasks.
Conceptual Model – to provide interconnection among current IS Lisora modules

1. Identify user needs for interconnection
2. Contact hospital IT department
3. Communicate the aim to the IT department and experts
4. Discuss details of the benefits
5. Interconnection of all Lisora modules
6. Enable information exchange among IS Lisora users

Efficacy: The system provides interconnection among IS Lisora modules
Efficiency: The interconnection intercommunication among users in a faster way without intervention of paper-based activities
Effectiveness: The interconnection fulfills Administrators and Clinicians needs for exchanging information on time

4.3.4 Second Root Definition and Conceptual Model

RD – Establishing standardized coding rules for inputting data

A system operated and owned by the hospital IT department, that will establish standardized coding rules for inputting data in the Lisora system with certain coding in order to understand data descriptions provided from each user and overcome inaccuracies of data descriptions by taking into account users positive attitudes to follow the standardized guidelines.

PQR

P: A system that will establish standardized coding rules
Q: for inputting data in the Lisora system with certain coding
R: to understand information provided from each user and avoid wasting time to figure out inaccuracies of data descriptions
More specifically, the CATWOE regarding this PQR was analysed as following:

(C): User (Clinicians and Administrators)
(A): Hospital IT department
(T): Need to use unique standard codification rules for data input
- Input: need to understand data descriptions
- Output: need to avoid inaccuracy of data descriptions
(W): To overcome data recording errors and understand the description of provided data.
(O): IT department
(E): Hesitance of IS user to follow unique guidelines of records and perceive this as necessary for accomplishing their duties through the IS.

**Conceptual Model** - establish standardized coding rules for inputing data

![Diagram showing the conceptual model](image)

**Figure 6: Second CM - establish standardized coding rules for recording data**

*Efficacy*: A system that will introduce standardized coding rules for recording data
*Efficiency*: Achieving value data provision to users.
*Effectiveness*: Reliable data provision and solve inaccuracies of data description

### 4.3.5 Third Definition and Conceptual Model

**RD** - *Introducing Personal Account with personalization features*
A system operated and owned by the hospital IT department that will create Personal Account with personalization features by allowing the identification of all types of users in order to enable the definition of users recording activities by taking into account the bad financial and human resources circumstances.

**PQR**

**P:** A system that introduces Personal Account with personalization features

**Q:** by allowing the identification from recording activities all types of users

**R:** in order to defining user’s activities in Lisora Modules for enabling better work operations

**CATWOE**

(C): User (Clinicians and Administrators)

(A): Hospital IT department

(T): Creation of an IS Personalization Account

Input: need to identify which user’s utilize information’s at time

Output: need met by defining easier the user’s activities in the IS Lisora

(W): Increase user’s work operations, since they become informed about possible activities of other users in the IS Lisora Modules.

(O): Ministry of Health

(E): Bad financial situation and human resources because it demands IT experts.

**Conceptual Model – to introduces a Personal Account with personalization features**

1. Appreciate personalization for user IS Lisora modules

2. Discuss the need to adjust this action

3. Discussion with IT professionals

4. Integrate Personalization into Lisora module

5. Enable identification of all users

6. Identify users activities in Lisora Modules

7. Improve users recording routines

Figure 7: Third CM - to introduces a Personal Account with personalization features
Efficacy: A system that creates Personal account with personalization features. 

Efficiency: Personal account will be introduced once and enables users better work operations.

Effectiveness: Personal account features provide Administrators and Clinicians information about user activities. No more problem identification come forth.

4.3.6 Fourth Root Definition and Conceptual Model

RD – Recruiting additional Administrative employees with IT expertise

A system operated and owned by the Hospital manager that will support Administrators’ daily work with recording routines by recruiting Administrator employees specialized in IT that will support the needed Administrator activities in order to cope with the big amount of recording routines by taking into account the Government agreement and Economic situation.

PQR

P: A system that will support Administrators’ daily work
Q: by recruiting additional Administrator with IT expertise
R: in order to cope with the big amount of recording needs that have to be proceed for assisting administrative staff services.

CATWOE

(C): User (Clinicians and Administrators)
(A): Ministry of Health and Hospital Manager
(T): Need to support Administrators’ daily activities
   • Input: Define the recording needs that have to be proceed by additional Administrators
   • Output: Need overcome routines regarding Lisora modules records
(W): Enable the current Administrator employees to complete all the work task for which they are responsible
(O): Ministry of Health and Ministry of Finance
(E): Unwillingness of Government to agree with this action due to bad Economic situation.

Conceptual Model – to recruit additional Administrative employees with IT expertise
**Efficacy:** System allows recruitment of Administrator employees for covering the amount of tasks

**Efficiency:** Administrator employees are able to cope with the amount of work tasks in an easier way than before

**Effectiveness:** Administrators will be able to perform recording routines in time required frameworks

### 4.3.7 Fifth Root Definition and Conceptual Model

**RD - Establishing training workshops for IS user**

A system operated and owned by the IT department that will train all users on the Lisora Modules features by introducing training courses in order to become more familiarized with the IS Lisora modules and facilitate data input formats by taking into account Financial requirements for training contents.

**PQR**

**P:** A system that will training all users on the Lisora Modules  
**Q:** by introducing training courses  
**R:** in order to become more familiarized with the IS Lisora modules and facilitate data input formats
**CATWOE**

(C): User (Clinicians and Administrators)  
(A): Hospital Manager and IT department  
(T): Training users through IS Lisora features  
Input: Need to develop user’s skill in utilizing IS Lisora Modules  
Output: Need to facilitate user’s data entry and quality of data formats  
(W): Help users to become familiarized with IS Lisora and increase their contribution in delivering quality data records.  
(O): Hospital Manager, IT Department  
(E): Bad financial requirements for training resources and experts.

**Conceptual Model - to establish training workshops for IS user**

1. Start planning the training sessions  
2. Estimate the needed financial resources  
3. Make a proposal to the Hospital Management and human-finance department  
4. Select and Invite users of IS Lisora  
5. Design the training sessions  
6. Select the users  
7. Familiarization of users with IS Lisora modules features  
7. Evaluate training sessions  

**Figure 9: Fifth CM - to establish training workshops for IS user**

*Efficacy*: encourage users to attend training workshops for improving quality of work  
*Efficiency*: provide users different reasons for encouraging training workshops  
*Effectiveness*: for better IS Lisora utilization
4.4 SSM Third Activity - Structuring discussion about the situation and its improvements

4.4.1 Comparing Conceptual Models with reality

After construction of Conceptual Models, the SSM third activity starts with comparing and contrasting the model with the reality in order to set up a debate about the situation in finding ways to improve it. To this, Conceptual Models aid in facilitating the revision and examination of the problem situation, for finding ways to change it.

In order to carry out this comparison, Checkland and Poulter (2006) suggest four ways,

- the most informal way which refers to recording differences between the models and current perceptions.
- a formal way by listing differences, where a series of questions define the model activities and accuracies opposite to real world situation.
- constructing a scenario about the operations of the activity system and describing the outcomes of this activity.
- building a new model part of reality and comparing it with the Conceptual Model in order to reveal the differences.

In this study, the comparison of the Conceptual Models and the real world was accomplished by using the activity model as a reference and highlighting the differences between the model and the present situation. The differences were listed, in order to decide which suggestions will form changes in the ill-defined situation. Through these exploited arguments, debate among the participants were developed to find solution that will advance the overall situation. The ultimate objective of them is to enhance the use of Lisora and bring improvements to user’s daily work. Furthermore, following this path the main differences and similarities between participants Rich Pictures were evaluated.

Hence, the following differences came up:

- The initial hospital IS Lisora Modules doesn’t offer a common way of accessing knowledge that resides in the separate Modules.

- In the initial hospital IS Lisora, users were not involved in the IS design process. The IS are not competent with users’ needs rather than based on old-rooted system centred design.

- The hospital IS Lisora doesn’t offer the same capabilities to all the user groups. There exists a need to take advantages of these capabilities in order to facilitate their work effectiveness.

- The initial hospital IS Lisora doesn’t enable intercommunication among health professional user’s Modules

- Health professional users are not motivating to use since they never get professional seminars or training in utilizing the IS Lisora.
Subsequently, the conclusion of the comparison between the initial and future IS Lisora, propose suggestions for overcoming the problem circumstances in the hospital of Preveza.

4.4.2 Feasible and Desirable Proposed Changes

In order to improve the current problem situation, changes should be culturally and feasible desirable, and ensuring the cultural aspects and dependencies of real world environment (Checkland, 2006). In the present problem situation possible changes which are not adaptable to the norms and values of the specific organization and its stakeholders, could fail in improving the problem situation. However, the scope of the comparison between model and reality is to set a base for debate among the research participants, regarding the identification of realizable change that could improve the situation.

In the specific case, debate carried out with the Administrators and Clinicians during the second Focus group sessions in order to deliberate discussion about the constructed Root Definitions, Conceptual Models and differences as well the potential benefits that could arise and pilot the hospital to develop an improved IS. Subsequently, the proposed changes, are:

- **1. Interconnection of Lisora Modules**

  Interconnection will enable to both Clinicians’ and the Administrators’ level access to the same information in real time. Both user group recognized the value of enabling intercommunication among the Lisora modules to facilitate the access, retrieve and dissemination of knowledge without limitations, ensuring that the right information is going to the right users at the right time. Both users validated that his change consist the cornerstone that relates to the other proposed changes.

- **2. Development of a standardized coding system for inputting data.**

  This activity will support the process of inputting data description into IS Lisora and set the requirements users shall follow, no matter their profession or the department they work for. Once this feature assigned to the IS Lisora, it could reduce the time-relate errors of recording routines and motivate users. Since the electronic record are increasing, it consists a significant necessity to facilitate the IS Lisora utilization by following standard “codes”, on recording routine activities.

- **3. Creation of Personal Account**

  Personalization of Lisora IS would give the ability to each user profession to have their identical personal account, especially to Clinicians. This change would save time for Administrators, who are obligated to transcribe the paper based mediations they receive from Clinicians into the system. Each profession, could access and process data from their own account, review the data and become responsible for input processes. Both user groups considerate this action feasible and agreed that such a capability would allow them to access the
data content ensure the validity of information accomplished through it. However, the development of this personalization processes, required the participation of user’s.

- **Recruiting additional Administrative employees with IT expertise**

Hiring additional Administrators with IT expertise will increase the teamwork and would help in better sharing their responsibilities. Especially, new employees will become responsible for recording processes demanded from the time period 15:00 pm till 07:00 am. Information descriptions will become more value, due to their expertise in IT domain. In addition, this action, will exempt Clinicians from the duties of Administrators, they were obligate to do, and allow them to focus on Clinical practices. The development of this action will increase collaboration between the colleagues, share responsibilities among Administrators and limit the time spending for handling increased workloads.

- **Workshops for training users on IS Lisora Modules**

With the training action, users, would become more familiarized with IS Lisora and reduce the data errors, especially as far as the advanced processes through Lisora Modules are concerned. The lack of hospital’s training strategy doesn’t allow health professionals to meet their objectives of accomplishing demanded tasks in daily routines. With specific training session, IS Lisora user’s will overcome the barriers and will be motivated to utilize all the functionalities of the Lisora Modules. Since, health care environments are changing frequently, employees have to be ready to adapt to the circumstances. Through the focus group interview session revealed, that both user groups were positive towards taking advantages of the benefits of the HIS.
5. Discussion

This chapter discusses the empirical findings of the research. The chapter begins with discussing the focus group interview findings with respect to the first research questions. Then, a thorough discussion of SSM application and proposed changes with respect to the second research questions takes place and theoretical framework are discussed. Finally, the significance and implication of the study are advocated.

5.1 Discussion with respect to Focus Group Interview Findings

The aim of this research is to contribute to the wider increased understanding of IS health care and provide knowledge about the role of information flow through IS. In the specific case, the research was performed in a health care organization, the general hospital of Preveza which IS is used by its users to support the internal work activities and enable information flow. According, to the literature, it becomes apparent that although IS in health care constitute a significant tool for enabling information flow and support professionals’ work activities it is poor and often undermines health professional work activities.

The outcomes of this study, like in previous researches indicate lack of communication and limited access to information (Scandura Hägglund and Koch 2007; Macia-Chapula, 1999; Torlak and Müceldill, 2013). Moreover, frequent and incorrect documentation and lack of coordination among health professionals. Misunderstanding among professional groups and lack of cooperative work as well as stress among employee’s groups, such as Administrators (Darzentas and Spyrou, 1993; Checkland and Poulter 2006). More specifically, results of research findings revealed the obstacles that users face, as well as changes that needs to be done in the system, in order to perform their job tasks more conveniently. Participants use the Lisora Modules to perform a wide range of daily tasks, concerning information flow, mainly such as inputting patients’ data, tracking appointment details, inputting patient registration information, schedule appointments, download patient’s data, print charges of assurances, book new or rebook appointments with Clinicians, process information of Paper Cards and produce a variety of statistical reports. However, both user groups expressed their dissatisfaction, while the most work is performed manually and is not supported by functions of IS. Neither intercommunication and information flow was adequately achieved, while the most work is performed manually and is not supported by functions of IS. Neither intercommunication and information flow was adequately achieved, since they spend more time in processing paper-written information.

Within this study a significant mark was that the involvement of users facilitates the analysis of the problematic area and contributes to a better utilization of the system, regarding the expressed work activities. Users’ perceptions and involvement in improving the IS could be a core factor guaranteeing the quality of provided services and working-conditions, which in turn affects the quality of hospital services to a big extent. Becoming aware of the needs of hospital IS users through my personal experience during my internship practice in the hospital, I considerate that the need of taking advantages of the full capabilities of the IS can offer to its users in improving their work activities. My intention was to conduct an investigation to elicit users’ (Administrators and Clinicians) worldviews and beliefs about the utilization of IS Lisora in supporting work activities. Focus group interviews enabled the participants to
elaborate, through their experience, the usage of IS Lisora, which guided to suggestions that could improve the problematic situation.

5.2 Discussion with respect to SSM application

It becomes evident from the empirical findings of this research that users, in our case the Administrators and Clinicians, perceive the IS of the hospital they work as highly important, in determining the efficiency and effectiveness of their daily work. The understanding of the IS and its users are a prerequisite in order to gain a deeper complexity of the situation and propose possible suggestions for improvements. Users’ needs and desires were identified, by employing Soft System Methodology. With the adoption of SSM the second research question were answered: “What are the needs and expectations of Clinicians and Administrators, regarding the IS in order to improve their daily work accomplished through it?”

Through SSM the study achieved to uncover a new understanding of users’ IS activities in relation to feasible changes. A significant also realization, due to the use of SSM, was the identification of users’ behaviour in relation to their health actions for which the system was initially established. It reinforced the message of Checkland and Poulter (2006, p.129) “desirable change has to be feasible for those people in the specific situation”. The research outcomes revealed new knowledge regarding the refinements and extension of previously SSM steps in order to accommodate better the flux of the problem situation according to organizational settings. The employment of the methodology helped in emerging suggestions that could drive to changes that were socially, culturally and politically feasible in the hospital environment.

More specifically, the proposed suggestions based on users’ perceptions are the interconnection of Lisora modules, the development of a unique and standardized coding system for inputting data, creation of personal accounts, empowerment of Administrative staff and Workshops. Fichman, Kohli and Krishnan (2011) and Dalrymple (2011), supports the first suggestion, the need for health care professionals to exchange and share information about health issues as a means of improving their operating efficiency. As it was analysed in the previous chapter, a major problem that users of the IS of the general hospital of Preveza faced was the lack of electronic connection among IS Lisora modules. Wagner (1993), also supports this finding by stating that when Administrators are isolated from the rest of a hospital’s offices, then delays and problems in hospitals’ task-processing takes place. Obviously, Administrators and Clinicians are aware of such developments, which are perceive d as fundamental for increasing their operating efficiency, since reliable information sharing through IS is one of the main benefits that offers to its users within the context of health institution (Thompson and Matthew, 2009; Yasnoff et al., 2006). Additionally, regarding the proposed change for Personal Account and standardized coding system as revealed from the findings, De Lone and McLean (1992), highlight that IS have to be designed and operate with the internal requirement and organizational settings and ensure that the designed services reflect the users’ standards. Lack of users’ experience in using the IS Lisora was a significant problem for using the IS of the hospital under discussion. This is probably why both, Administrators and Clinicians, recommended the implementation of workshops for training users in order to become more familiar with the IS Lisora Modules and emphasizes on the need for improving their IT effectiveness through training session that can produce embedded IT skill. They wish
workshops were organized, in order not only to face the lack of experience of their peers, but also their own.

To the last proposed suggestion, as revealed from the users’ expressed needs for empowerment as a mean of resolving obstacles of lacking employees during the time 15:00 pm till 07:00 am., Madhavan (2014), argue that empowerment prepares collaboration of employees and grow the organizational power by sharing responsibilities. Following Greenbaum and Kyng’s (1991) opinion, it is necessary to be taken into consideration the needs, capabilities and desires of their users. In other words, Administrators and Clinicians of the general hospital of Preveza utilized their creativity to challenge the existing system and made recommendations for improvement (Bronte-Steward, 1999).

5.3 Implications for future research

As a whole, empirical findings revealed from Administrators’ and Clinicians’ insights indicate rooted traditional functionalities which complicating users work tasks and slow down the quality of overall services provided to patients. This express the necessity of an improved utilization of IS Lisora. Following Hagen & Robertson, (2010) beliefs, user’s insights making adjustments to the current IS and produced the necessity of changes of internal processes of employees and health care services in general. This is consistency with Harno (2009), which refer to the quality of users’ working conditions and the functions of the hospital’s IS, as a factor that influence the quality of hospital and public services

The research would be on interest, a part of those people who are owners of the problem, for other health organizations who are anxious about intercommunication and information flow accomplished through IS. Since hospital management is also concerned about the internal organizational activities, they could plan a strategy to enhance the usage of IS Lisora regarding users’ work activities and bring change based on the proposed suggestions of the study. Identical to this, other health organizations could take ideas of reviewing the suggestions and applying them to their problem situation. Finally, the findings could be offer insight to other researches in order to help them face problems regarding the utilization of IS so as to improve health professionals’ work activities.
6. Conclusion

This chapter provides a summary of the empirical findings producing an outcome of the research that was held and highlight the main points of interest. It follows the contribution of the research, personal reflections on the study conduction, as well as their implications for future research.

6.1 Summary of Findings

The main aim of the present interpretivist study was orientated into two directions. At first to explore users’, Administrators’ and Clinicians’, perceptions on the utilization of IS Lisora in order to gain a deeper knowledge on the problems they encounter during their work duties. Secondly, the scope was extended into proposing recommendations that enhance users’, Clinicians’ and Administrators’, work and performance through the IS. This scope was achieved with the commitment of SSM three activities and focus group interview sessions, emphasizing on participant’s different worldviews.

More specifically, this research aimed at providing answers to the following research questions:

1. How does the current IS support Clinicians and Administrators with their daily work? What are the problems they encounter?

2. What are the needs and expectations of Clinicians and Administrators, regarding the IS, in order to improve their work accomplished through it?

Regarding the first research question, focus group interview sessions were conducted and analyzed through thematic analysis by producing five themes. The outcomes revealed that users face important problems in their daily operations associated with the IS. The current IS Lisora Modules doesn't help, Clinicians and Administrators, in accomplishing their work duties, as most participants describe their experience with the system as dysfunctional. Both users agreed that IS Lisora serves a crucial role in the hospital such as patients records, administrative registration however lacks in delivering essential electronic information flow. User perceptions indicate that only a part of their work as described above is accomplished electronically through IS Lisora, while the most is performed manually and is not supported by functions of IS. Neither intercommunication nor information flow is adequately achieved. Additionally, their situation of spending more time in processing paper-written information and not having the efficient IS for accomplishing their work made them the perfect participants for this research.

All in all, the barriers of both users indicate deficiency in recording patient information, lack of adequate experience in using the system, lack of electronic information-sharing among departments, lack of a common code for all users to input information in the system, absence of personal accounts for users, as well as a general shortage of Administrators. The empirical findings result in common issues, meaning that the problems identified in focus group discussions were also reflected in participants’ Rich Pictures. However, barriers exposed through the focus group interviews were
developed into ideas on how to deal with them, by formulating Root Definitions and Conceptual Models and produce possible suggestions. These devices, helped in answering the second research question.

Concerning the second research question, SSM three of five activities were employed, since the study did not aim to take action and reflect critically. In the first activity, the finding out phase, users’ perceptions through focus group interviews and rich pictures illustrations were depicted. Using this action as a base, in the second activity, purpose activity models were formulated according to declared worldviews, which include descriptions that could bring improvements. Finally, in the third activity the models were compared to reality and set up a debate for possible and feasible suggestions. The suggestions that help answering the 2nd research question is the following:

1. **Interconnection of Lisora Modules**, so that both Clinicians and the Administrators’ level have access to the same information in real time.

2. **Development of a standardized coding system for inputting data**, for supporting the process of inputting data description into IS Lisora.

3. **Creation of Personal Account** that would give the ability to each user profession to have their identical personal account, especially to Clinicians.

4. **Recruiting additional Administrative employees specialized in IT** for the position of Administrators will increase the efficiency in recording routines and help in better sharing of Administrator work responsibilities.

5. **Workshops for training users on IS Lisora Modules**, in order to become more familiarized with IS Lisora and reduce the data errors, especially as far as the advanced processes through Lisora Modules are concerned.

Overall, the research findings provide important implications about the communication and information flow accomplished through IS Lisora. Following the framework developed by the National Institute of Health Public Access (2010), research findings imply that the hospital under discussion has the opportunity to improve the quality professional work activities and the health services offered to its patients, through the improvement of the IS of the hospital.

### 6.2 Contribution of the Research

First of all, this thesis contributes to a wider understanding of IS in healthcare and provide significant knowledge for further IS development in Health care environments. Additionally, one of the most significant contribution is the involvement of system users in the IS design process. In order to have a positive impact and provide reliable services, IS design should be involving individual experiences. Such a ground is offered through SSM, where users offered significant insight about the impact of IS in daily work associated with IS utilization. The methodology was absolutely appropriate in seeking and examining existing barriers that users face.

An essential point in the study is also the combination of focus group interview sessions and qualitative thematic analysis within SSM approach. It consists by its own a
contribution, as the combination of these two paths increases the richness of data collection and the wider understanding of the problematic situation. In accordance to previous studies that also tried to explore and improve problematical situations through SSM application, this study employed only three of the five activities of SSM, since the research did not aim to take action and reflect critically. It depended on the organizational settings. Additionally, this study constitutes the second effort in Greece aiming to address and develop an IS in health care through the employment of SSM. Such a research design in a Greek hospital setting constitutes another contribution.

6.3 Personal Reflections

The whole process of conducting this thesis was very beneficial and highly interesting. First of all, by conducting this thesis I had the opportunity to develop and analyse a real case study, the one of the general hospital of Preveza aby taking into consideration user point of view. After reviewing and examining various methodologies, I decided to choose SSM since it would be the best choice for the specific organizational settings. Checkland’ s Retrospect helped me in carry out the research and guided the study in the most of its parts. As a challenging methodology, SSM allows to explore how individuals generate the meaning of the real world for themselves by generating a learning process.

There is no doubt that I also faced challenges through the process of making this thesis. One of these was the vast amount of secondary information that I had to deal with, which had to be filtered and sorted, so that only those pieces of information that are relevant to my research subject are embodied in the main part of the research. Specifically, it was challenging to transcribe the participants’ data ad translate the native language into English. Additionally, the thematic analysis was more time consuming than expected, since it was difficult to extract the “pieces of the puzzle” for producing correct categories. Participants at least one (1) year experience of using the IS Lisora limited the study, as the he outcomes could be different if the research involved less experienced users. However, the biggest challenge that I faced was the National Economic and Political circumstances the time of collecting the research data. Although it was also my favourite part of the research process, it was difficult to persuade Administrators and Clinicians employees to participate in my research due to a period of strikes. After several cancellations I managed to plan a day that would be convenience to all.

6.4 Implication for Future Research

The research was concentrated on the case of the general hospital of Preveza, but the implications of its empirical findings could be extended to the rest of the public and private hospitals in Greece, as well as those of other countries. This research provides results that would bring insight to IS internal problem and provide solutions than can be adopted from hospitals across the world, especially in countries like Greece, with rooted Information Systems. In other words, also provide knowledge to other healthcare organizations which face problems relevant to this context.

Taking into account this situation the thesis will be the effort of achieving sustainability and efficiency of health practices performed through Information Systems. Furthermore, based on this study, researchers could conduct a quantitative research with
a by far bigger sample from various hospitals, not only in Greece, but also abroad, in order to gain reliable insights on opinions of health professionals under investigation.

It is worth mentioning, that the research conduction is a process that requires many things in order to achieve accurate outcomes. Finally, it is impossible to cover all the aspects of the research thesis since every research include inadequacies.
References


Hagen P., Robertson T., (2010). *Social Technologies: Challenges and Opportunities for Participation*, University of Technology, Sydney.


Available at: <http://eurpub.oxfordjournals.org/content/eurpub/23/2/206.full.pdf> [Accessed 10 June 2015]
Appendices

Appendix I: Letter to Director of General Hospital of Preveza

Dear Sir. Oikonomou,

In the progress obtaining my master in "Information Systems" and my Thesis at University Linnaeus of Sweden, I will conduct a research at general hospital of Preveza regarding the Hospital Information system. The research entitled" aims to explore users’, Administrators’ and Clinicians’, perceptions on the utilization of IS Lisora in order to gain a deeper knowledge on the problems they encounter during the performance of their work duties. Furthermore, based on these insights to propose solutions for improvement. In the research 4 Administrators and 4 Clinicians that are main users of the HIS will participate. More specifically, focus group discussion will be conducted through two separate interviews where the participants will be invited to draw SSM Rich Pictures that will illustrate user perception of problems and expectations about an improved IS.

As a researcher assure to follow all the necessary procedures for ensure privacy and anonymity of participant’s information and they will be informed of their rights with an Informed Consent form which will be signed in from the participants, Administrators and Clinicians.

I assume, your agreement with the research conduction, the results of which will be contribute to the overall improvement of the IS service provided to Administrators and Clinicians, all in all to the improvement of Hospital provided services.
Προς τον Κύριο Γρηγόριο Οικονόμου, Διευθυντής Νοσοκομείου Νομού Πρέβεζας

Αξιότιμε κ. Οικονόμου,

στη διαδικασία ολοκλήρωσης του μεταπτυχιακού μου προγράμματος του Πανεπιστημίου Linnaeus της Σουηδίας και της διπλωματικής μου επιθυμώ να διεξάγω έρευνα στα πλαίσια του Πληροφοριακού Συστήματος του Νοσοκομείου της Πρέβεζας. Με τίτλο "Βελτίωση των παρεχόμενων υπηρεσιών του Πληροφοριακού Συστήματος" η έρευνα αποσκοπεί να εξετάσει τη προβληματική κατάσταση της υπάρχουσας κατάστασης του συστήματος λαμβάνοντας υπόψη τις ανάγκες των χρηστών του και τις επιθυμίες για βελτίωση των δραστηριοτήτων που διεξάγουν μέσω αυτού. Στη έρευνα θα λάβουν μέρος 4 Διοικητικοί και 4 Ιατροί οι οποίοι θα χωριστούν σε 2 ομάδες συζήτησης στο πλαίσιο συνέντευξεων και θα ερωτηθούν να σχεδιάσουν μια εικόνα (Rich Picture) η οποία θα χρησιμεύσει στην ανάλυση των δεδομένων μου.

Εκ μέρους μου πρόκειται να τηρηθούν όλες οι διαδικασίες οι οποίες θα διαβεβαιώσουν ανονωματικά των συμμετεχόντων της έρευνας και θα υπογραφούν από κάθε συμμετέχον ξεχωριστά, τόσο από τον Διοικητικός όσο και από τους Ιατρούς.

Ελπίζω, να συμφωνείτε με τη διεξαγωγή της έρευνας, τα αποτελέσματα της οποίας θα συμβάλλουν στην αναβάθμιση των υπηρεσιών του Πληροφοριακού Συστήματος και των διεργασιών που εκτελούνται από τους χρήστες του, συμπερασματικά στην αναβάθμιση των παρεχόμενων υπηρεσιών του Νοσοκομείου. Σας ευχαριστώ πολύ για τη συνεργασία σας.
Appendix II: Statement of Confidentiality

(Adapted from Berg, 2001)

<table>
<thead>
<tr>
<th>Statement of Confidentiality</th>
</tr>
</thead>
<tbody>
<tr>
<td>With this form I declare that I will not announce the obtained data during the course of my research to third parties and I agree to announce my results only to the participants. I agree to remove any potential identifiers that could harm my participants.</td>
</tr>
<tr>
<td>Name: ____________________________</td>
</tr>
<tr>
<td>Signature: __________________________</td>
</tr>
<tr>
<td>Date ____________________________</td>
</tr>
</tbody>
</table>
Appendix III: Informed Consent Form

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**Informed Consent Form Template for Master Thesis**

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[Informed Consent Form for Clinicians and Administrators]

**Researcher:** Milionis Konstantina (km222fe@student.lnu.se, 6947282026), Master Program in Information Systems, Linnaeus University.

**Organization:** Hospital Preveza

**Introduction and Purpose of the research**

In the process of obtaining a Master Thesis program I will conduct a research whose purpose is to examine Information System user’s, Administrators’ and Clinicians’, perceptions on the utilization of IS Lisora in order to gain a deeper knowledge on the problems they encounter during the performance of their work duties. Additionally, through the employment of SSM suggestions that could improve users’ performance through IS Lisora will come up.

I strongly believe that you can help us providing insights to practical problems of using such a IS and increase our understanding in describing the complications in the daily workflow of using the IS. This knowledge will guide us to produce plausible recommendations for improving the HIS and the amount of work accomplished through it.

**Type of Research Intervention**

Group discussion that will take about 30-50 minutes.

**Voluntary Participation**

Your participation in this research is entirely voluntary. It is your choice whether to participate or not.

**Participants role in the Research:**

Participate in focus group discussion with other employees of profession (2 groups) and draw Rich Pictures in order to share their experience with the Hospital Information System. The response will help to gain deeper knowledge about problems users encounter in performing work activities through IS
Lisora. Additionally, each group will be requested to draw Rich Pictures by representing characteristics that the IS should include.

1st Group: Administrative Employees
2nd Group: Clinicians

Confidentiality:
- The information that I collect will be not shared to third parties
- Result will be used only for the scope of this research
- You will share your responses only with the other groups of the same Organization me and my Supervisor.

Questions: Do not hesitate to contact me for Question about the research process. Milionis Konstantina (km222fe@student.lnu.se, 6947282026), Master Program in Information Systems, Linnaeus University

Legal Rights and Signatures: I agree to participate in the research study.

I confirm my consent with my signature:

Name of Participant________________________
Signature of Participant _______________________
Date __________________________

Day/month/year
Φόρμα Συγκατάθεσης για συμμετοχή σε έρευνα

[Φόρμα συγκατάθεσης για τους Γιατρούς και Διοικητικούς]

Ερευνητής: Μηλιώνη Κωνσταντίνα (km222fe@student.lnu.se, 6947282026), Master στα "Πληροφοριακά Συστήματα", Linnaeus University.

Οργανισμός: Νοσοκομείο Πρέβεζας

Σκοπός της έρευνας

Για την ολοκλήρωση του μεταπτυχιακού μου προγράμματος, θα διεξάγω μια έρευνα η οποία έχει ως στόχο να εξετάσει τις υπηρεσίες του πληροφοριακού συστήματος στο διοικητικό επίπεδο του Νοσοκομείου, λαμβάνοντας υπόψη τις απόψεις των χρηστών του, ώστε να προταθούν προτάσεις για ένα βελτιωμένο πληροφοριακό σύστημα. Πιστεύω πως θα με βοηθήσετε να καταγράψω τα πρακτικά προβλήματα που αντιμετωπίζετε καθημερινά στην ολοκλήρωση των αρμοδιοτήτων μέσω του Πληροφοριακού συστήματος. Η γνώση που θα προκύψει θα αποτελέσει τη βάση για να δημιουργηθούν προτάσεις για τη βελτίωση του Πληροφοριακού Συστήματος, και την αναβάθμιση των παρεχόμενων υπηρεσιών του Νοσοκομείου.

Τύπος συλλογής δεδομένων

Ομάδες συζητήσεις οι οποίες θα διαρκέσουν 30-50 λεπτά

Εθελοντική συμμετοχή

Η συμμετοχή σας στη έρευνα είναι εντελώς εθελοντική. Από εσάς εξαρτάται αν θέλετε να συμμετάσχετε.

Ο ρόλος των συμμετεχόντων στην έρευνα

Θα συμμετάσχετε σε μια συζήτηση μαζί με άλλα άτομα της ειδικότητάς σας ώστε να ανταλλάξετε απόψεις και ιδέες για την εμπειρία σας στη διαχείριση του πληροφοριακού Συστήματος. Οι απαντήσεις θα βοηθήσουν στη συλλογή πληροφοριών και τη δημιουργία προτάσεων βελτίωσης.

Επιπρόσθετα, κάθε ομάδα θα εροτηθεί να συμμετάσχει στη δημιουργία μιας εικόνας η οποία θα απεικονίζει τις επιθυμίες των χρηστών για ένα βελτιωμένο Πληροφοριακό Σύστημα.

1η ομάδα Διοικητικοί
2η ομάδα Γιατροί

Εμπιστευτικότητα:

- Οι Πληροφορίες που έχω συλλέξει δεν θα μοιραστούν σε τρίτους
- Τα αποτελέσματα θα χρησιμοποιηθούν μόνο για το πεδίο εφαρμογής της παρούσας έρευνας.
- Οι απαντήσεις θα δοθούν μόνο σας μόνο με τις άλλες ομάδες του οργανισμού και στον καθηγητή μου.

Ερωτήσεις: Μην διστάσετε να επικοινωνήσετε μαζί μου για οποιαδήποτε ερώτηση σχετικά με τη διαδικασία της έρευνας. Μηλιώνη Κωνσταντίνα (km222fe@student.lnu.se, 6947282026), Μεταπτυχιακό Πρόγραμμα Σπουδών στα Πληροφοριακά Συστήματα, Πανεπιστήμιο Linnaeus.

Πνευματικά Δικαιώματα και υπογραφές: Συμφωνώ να συμμετάσχω στην έρευνα.

Επιβεβαιώνω τη συγκατάθεσή μου με την υπογραφή μου

Όνομα συμμετέχουν____________________

Υπογραφή συμμετέχουν____________________

Ημερομηνία ___________________________

Ημέρα/Μήνας/χρόνος
Appendix IV: Interview questions for Administrators and Clinicians

Adapted from (Krueger, 2002)

Interview guide for the focus group of Administrators and Clinicians

Welcome

Hello, In the process of obtaining a Master Thesis program I would like to thank you for accepting my invitation to participate in the research. The main scope in this research is to explore Information System user’s perception about the current provided functions in hospital IS of Administrative level and their expectations regarding their work, so as to propose recommendations for an improved IS. I strongly believe that you can help us providing insights to practical problems of using such an IS and increase our understanding in describing the complications in the daily workflow of using the IS.

The results of the meeting will be used to guide the research in producing plausible recommendations for improving the daily work accomplished through the HIS and all in all the services delivered to patients.

You were selected due to your similar characteristics of at least one (1) year experience in using the HIS Lisora

Interview guidelines for Clinicians and Administrators:

1. The session will be recorded.
2. Please turn off your phones or answer quietly as possible.
3. Don’t hesitate to express your own views, as there are no right or wrong answers.
4. As a facilitator I will guide the discussion with a set of prepared questions.

Questions for Administrators:

General Questions

1) Could you please tell us your name?
2) How many years have you been working in the Hospital?
3) Have you worked in the past with other HIS Modules?

Questions

4) Are computers available in all the offices of the administrative department?
5) Could you please tell us what your working schedule is?
6) What are the processes and daily duties in your workplace, for which you need to use the IS of the hospital, in order to accomplish them?
7) How would you comment on the exchange of information among departments through the use of the HIS?

8) I have noticed that you check and sign Paper Referrals and Cards you receive from Clinicians. Moreover, I have noticed that you receive paper cards from Clinicians, which include information that you have to input in the system. Are there any problems that you encounter throughout this process? Is the information provided by clinicians enough for you to do your job?

9) How do you input information in Lisora HIS? Are there any problems encountered there?

10) Are there any guidelines to help you in how to use Lisora HIS?

11) How would you commend on the overall user interface of the current system of your hospital? Is it user-friendly? Can you find easily the information that you want?

12) Do you believe that you need to improve your skills in Information Communication Technologies, and specifically on IS Lisora Modules?

13) In general, do you believe that the HIS helps you in performing your overall daily tasks? How would you describe the communication channel provided through the Lisora Modules?

14) Is there anything else that prevents you from doing your job efficiently and in the right way? Please describe our problems in terms of Hospital’s IS?

15) Please share your ideas you thing could improve the work activities accomplished through the Lisora Modules

16) What might be the characteristics that you wish the IS Lisora to have, in order to improve the workflow of Administrative Level employees? Would you please draw in a picture your wishes for an improved HIS?

Questions for Clinicians:

General Questions

1) Could you please tell us your name and profession in the Hospital?
2) Could you tell us how many years are you working in the Hospital?
3) What experience do you have working in an electronic medical record?

Questions

4) Are computers available in all the offices of the Clinicians’ department?
5) Could you please tell us what your working schedule is?
6) What are the processes and daily duties in your workplace, for which you need to use the IS of the hospital, in order to accomplish them?
7) How would you comment on the exchange of information among departments through the use of the HIS?

8) How do your record information? Am I right in that you do so both in print and electronically?

9) How do you input information in IS Lisora? Are there any problems encountered there?

10) I have noticed that you get directions from Administrators for entering patient Information. Aren’t there any guidelines to help you in how to use IS Lisora?

11) I have noticed that you prescribe hand-written Referrals for Laboratory tests. Do you think that the Interconnection of IS Lisora Modules, would facilitate your work?

12) How would you commend on the overall user interface of the current system of your hospital? Is it user-friendly? Can you find easily the information that you want?

13) Do you believe that you need to improve your skills in Information Communication Technologies (ICTs), and specifically on IS Lisora Modules?

14) In general, do you believe that the hospitals IS helps you in performing your overall daily tasks?

15) Is there anything else that prevents you from doing your job efficiently and in the right way? Please think in terms of the IS of the hospital

16) What might be the characteristics that you wish the IS Lisora to have, in order to improve the workflow of Clinician employees? Would you please draw in a picture your wishes for an improved HIS?
Interview questions for Administrators and Clinicians in Greek

Οδηγός Συνέντευξης για ομάδα συζήτησης Διοικητικών και Ιατρών

Καλώς ήλθατε

Γεια σας, στη διαδικασία απόκτησης του Μεταπτυχιακού τίτλου σπουδών μου θα ήθελα να σας ευχαριστήσω που δεχτήκατε να συμμετάσχετε στην έρευνα αυτή. Ο κύριος σκοπός της έρευνας είναι να εξετάσουμε τις εμπειρίες των χρηστών για τις παρεχόμενες υπηρεσίες του Πληροφοριακού συστήματος του Νοσοκομείου καθώς και επιθυμείς για την βελτίωση των διεργασιών που εκτελούνται μέσω αυτού ώστε να διατυπωθούν προτάσεις για βελτίωση των παρεχόμενων υπηρεσιών αυτών. Πιστεύω πως μπορείτε να προσφέρετε μεγάλη βοήθεια να αναδείξουμε τα πρακτικά προβλήματα χρήσης που υπάρχουν, και να περιγράψουμε τις δυσκολίες υφίστανται κατά σε καθημερινές ενέργειες που διατελούντα μέσω αυτού.

Τα αποτελέσματα από τη συνάντηση θα αποτελέσουν οδηγό στη δημιουργία προτάσεων βελτίωσης των διεργασιών που εκτελούνται μέσω του Πληροφοριακού συστήματος καθώς και την αναβάθμιση των παρεχόμενων υπηρεσιών.

Επιλεγθήκατε με κοινό χαρακτηριστικό, τουλάχιστον ενός (1) χρόνου εμπειρία του Πληροφοριακού Συστήματος .

Οδηγός ερωτηματολογίου για την ομάδα Γιατρών και Διοικητικών.

Γενικές ερωτήσεις

Ερωτήσεις Διοικητικών
1) Ποιο είναι το όνομα σας?
2) Πόσα χρόνια εργάστε στο Νοσοκομείο?
3) Έχετε εργαστεί στο παρελθόν με άλλα Πληροφοριακά Συστήματα Νοσοκομείων?

Ερωτήσεις
4) Υπάρχουν διαθέσιμοι υπολογιστές στα γραφεία του διοικητικού τμήματος?
5) Μπορείτε να μας πείτε το οράμα εργασίας σας?
6) Ποιες είναι οι εργασίες που εκτελείτε καθημερινά στη δουλειά σας οι οποίες απαιτούν τη χρήση του Πληροφοριακού Συστήματος?
7) Ποια η άποψη σας για τη μετάδοση δεδομένων μεταξύ των τμημάτων μέσω του Πληροφοριακού Συστήματος?
8) Παρατήρησα ότι διαθέτετε και υπογράφετε παραπεμπτικά και καρτέλες των γιατρών. Επιπλέον, παρατήρησα ότι καθημερινά οι Γιατροί σας φέρνουν έντυπες καρτέλες, οι οποίες αναγράφουν πληροφορίες των ασθενών και πρέπει να περαστούν
στον σύστημα. Ποια τα προβλήματα που αντιμετωπίζετε κατά αυτή τη διαδικασία; Θεωρείτε αρκετές τις πληροφορίες που λαμβάνετε από τον γιατρός?

9) Με ποιο τρόπο εισάγετε πληροφορίες στο Lisora? Ποια τα προβλήματα που αντιμετωπίζετε?

10) Ακολουθείτε κάποιες οδηγίες που σας υποδεικνύουν πως να το χρησιμοποιήσετε?

11) Ποια η άποψη σας για το προσωρινή χρηστικότητα του Συστήματος? Είναι φιλικό σε εσάς; Βοηθάει στη εύρεση πληροφοριών που επιθυμείτε κάθε φορά?

12) Θεωρείτε πώς χρειάζεστε επιμορφωτικά μαθήματα για τη χρήση νέων τεχνολογιών, και συγκεκριμένα του Πληροφοριακού Συστήματος Lisora?

13) Θεωρείτε ότι το Πληροφοριακό Σύστημα σας βοηθάει ώστε να διεκπεραιώσετε τις καθημερινές δραστηριότητες σας?

14) Υπάρχει κάτι το οποίο σας εμποδίζει στο να διεκπεραιώσετε αποτελεσματικά τις καθημερινές δραστηριότητες σας στο χώρο εργασίας σας στη διοίκηση; Παρακαλώ σκεφτείτε ποια είναι αυτά στα πλαίσια χρήσης του Πληροφοριακού Συστήματος.

15) Ποια είναι τα χαρακτηριστικά που επιθυμείτε να έχει το Πληροφοριακό Σύστημα, τα οποία θα διευκολύνουν τις μελλοντικές δραστηριότητές σας στη διοίκηση? Μπορείτε να μας χέστετε μια εικόνα της οποία θα αποκαλύψει τις επιθυμίες σας?

Ερωτήσεις Ιατρών

1) Ποιο είναι το όνομα σας?
2) Πόσα χρόνια εργάζεστε στο Νοσοκομείο?
3) Έχετε εργαστεί στο παρελθόν με άλλα Πληροφοριακά Συστήματα Νοσοκομείων?

Ερωτήσεις

4) Υπάρχουν διαθέσιμοι υπολογιστές στα γραφεία του διοικητικού τμήματος;
5) Μπορείτε να μας πείτε το οράριο εργασίας σας;
6) Ποιες είναι οι εργασίες που εκτελείτε καθημερινά στη δουλειά σας στη δουλειά σας οι οποίες απαιτούν τη χρήση του Πληροφοριακού Συστήματος;
7) Ποια η άποψη σας για τη μετάδοση δεδομένων μεταξύ των τμημάτων, μέσω του Πληροφοριακού Συστήματος;
8) Παρατήρησα ότι διαθέτε και υπογράφετε παραπεμπτικά και καρτέλες των γιατρών. Επιπλέον, παρατήρησα ότι καθημερινά οι Γιατροί σας φέρνουν έντυπες καρτέλες, οι οποίες αναγράφουν πληροφορίες των ασθενών και πρέπει να περαστούν στον σύστημα. Ποια τα προβλήματα που αντιμετωπίζετε κατά αυτή τη διαδικασία; Θεωρείτε αρκετές τις πληροφορίες που λαμβάνετε από τον γιατρός?
9) Με ποιο τρόπο εισάγετε πληροφορίες στο Lisora? Ποια τα προβλήματα που αντιμετωπίζετε?

10) Παρατήρησα, πώς λαμβάνετε οδηγίες από τους Διοικητικούς για την εισαγωγή δεδομένων στο Σύστημα? Υπάρχουν κάποιες οδηγίες για τη χρήση του Πληροφοριακού Συστήματος και των μοντέλων του?

11) Παρατήρησα, πως τα παραπεμπτικά για εξετάσεις γίνονται χειρόγραφα σε έντυπα. Πιστεύετε πως η σύνδεση των μοντέλων του συστήματος μεταξύ των τμημάτων σας με τα εργαστήρια θα επλύσει το πρόβλημα?

12) Θεωρείτε πώς χρειάζεστε επιμορφωτικά μαθήματα για τη χρήση νέων τεχνολογιών, και συγκεκριμένα του Πληροφοριακού Συστήματος Lisora?

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15) Ποια είναι τα χαρακτηριστικά που επιθυμείτε να έχει το Πληροφοριακό Σύστημα, τα οποία θα διευκόλυνουν τις μελλοντικές δραστηριότητες σας στη διοίκηση; Μπορείτε παρακαλώ να μας σχεδιάσετε μια εικόνα η οποία θα απεικονίζει τις επιθυμίες σας?
Appendix V: Organizational Chart of General Hospital of Preveza’s Lisora
Appendix VI: Lisora Modules of General Hospital of Preveza
Appendix VII: Administrators’ Rich Picture (Original Greek version)
Appendix VIII: Clinicians’ Rich Picture (Original Greek version)
## Appendix IX: Example from Codes to Theme

<table>
<thead>
<tr>
<th>Data</th>
<th>Code</th>
<th>Overall Theme</th>
<th>Emerged Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>I don't know which data is mandatory to fill in Paper Cards when we have to perform Administrators work. It is very stressful since we are not informed about their recording routines. Without a standard coding system, it will be difficult to continue delivering value information on time. Failures in data descriptions are common. This imperfection cause problem in accessing patient data.</td>
<td>Difficult Record Failures Problem description</td>
<td>Recording patient information issues</td>
<td>Deficiency in recording patient information from users</td>
</tr>
</tbody>
</table>

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