THE RELATIONSHIP BETWEEN USER CHARACTERISTICS, PARTICIPATION AND USER SATISFACTION OF INFORMATION SYSTEM IN HUA-HIN HOSPITAL: CASE STUDY

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ABSTRACT

Five years ago, Hua-Hin Hospital developed and implemented a Hospital Information System (HIS) to support health care service, health care provider, and hospital management. The hospital had planned to expand the HIS, however, no evaluation of the Hua-Hin HIS has been performed.

This research was a cross-sectional survey that attempted to study information system success in dimensions of the user satisfaction level and to find the association between the independent factors of the user experiences, user knowledge, user attitude, user participation, and user satisfaction.

The study sample was selected using simple random sampling that comprised of 190 users who had used the Hua-Hin HIS for more than six months. The data were reported from 165 questionnaires.

The results found that the user satisfaction was at a moderate level, user satisfaction on the information quality and system quality was at a moderate level, while satisfaction on service quality was at a high level. The computer knowledge of the user was at a moderate level, and the user attitude was at a positive level. The participation of the user was at a low level and the participation in decision and in evaluation was at a low level; however participation in implementation and in benefit was at a moderate level. It was found that the relationship between the system training (χ^2 = 14.75, p-value = 0.001) duration of system use (r = -.187); user attitude(r =.301); user participation (r =.364) and user satisfaction.

The research suggests the system manager should develop a policy and strategic plan to enhance the participation of the user. The user should be trained by an experienced user as a facilitator, this would help to increase the user satisfaction, the user attitude, and the user participation when using the Hua-Hin HIS.

KEY WORDS: INFORMATION SYSTEM SUCCESS / USER SATISFACTION

153 pages

ความสัมพันธ์ระหว่างคุณลักษณะของผู้ใช้ระบบ การมีส่วนร่วมของผู้ใช้ระบบ กับความพึงพอใจของผู้ใช้ระบบสารสนเทศโรงพยาบาลหัวหิน: กรณีศึกษา

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บทคัดย่อ

โรงพยาบาลหัวหินได้มีการพัฒนาและใช้ระบบสารสนเทศโรงพยาบาลเป็นเวลากว่า 5 ปี เพื่อสนับสนุนการให้บริการสุขภาพแก่ผู้ป่วย เจ้าหน้าที่ผู้ให้บริการสุขภาพและการบริหารงานโรงพยาบาล โรงพยาบาลมีแผนการขยายระบบสารสนเทศโรงพยาบาล อย่างไรก็ดี ยังไม่เคยมีการประเมินระบบสารสนเทศโรงพยาบาลหัวหินมาก่อน

การวิจัยนี้เป็นการวิจัยเชิงสำรวจภาคตัดขวาง (Cross-sectional research) มีวัตถุประสงค์เพื่อประเมินความสำเร็จของระบบสารสนเทศโรงพยาบาล โดยพิจารณาจากระดับความพึงพอใจของผู้ใช้ระบบสารสนเทศโรงพยาบาลหัวหิน และเพื่อหาความสัมพันธ์ ระหว่างตัวแปรอิสระได้แก่ ประสบการณ์ ความรู้ ทัศนคติ และการมีส่วนร่วมของผู้ใช้ระบบ กับความพึงพอใจของผู้ใช้ระบบ โดยใช้แบบสอบถามในการเก็บข้อมูลจากผู้ที่ได้ใช้งานระบบสารสนเทศโรงพยาบาลหัวหินเป็นเวลา 6 เดือนขึ้นไป จำนวน 190 คน ผลการศึกษาได้มาจากแบบสอบถามที่ได้กรอกแล้วและส่งคืนมาจำนวน 165 ฉบับ

ผลการวิจัยพบว่า ผู้ใช้ระบบสารสนเทศมีความพึงพอใจต่อระบบสารสนเทศโรงพยาบาลหัวหินโดยรวมอยู่ในระดับปานกลางโดยมีความพึงพอใจต่อ คุณภาพของสารสนเทศในระดับปานกลาง คุณภาพของระบบในระดับปานกลาง และคุณภาพบริการ อยู่ในระดับสูง ความรู้ของผู้ใช้ระบบสารสนเทศอยู่ในระดับปานกลาง ทัศนคติของผู้ใช้ต่อระบบสารสนเทศ เป็นไปในทางบวก การมีส่วนร่วมโดยรวมของผู้ใช้ระบบอยู่ในระดับต่ำ โดยมีส่วนร่วมในการตัดสินใจ และการประเมินระบบอยู่ในระดับต่ำ การมีส่วนร่วมในการดำเนินการและการได้รับประโยชน์อยู่ในระดับปานกลาง ด้านความสัมพันธ์พบว่าผู้ใช้ระบบที่ได้รับการฝึกใช้ระบบ (χ^2=14.75, p-value=0.001) มีความสัมพันธ์กับความพึงพอใจของผู้ใช้ระบบ ระยะเวลาที่ใช้ระบบ (r =-.187) มีความสัมพันธ์ในทางลบกับความพึงพอใจของผู้ใช้ระบบ ทัศนคติของผู้ใช้ระบบ (r=.301) และการมีส่วนร่วมของผู้ใช้ระบบ (r = .364) มีความสัมพันธ์ทางบวกกับความพึงพอใจของผู้ใช้ระบบ แต่ความสัมพันธ์อยู่ในระดับต่ำ

ข้อเสนอแนะจากการวิจัย ผู้บริหารระบบสารสนเทศควรมีนโยบาย และวางแผนกลยุทธ์ เพื่อหาวิธีการในการส่งเสริมการมีส่วนร่วมของผู้ใช้ระบบ เช่น การฝึกใช้ระบบสารสนเทศผ่านกระบวนการกลุ่ม โดยให้ผู้ใช้ระบบที่มีทัศนคติที่ดี มีประสบการณ์และมีความชำนาญในการใช้ระบบเป็นผู้ช่วยฝึกสอน

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CHAPTER I
INTRODUCTION

Background and Significance of the Study

Since 1970, our world has moved into the age of information technology, when the information becomes powerful and essential for any survival and competitiveness in all regimes. Information has given broad effects to working at the individual, group and organization levels in all careers (Lohsuwanrat, 2005; Hagg, 2005). As the information technology (IT) has been so advanced at this age, therefore, IT takes a very prominent role in human life. IT allows humans to access to information, and to communicate with each other rapidly over borders. It could be said that IT is a living tool of humans in the IT society. Since IT leads to the storage, usage and analysis of information broadly, conveniently and rapidly, which provokes the database and knowledge base of the genius age when the information technology system is utilized in the replacement of humans (Watthana, 1996) because information technology is widely accepted for its highest potential at all facets (Wongpanichlert & Chantramangklasri, 1995).

Information technology involves two technological areas: computer technologies and telecommunication technologies. To elaborate, computer technologies deal with storage, recording, processing of information as well as reports, but such activities must be based on the telecommunication technologies, e.g. telephone, facsimile, television, email, to disseminate the information obtained from the computer technologies to other persons or regimes. Thus, information technology takes role in developing and performing all activities such as communications, working and solving problems as well as decision-making. Certain agencies are established to compile, analyze and prepare reports so that the information could be utilized broadly and worthily, and it helps that work more effective and efficient (http://csnet.dru.ac.th/lecture/ltlife/htm#life2).

Thailand's Information Promotion Committee had been founded in 1992. The Year 1995 was officially announced to be the Year of Information Technology of Thailand (Kiritoh, 1995). In addition, the Ministry of Information and Communication Technology was established under the concepts of ministry establishment in conjunction with the Information and Communication Technology Policy, 2001 – 2010 (IT Plan Year 2010) that the Information Policy would be implemented to develop the country to be an intellectual and learning-based society. Moreover, it is expected that the information and community technologies would be used to enrich the effectiveness of the state's working process and good governance, which is called E-Government. The state's administration is also targeted that, by Year 2010, the executives of each ministry should hold at least 1 system capable of retrieving quality and updated information, which summarizes the national overview for any decision-making at anytime. To step into such target of state administration, it should start from: 1) cost-effective utilization of information technology to enhance the state's efficiency, leading to 2) quality improvement of information, leading to 3) executives utilize the information and targets for the public service in 2010 that every ministry must set up at least one service where the general people could receive it from one location at any district at anytime. Moving into this target of public service should start from: 4) engaging an efficient public service system; 5) connecting such service with other local areas and 6) connecting such system with other agencies around the country. All these 6 viewpoints are the definition of success in implementing the information technology in the government sector (Master Plan, Ministry of Public Health, 2004 – 2006). Top management at the ministerial, bureau and department levels would be encouraged to be the advanced information technology executives, who would be a key mechanism of utilizing the information technology in an integrated way in order to administer the government agencies universally to support the world's new society and economics (http://www.egovernment.or.th).

Harris Kern et al. wrote in a book titled "IT Organization" in 2000 that his team has surveyed the IT infrastructure in several companies before summarizing significant problems affecting those organizations, which included the waste of budgets, duplicated working, communication problems between agencies, confusion and no-satisfaction of users, and no direction of IT (Malaiwong, 2003,). Using the

information technology definitely gives several impacts to that organization such as impact to the working efficiency as the working system is changed to be an automatic and more rapid system. It also affects the working quality, that is, it improves the working procedure and performance, which leads to new innovations. IT gives impact to the personnel by encouraging the workers at all levels to have attempts, learning and self-learning about the use of computer. IT affects the business communications as it facilitates the business communications. The business impact from IT is the commercial services via the internet network system that is called e-commerce. Therefore, to use the information technology in any agency, the executives must study and comprehend the impacts caused by the use of information technology so that that agency gets the best benefit from the use of information technology; otherwise, IT may cause problems there (Malaiwong, 2004). Paula J. Vaughan, Information Service Program Manager, Colorado University, stated that the factors of successful setting of information technology system do not involve only technologies, but also the reaction of such technologies with the organization, participation of system users, system resistance, adherence, planning and system risks (www.educause.edu retrieved on 30/10/2006). Moreover, according to the statistic report on success and failure of system development based on the survey done in 1994, about 53% of system development projects were delayed or was over budget while 31% of system development projects were incomplete. In conclusion, in 1994, about 84% of system development projects collapsed. According to a study, about 75% of major IT systems faced the operating failure (cited in Lohsuwanrat, 2005). It was estimated that, in 2000, the failure of system development might reach 90% if the system development lacked a good project management (*Oz, E., 2002*). In 2003, Laudon & Laudon reported that the system development ended with failure due to the negligence of system changing. It was found that 70% of projects failed because the project scope was too broad; so the system was so complicated to be completed.

Under a vision that “The Ministry of Public Health (MOPH) is a ministry utilizing the advanced and sophisticated information technology to undertake public health activities appropriately” and according to the Eighth Public Health Development Plan, MOPH set up a policy of utilizing the information technology in hospitals whereas certain processing programs were developed to reduce the hospital

officials' task in preparing the reports. Later, in the Ninth Public Health Development Plan (2002 – 2006), the health information system of the MOPH was reformed to be in line with the governmental system reform. The mission and structure of MOPH was also changed; a new development of public health information system for management (MIS reform) was set up as the electronic individual cards connecting the information at the central part and between areas, and this information system would be the database of each province for the integrated administration. The database at the operating level, e.g. community health center and primary health care unit, hospital, provincial health office, was developed to stand on the same infrastructure and to be connected throughout the system, which may be connected to the Smart Card System in the future. This development would help respond to several achievement indexes such as KPI, E-Inspection and MOC (Ministry Operation Center) according to roles and duties of each agency efficiently (Thai Public Health Report of Thailand, 2001 – 2004) so that the public health care among Thai citizens becomes efficient. The inclusive objectives of developing the information and communication technology of MOPH were: 1) to enhance the potential of information and communication technology of the Ministry so that it is capable of supporting the present and future needs of using the information technology for the health system in part of administration, service and academics; 2) to develop human resources so that they are prepared to use and maintain the information and communication technology system and to further develop it and 3) to develop the information and communication technology system so that it is operated cost-effectively and worthily based on joint cooperation and resource consumption (Master Plan, Ministry of Public Health, 2004 – 2006).

Using the information technology in hospitals has caused several problems. According to the report on situations of health management system in connection with information technology system in term of health, main problems are the huge amount of stored data and duplicated data in the system but the data is not accurate or reliable. Most information in the system deals with the activities or operating results rather than the information showing the success of system development. Moreover, from the technical report on the project of studying appropriate operating characters of information working system in hospitals under the

supervision of the Ministry of Finance from Year 1983 – 2000, as done by the Public Heath System Research Institute in collaboration with the National Electronics and Computer Technology Center (NECTEC) regarding Development of Computer-based Information System in Hospitals, it showed that core problems found in the information system development of hospitals were: 1) shortage of organization's planning for an integrated information system development; 2) shortage of main standard of information system; 3) shortage of well-trained and skillful computer personnel and 4) shortage of efficient management of personnel, tasks and budget (Public Health Policy and Plan, 2001).

In conclusion, the hospitals under the supervision of MOPH have tried to develop the computer-based information system from Year 1983 – 2000 or for 17 years, but they have not yet been able to announce that they "are successful in the development of computer and information technology system" (Public Health Policy and Plan, 2001; NECTEC, 2001). It was also found that hospitals at 88.49% used the computer-based information system to facilitate their general administration and reports rather than to give medical care to patients and to develop the medical care quality. The average investment cost in such system is approximately baht 3.87 million per hospital and it is likely that the investment cost in the information system would be higher while, at present, there has not yet been the apparent controlling mechanism (Pongpiroon & Sriratana, 2005). This means that it is possible that the total health system of the country would be affected because this investment amount has not been calculated clearly (Tangcharoensatien et al., 2001). In addition, the hospitals establish the information committee who has not actually understood its roles and duties, especially duplicated roles between the department in charge of administering the computer system or medical records and the hospital information committee. As a result, there are problems about coordination between agencies, confusion about interpretation until the working cannot be connected to the standard system. These are the problems being faced by every hospital (Pongpiroon, & Sumalee, 2005).

According to the survey report of Krit Pongpiroon and Sanya Sriratana on the Use of Computer-based Information System of Hospitals in Thailand by surveying the information from hospitals across the country, it was found that the hospitals at

88.49% used the computer-based information system to facilitate their general administration and reports rather than to give medical care to patients and to develop the medical care quality. The expenses for personnel and readiness of back-up system are also main problems obstructing the hospitals from using the computer-based information system. Considering to selecting the computer-based information system lacks the apparent controlling mechanism and it depends on the discretion of each hospital. At present, there are 44 different computer-based information systems. In addition, the average investment for each computer-based information system is baht 3.87 million per hospital and this investment is likely to be higher gradually (Pongpiroon, &Sriratana, 2005).

As mentioned earlier, it could be concluded that there are still some problems of utilizing the computer-based information system in hospitals under the supervision of the Ministry of Public Health, which included the problems about higher investment amount, management, allocation of information resources, knowledge about information system and information technology, and cost-effective use of information technology or value-added in the service system.

Hua Hin Hospital is a hospital under the supervision of the Ministry of Public Health. Its information system has been gradually improved. Up to the end of 2002, Hua Hin Hospital, for the first time, set up a policy of using the information system to provide services to patients at the Medical Records Department, Out-patient Department, In-patient Department, Pharmacy Department, Consulting Room, patient appointments, Finance Department, Social Security Department, etc. According to the research data obtained by investigating the officers who were system users, including supervisors, department heads and workers, for the results caused by the use of information system on the period of using the system. Most answers from the users dealt with the system failure to serve the users' information demands. Moreover, anytime when the system was out of work, the users could not remedy it at the service point, but had to wait the system administrator. This kept the service recipients wait longer and it prolonged other service activities. In addition, the system operating was not stable enough, so the system has frequently collapsed and the data could not be retrieved. The communications between the system administrator and system users were not good. The system administration officers lacked certain technical skills and

system management. There were few computer officers while the existing officers had no sufficient knowledge, understanding and competence in the information technology and computer skills. The supports given by hospital executives at all levels were not explicit and these executives had no involvement in planning and utilization of the information system. Furthermore, Hua Hin Hospital is now under construction to expand its service from a 90-bed community hospital to be a 200-bed general hospital. Due to the policy of expanding the medical services to engage broader services, the organization becomes more sophisticated. The Hospital's policy of information technology also requires that the information technology be more applied up to the level of paperless office.

Nevertheless, for 4 years from the beginning of using the information system at the Hospital, there have not been any serious and tangible evaluations for the satisfaction of system users in Hua Hin Hospital. In the past, only confronting problems were resolved and the dissatisfied system users have not been allowed to show their opinions. Moreover, there was the shortage of some essential system resources such as officers with relevant IT knowledge, system officers for the analysis of system, devices, computer sets and network system. Additionally, the Hospital is expanding its medical services; thus, IT infrastructure system must be placed to be in line with the expansion of service areas. To enhance an efficient information technology system, it should not depend on good management of information system only. A perfect information system without any defects in an organization may not be used successfully in another organization although it is the same system. A key factor enriching the efficiency of information system is the system user. Based on an efficient information system, receipt of quality information by users, and crucial use of that information system, the users would feel satisfied with the system (cited in Sabwal, 2004). These indicate the significance of information system. If the users are not satisfied with the system, its significance will be less and it will not be worthwhile for the investment. In addition, the information from the executive report of the Information Technology Committee of Hua Hin Hospital in the fiscal year of 2005 – 2006 showed that: service information was not compiled and saved completely and not relevant to facts; ICD-10 and ICD-9-CM were recorded in wrong sectors; use of network computer system in connection with users was so sophisticated; there were no

responsible personnel for reports; reports could not be submitted in time due to the system collapse; and reports were submitted to the National Health Security Office (NHSO) less than the actual reports prepared. These problems blocked the Hospital to have a perfect and accurate information system to be used in providing the medical services to the service recipients of the Hospital. This information, in fact, is the evidence of reimbursing the budget from the National Health Security Office (NHSO), which may give effect to the health service provided to the general people in this area.

The Researcher is an officer of Hua Hin Hospital; so I have seen problems and hindrance caused by the development of information technology system there. It is apparent that the investment in the development of information system is likely to be hiking. However, information is an essential resource of the organization because it could be used to turn the organization to be the knowledge-based society. The aims of employing the information technology are to obtain the quality information, and to utilize such information to increase the quality of medical care, to enhance the efficiency of hospital management by employing facts for the management decision, and to apply such information for the strategic planning for human, work and hospital sustainable development in every situation. Thus, the evaluation results from the use of information system in the Hospital are essential and critical for make the management system efficient because the evaluation result is the best way of improving and driving the work to meet the required success (Suwanpong & Boonsuya, 1999) and the evaluation of system users' satisfaction is also one way of evaluating the information system, which reflects the success of developing the information technology system (DeLone & McLean, 1992).

From the reasons above, the Researcher was interested in examining the correlation between Information System Users' Characteristics and participation and Information System Users' Satisfaction at Hua Hin Hospital: Case Study of Implementations of Research Results to the Development and Efficiency of Information System.

Research Questions

The researches questions of this study seek to answer were:

1. What were the user satisfaction levels for Hua-Hin Hospital Information System?

2. What were the computer knowledge levels of user in Hua-Hin Hospital Information?

3. What were the user attitude levels toward Hua-Hin Hospital Information System?

4. What were the user participation levels in Hua-Hin Hospital Information System?

5. What was the association between user characteristics, computer knowledge, attitude, participation and user satisfaction levels toward Hua-Hin Hospital Information System?

Research Objectives

The research objectives of this study are:

1. To describe the user characteristics of Hua-Hin Hospital Information System

2. To measure the user satisfaction levels for Hua-Hin Hospital Information System.

3. To measure the computer knowledge levels of user in Hua-Hin Hospital Information System

4. To measure the user attitude levels toward Hua-Hin Hospital Information System

5. To measure the participation levels of user in Hua-Hin Hospital Information System

6. To analyze the association between computer knowledge, attitude, user participation, user satisfaction toward Hua-Hin Hospital Information system.

Research Hypotheses

The researches hypotheses of this study are:

1. User's characteristics related to user satisfaction in Hua-Hin Hospital Information System.

2. Computer knowledge related to user satisfaction in Hua-Hin Hospital Information System

3. User attitude related to user satisfaction in Hua-Hin Hospital Information System.

4. User participation related to user satisfaction in Hua-Hin Hospital Information System.

Scope of Study

The populations of this research were staffs in Hua-Hin Hospital who had been using hospital information system at least 6 months. The studies focused on factors that affect user were user characteristics, computer knowledge, user attitude, user participation, and user satisfaction in Hua-Hin Hospital Information System.

Operational Definitions

Information System means the system of hardware, software, people ware and telecommunication network that collect data, create and distribute information to meet users need.

Hua-Hin HIS means the information system that was used in Hua-Hin Hospital for support working activities in the hospital.

User satisfaction means the satisfaction of user on Hua-Hin HIS in quality of information, system and service.

User characteristics means the personality such as gender, age, educational level, working position and professional occupation of users who had been working on Hua-Hin HIS at least six months.

Experience means; Computer experience of user to using and learning computer. System training and period of system used of users who had been working on Hua-Hin HIS at least six months.

Computer knowledge means the knowledge, skill and ability to used computer of users to support Hua-Hin HIS.

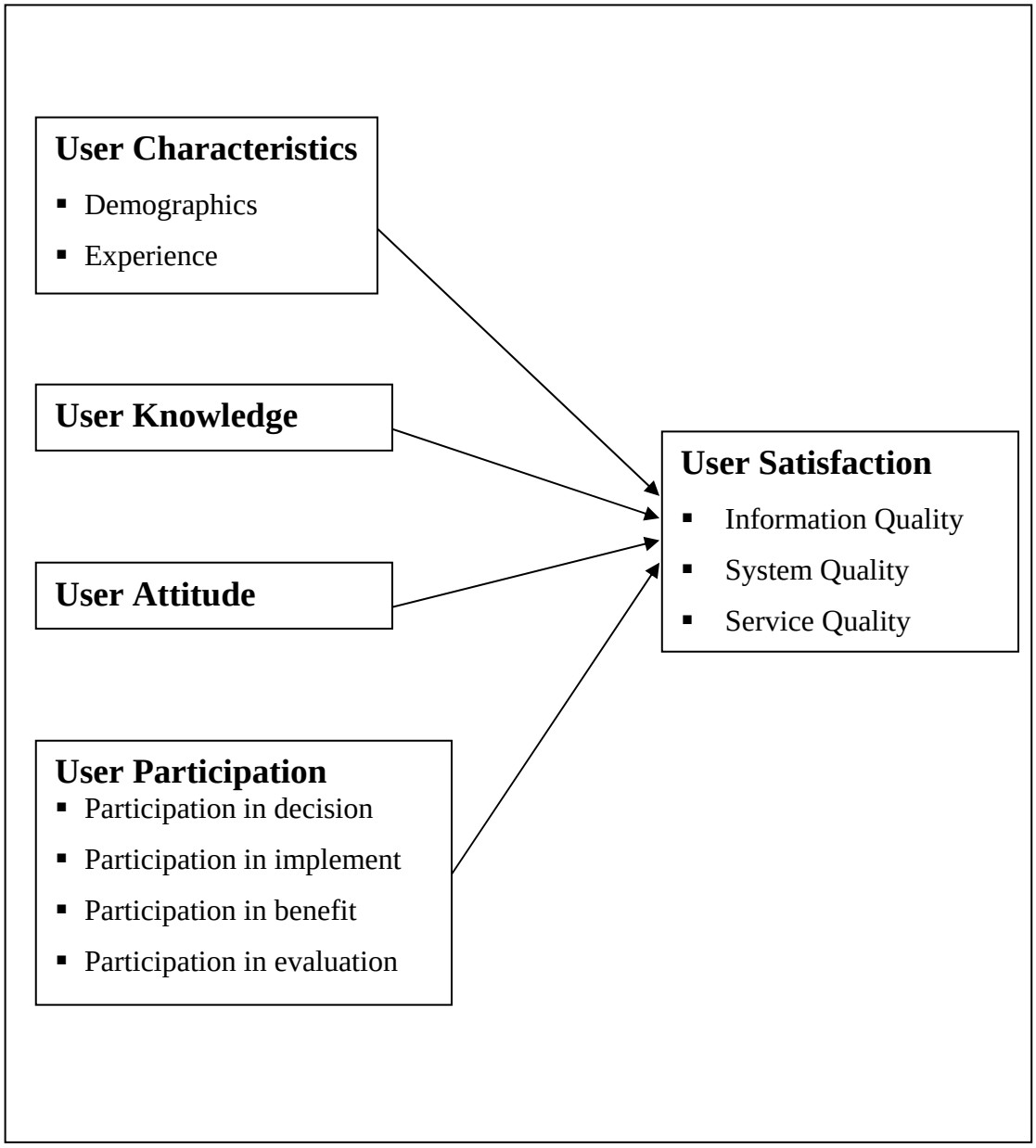
User Attitude means the status of user is thinking, belief on Hua-Hin HIS.

User participation means the participative behavior of user on decision, implement, benefit and evaluation on Hua-Hin HIS development.

User satisfaction means the satisfaction of user on Hua-Hin HIS in quality of information, system and service.

Perceptions means interpretation of stimulus from environment through prior experience, belief, learning and attitudes of each user who used Hua-Hin HIS.

Conceptual Framework



Variables

Dependent variables

User satisfaction in Hua-Hin Hospital Information System consisted of information quality, system quality and service quality.

Independent variables

1. User characteristics including gender, sex, educational level, working position, professional occupational, experience in computer used and learned, experience in system used and trained.
2. Computer knowledge of users
3. User Attitude toward Hua-Hin HIS.
4. User participation consist of participation on decision, implement, benefit and evaluation on Hua-Hin HIS

CHAPTER II
LITERATURE REVIEW

The researcher has reviewed literature including theories, documents and others articles to completely cover thesis questions. The thesis was fundamentally studied from theories and related documents as listed in 7 sections below.

1. The concept of Information System
2. The concept of Hospital Information System (HIS) and Hua-Hin HIS
3. The concept of user satisfaction
4. The concept of computer knowledge
5. The concept of user attitude
6. The concept of user participation
7. The related Information System Researches

1. The concept of Information System

We can understand the information system and the organization by use the model of system approach, which can help us to analyze and explore the operation and interaction of the other system (Lucey, 2005). The best-known French popularized of system analysis, Joel de Rosney (1977, 1979), suggested the definition of system that "A system is a set of elements which interact dynamically and are organized to achieve goal" (Cite in Hurtubise, 1984: #135).

System means a group of elements that are integrated with the common purpose achieving an objective (McLeod Raymond, 1995).

System means a group of interrelated components working together toward a common goal by accepting inputs and producing outputs in an organized transformation process (O'Brien, 1993).

This definition comprise of the essential elements of set, interact and goal. It is can apply to any of the other system in the world (Lucey, 2005).

The systems are composed of interrelate parts or sub-systems and can explained as a whole that known called holism or synergy. Holism is the whole of anything that more than the sum of its each parts. We can see the property of the whole when the parts are combination, but when the part separates it do not possess.

The sub-systems are made up of the small part as hierarchy in the part of systems. The sub-systems should work to focus the goal of the higher system and each part of the system usually affecting to the other systems. The organization systems contain both hard and soft properties. Hard properties are those that can be define and measure in objective way while soft properties are more imprecise and matters of individual value and sensitive (Lucey, 2005; Haux, 2003).

There are the difference between natural systems and artificial (man-made) systems. The nervous system is a typical natural system that consists of neuron and their relation ships. The hospital system is artificial (man-made) systems that consist of both human and technical components; we called a socio-technical system. (Haux, 2003)

System	**Goal**	**Elements**		
		Input	**Processing mechanisms**	**Output**
University	Acquisition of knowledge	Students Professors Administrators Textbooks Equipment	Teaching Research Service	Educated students, meaningful research, service to community and nation
Hospital	High - quality health care	Doctors Patients Nurses Equipment	Diagnosis Surgery Medication Testing	Healthy patients, service to community

Figure 1 System components: input, process, output and goal

Source: Ralph M. Stair, ***Principles of Information Systems: a Managerial Approach***, Boyd & Fraser publishing company, USA, 1992, p7

There are two kind of fundamental system related to system type:

1. The close system is closed to it environment; only the links, liaisons, interactions and reaction that are internal to it exist. There are no transfers of anything-data, information, and matter, energy to or from the environment.

2. The open system was opened to its environment, the relations are maintaining data, and information, matter and energy are exchanged with the environment.

1.1 The Basic elements of system

All of system comprise of the basic elements as follow:

1.1.1 Input is the essential material of system such as raw materials, labor skill, equipment, power supply that can be change to output.

1.1.2 Process is the step of processing input that transform into product.

1.1.3 Output is the result of the system processing to meet the goal.

1.1.4 Feedback is a loop linking between output back to input and process for recheck the situation of result that compare with the objective. The feedback is very important because it has contributed to control and monitor the system for proper improvement and for more effective.

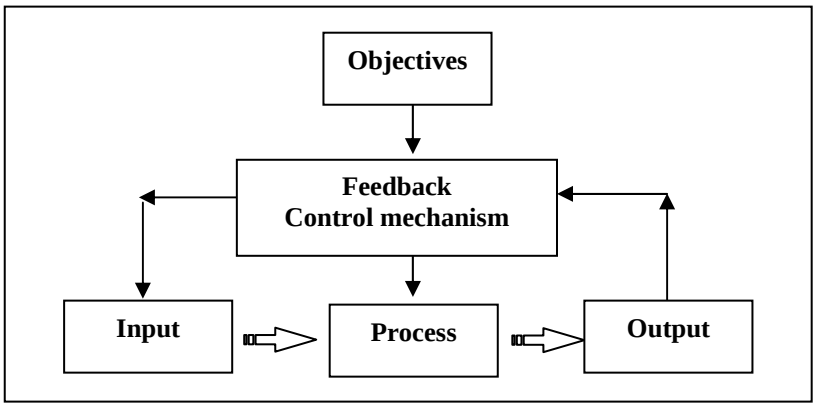


Figure 2 System components and Control

Source: Raymond McLeod, Jr., ***Management Information Systems: A Study of Computer-Based Information Systems***, Prentice Hall, Inc., USA, 1995, p13

Briefly, we can describe the system work with the basic system models. The basic system model of all information systems and organization is to use an input, process, output and objective. System can divide into sub-systems and can be representing by using models. Models can describe of the concept to be relevant to a system. The benefits of model are; the first usually form easy to represent of reality, the second should be adapted to a specific task and the last should be appropriate for the respective question or tasks (Haux, 2003).

1.2 Definition of Data and Information

The term of 'information' and 'data' was using to mean the same thing in our working. In Management Information System (MIS), information has precise meaning and it is difference from data. Now, we need to clearly them as follow.

1.2.1 Data

Data is the raw material of organizational life; it consists of disconnected numbers words, symbols and syllables relating to the events and processes of the business (Martin, 1992).

Data are streams of raw facts representing events occurring in organizations or the physical environment before have been organized and arranged into a form that people can understand and use (Laudon, 2004).

Data are facts, events, transaction and so on, which have been recorded. They are the input raw materials from which information is produced (Lucey, 2005).

In summary, data are the raw facts, events, anything that happened in organizations, world or in any environment before organized into a form for understand.

1.2.2 Data processing system

Data processing system can be working in to 2 different types as;

1) Manual data processing system, completely processing was done manually. Data acquisition, filing, storage, processing, calculating, output, production, all these tasks are done manually.

2) Electronic data processing system, the data is processed using the electronic device such as computer. Because of its capabilities, computer is a potent too for the data processing. There are two type of electronic data processing as follow:

- *Batch processing* is collecting data over time and processing it periodically.
- *Real time processing* is immediately data processing, as in online purchase.

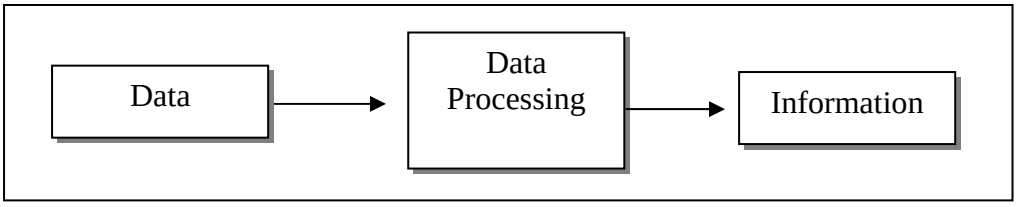


Figure 3 Show Data processing

Source: Modified Tipawan L: (2005). ***Management Information System.*** (7^{th} ed) Bangkok: Satfore Printing Company.

1.3 Information

Le Moigne, 1978 state that “Information is a formatted object (endowed with identifiable forms) artificially created by the human being to represent a type of event which he can perceive and identify in the real world” (Cite in Hurtubise, 1984).

Information is data that that have been put into a meaningful and useful context and communicated to a recipient who uses it to make decisions. (Burch, 1986).

Information means data that have been shaped into a form that is meaningful and useful to human being (Laudon, 2004).

Information is data that have been processed and communicated in such a way that they can be interpreted and understood by recipient (Lucey, 2005).

In summary, information is the results of data processing that have been systematic organized which have value and useful to a recipient who needs it.

1.4 The value of information

In general, information has no value in itself; its value derives form the value of the change in decision behavior caused by the information being available minus the cost of producing the information. We can see the important of the user, once; data capture, handling, recording and processing-by whatever means- incur cost and do not produce value. Nevertheless, when data was communicated and understood by the recipient and transformed into information, the value may be arise by providing that information for support the user to improve or confirm their decision-making. In other word, information value depend on each of user need, different need and demand on information system exist, depending on the tasks and responsibilities. (Lucey, 2005; Hagg, 2005; Haux, 2003).

1.5 Characteristics of good information

The good information has numerous qualities. Lucey T. (2005) Stated: Good information is:

1) **relevant** for its purpose
2) sufficiently **accurate** for its purpose
3) **complete** enough for the problem
4) from a source in which the user has **confidence**

5) communicated to the **right person**
6) communicated in **time** for its purpose
7) that which contains the **right level of detail**
8) communicated by an appropriate **channel of communication**
9) that which is **understandable** by the user

The quality of information can be good or bad depending on the mix of characteristics of information. (Jawadekar, 2007)

1.6 Definition of information system

An information system is a set of organized procedures which when executed provide information to support decision-making. Information is tangible or intangible entity, which serves to reduce uncertain about some future state of event (Lucus, 1982).

Information system means a set of interrelated components working together to collect, process, store, and disseminate information to support decision-making, coordination, control, analysis, and visualization in an organization (Laudon, 1996).

Information systems are combinations of hardware, software, and telecommunication networks that people build and use to collect, create, and distribute useful data, typically in organizational setting (Jessup, 2003).

1.6.1 Component of information system

Information systems are comprised of five mains components:

1) **Purpose of the information system**: is the reason for having the system.
2) **People of the information system:** including the developers, managers, and users.
3) **Information Technology:** that comprise with hardware, software, and network components.
4) **A procedure** is the manual for user or people who interact with the system.

5) **Data** is event in that system including text, images, sounds, and video.

There are three activities in information system. These activities are input, processing and output as follow:

1) **Input** captures, collects raw data within organization and from external environment.

2) **Processing** converts raw data into a more meaningful form.

3) **Output** transfers the processed information to the people who need it.

Briefly, Information system is a system that collects data and processing into information that can be storage, retrieve, and disseminate information to support user for decision-making in that organization.

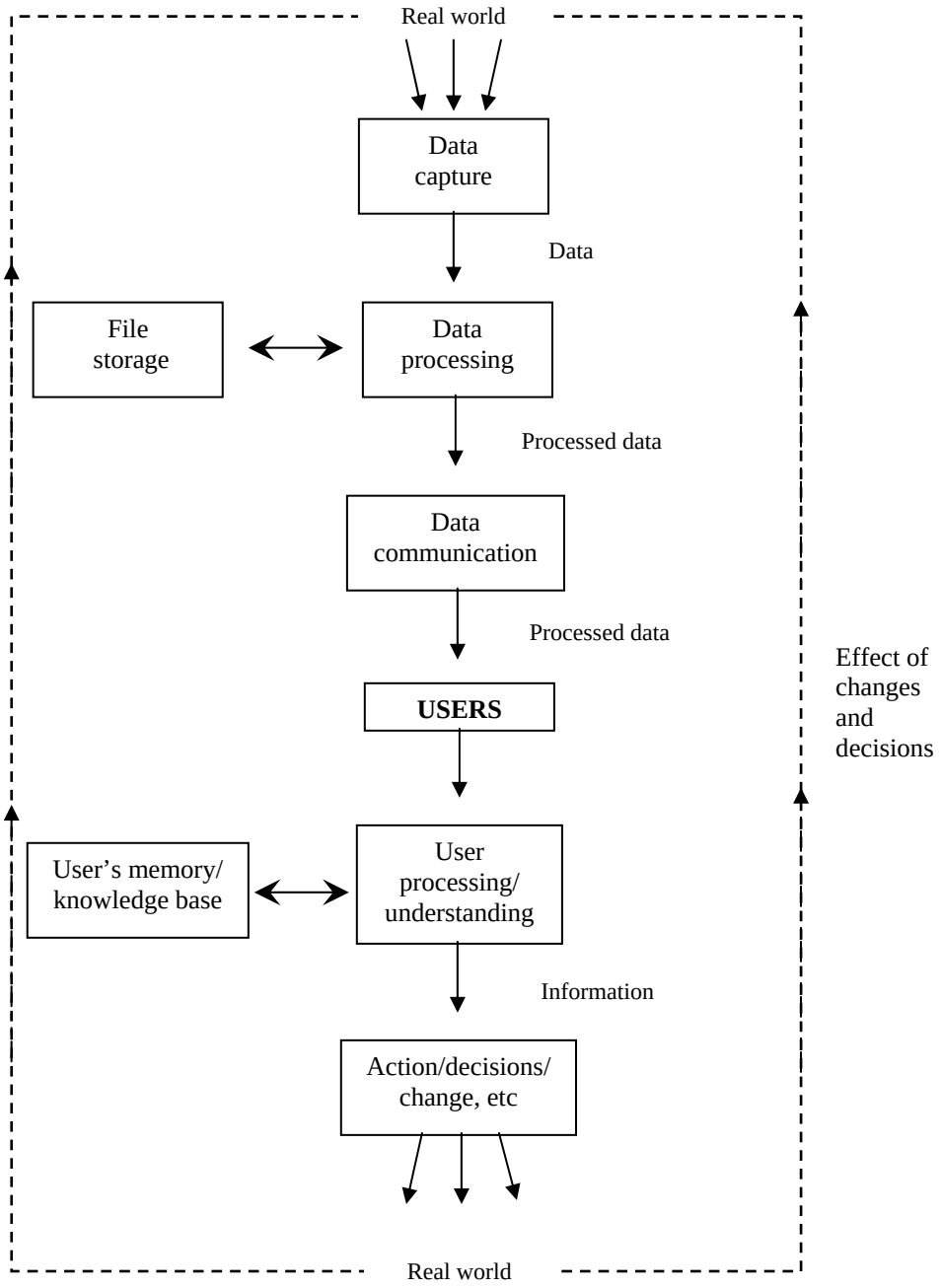


Figure 4 Show Information system

Source: Lucey. (2005). ***Management Information Systems***, Thomson Learning, Inc., UK, p19

1.7 Management Information System and Management Levels

MIS characteristics vary according to the level of management supported, we can see as the follow;

1.7.1 Information System classification

There are many characteristics of information system that design to support in each level of organization.

1) Transactional Processing Systems (TPSs)

Transaction or data processing systems perform the essential role of collecting and processing the daily transactions of the organization (transaction processing). Transaction processing is essential to keep the operations of the organization running smoothly and provide the base for all other internal information support. Transaction processing systems are designed to process business events and transactions and reside closed to customers at the operational level of organization. These systems are used to automate repetition information processing activities to increase speed and accuracy and to lower the cost of processing each transaction, to make the organization more efficient.

2) Management Information Systems (MISs)

Management information systems are reside at the managerial level and are designed to produce regular and ad hoc reports to support the ongoing, recurring decision activities associate with managing an entire business of functional area within a business. These systems are used to help mid level manager make decision more effective.

3) Executive Information Systems (EISs)

Executive information systems are used to provide information to executive in very high-level aggregate form so that information can be scanned quickly for trends and anomalies. Executive used these systems to provide a one-stop shop for a lot of their information needs.

4) Decision Support Systems (DSSs)

Decision support systems are used to support organizational decision-making and are typically designed to solve a particular recurring problem in the organization. Managerial level employees most commonly

use decision support systems to support semi structure problems that are address. A decision support system is designed to be an interactive decision aid.

5) Expert Systems (ESs)

Expert system is special type of information system that uses knowledge within some topic area to solve problems or provide advice. Expert systems are used to mimic human expertise by manipulating knowledge (understanding acquire through experience and extension learning) rather than simply information. Expert systems are used when expertise for particular problem is rare or expensive. In this way, organizations hope to replicate the human expertise more easily and inexpensive.

6) Office Automation Systems (OASs)

Office automation systems are technologies for developing documents, scheduling resources, and communicating, collaboration technology such as video conferencing, groupware, and electronic meeting systems are used to support the communication and teamwork of virtual teams.

1.7. 2 The Level of Organization Management

Every organization is composed three levels of decision-making. Each level of an organization has different responsibilities and, different information needs.

1) Operational Level

Information systems of this level are the routine, day-to-day business process and interact with customers occurred. An information system of this level was designed to automate repetitive activities and improve the efficiency of business process and customer interface.

Manager at this level make day-to-day decisions that are highly structured and recurring.

2) Managerial Level

Information system of this level was designed to automate the monitoring and controlling the operational activities and providing information to higher levels of organization.

Manager of this level focus on effectively utilizing and developing organization resources to achieve the strategic objective of the organization.

3) Executive Level

Information system of this level was designed to aggregate summaries of past organizational data and projections of the future.

Manager of this level focus on long-term strategic issue facing the organization, such as which services to service, which products to produce and what organizational strategy need to follow.

Level of Management	**Typical Responsibilities**	**Planning horizon**	**Decision types**	**Information characteristics**			
				Orientation	Source	Aggregation	Accuracy require
Strategic / Executive Level	• Definition of objectives, Policy for whole organization • Long-term planning • Large-scale investment decision • Middle management appointment	Wide	Unstructured	External and future	External	Aggregated	Low
Tactical / Managerial Level	• Establishment and monitoring of budgets • Acquisition of resource • Developing operational policies and objectives • Appointing staff			Internal achievement future/ historical			
Operational Level	• Effective use of existing facilities and resources within budget constraints and prescribed objectives • Making routine day-to-day decisions	Narrow	Structured	Internal transactions and historical	Internal	Detailed	High

Figure 5 Level of management and characteristics of Information

Source: Lucey. (2005). ***Management Information Systems***. Thomson Learning, Inc., UK, p113

1.8 Measurement of Information System Success

After implementation information system, the evaluations are essential to help insure that system accomplishes its, indeed purpose and is successful. In general, the success of an information system can be evaluated through:

1. The quality of information provided to the users
2. The impact of IS on users' thinking, decisions or actions
3. The impact of IS on organization level costs and benefits

Garrity and Sanders (1998) argued, Information system success can be measured at multiple levels of analysis. At the organization level, information system success is measured using metrics related to organization performance. At the functional level, system success is measured in terms of the efficient use of resources and the reduction of process cycle times. At the individual level, system success at this level success is measured focus on the user's perception of utility of the system and their satisfaction with the information system or called "User satisfaction". It has been documented that measures at the individual level have been the most popular methods adopted by researchers to study success (cite in Coombs, 1999)

Individual Level Measures of Success	**Process Level** Measures of Success	**Organization Level** Measures of Success
• User Satisfaction • User Information Systems Satisfaction • Utility of System	• Reduced Process Cycle times • Reduced Costs • Operating efficiency of function area	• Market share • Return on investment • Return on equity and stock • Revenue from new product and services

Figure 6 Information System Success Measures in multi levels
Source: Modified from [Garrity and Sanders, 1998: 3]

This study the success of information system was evaluated in individual level through the user satisfaction.

2. The concept of Hospital Information System (HIS) and Hua-Hin HIS

2.1 Data, Information and Knowledge in Hospital

The distinction between data, information and knowledge provides the foundation for design, development, and evaluation of information systems relative to the function support(John, 2002).When working on hospital information systems, we must distinguish among data, information and knowledge; Data can be defined as a representation of information, or knowledge, in a formalized manner, suitable for communication, interpreting, or processing. Information can be defined as specific knowledge about entities such a fact, events, things, persons, processes, ideas, or concepts. Knowledge can be defined as general information about concepts in a certain domain (Haux, 2003).

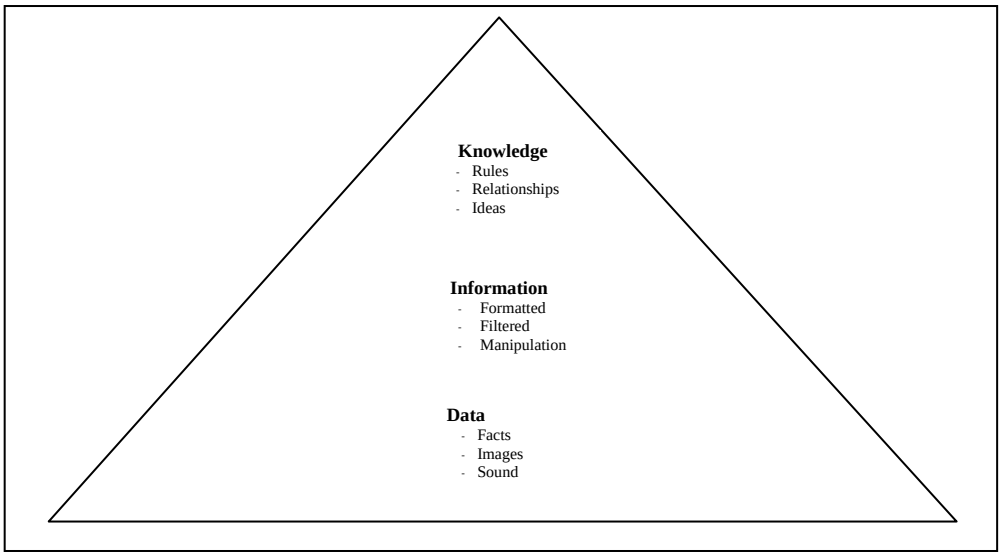


Figure 7 Hierarchical views of data, information, knowledge

Source: Johns L Merida. (2002). ***Information Management for health profession***, Thomson Delmar Learning., city, p.58

We can describe information and knowledge logistics, when the right information and knowledge was available at the right time, at the right place, to the right person in the right people, in the right form after that the physician, nurse and health provider can make the right decisions.

2.2 Hospital Information System (HIS)

The computer-based information system in the Hospital is a major computer-based information system comprising minor information systems communicating in the mutual network system. It is the hospital information system or the information system for management in the hospital. At present, the Hospital changes its role from selling health services to the general people or patients to selling health services to the state, insurance companies, social security fund and other funds, which involve a huge proportion of service purchase and hold power of setting of the criteria of service purchase. As a result, various hospitals must have adaptation and change the working system to be more efficient, have standardized service quality, and have performance indicators to monitor their work performance more explicitly.

By this reason, the Hospital must improve and develop the information system by using the computer software to make the management of information system in the hospitals more accurate, rapid and efficient. The main objective of managing this hospital information is to process the information systematically to respond to the strategic objectives of the organization. This could help the Hospital to achieve the management success and competitiveness.

Hospital information systems provide communication among health facility workers and support organization information needs for operation, planning, patient care and documentation. Enormous amounts of information and high level of communication are required for optimal efficiency and effectiveness. Through communication architectures, databases, and application programs, HIS help to handle this complexity by coordinating work tasks, integrating information for decision support. Friedman and Martin (1987) developed the HIS model that should be capable of performing the following function: 1) core applications; 2) business and financial function; 3) communication and networking; 4) departmental management; 5) medical documentation; and 6) medical support (John, 2002).

A hospital information system (HIS) is the socio-technical subsystem of a hospital, which comprise all information processing as well as the associated human or technical actor in their respective information-processing role. The goal of HIS is to sufficiently enable the adequate execution of hospital function for patient care, including patient administration, taking economic hospital management as well as

legal and other requirements into account or to support patient care and the associated administration, sometime called in term “Electronic Health Record(EHR)”

In addition, HIS is systematic information processing that contributes to hospital’s strategic goals such as efficient patient care and high satisfaction patient and staff, it is means the hospital’s success and ability to compete. Information management in hospitals is those management activities in a hospital that deal with the management of information processing and therefore with management of hospital system (Haux, 2003).

2.3 Functions of hospital information system

Functions of hospital information system are:

1) To make the primary patient’s information available that be on time, at the right location, to authorized staff in an appropriate and usable form. Therefore, data must be correctly collected, truth, and up-to-date.

2) To make the available knowledge for support health provider: knowledge about disease, about medication, and other to support diagnosis and therapy.

3) To make the available information about the quality of patient care and performance and cost situation within the hospital.

The management of hospital information may be divided into 3 main parts:

1. Planning, e.g. work planning and architecture of hospital information system.
2. Directing, e.g. supervising the establishment of system and use of information system.
3. Monitoring, e.g. development and undertaking to be in line with preset objectives.

The general objectives of hospital information system are:

1. To have sufficient and appropriate information for operating the Hospital pursuant to roles and duties of the hospital to provide medical services to patients.

2. To use the financial benefits, legal issues and necessary requirements under the Hospital's responsibility.

To attain the above objectives, the Hospital's information system must achieve the efficiency of information logistics, that is:

- The Right Information and the Right Knowledge
- At the Right Time
- In the Right Place
- For the Right People
- In the Right Form

Under the quality concept in the context of hospital information system, the evaluation of quality must involve:

1. **Quality of Data:** The Hospital must provide and be ready in techniques, personnel and essential resources, in term of quantity and quality, or the personnel who have computer-based knowledge and competence.

2. **Quality of Process**: The system can process to get the essential information as the users require under the following criteria:

- Efficiency of Information Logistics
- Leanness of Information Process Tool
- Single Record, Multiple of Usability of Data
- Controlled Transcription of Data, No Media Cracks
- Patient's Centered Information Processing

3. **Quality of Outcome:** Achievement of objectives in managing the information. In other words, the hospital information system helps the hospital attain its objectives, which would further give effect to the care of patients and changes of patients' health. To elaborate, the hospital information system helps the hospital fulfill its goals:

1) If a hospital is a business establishment, the hospital information system provokes the quality improvement, makes the patients satisfied and helps reduce operating cost.

2) For general objectives of the hospital, the hospital information system helps the obligations required by law possible, supports the clinical research and helps the hospital be a specialized medical center.

3) In addition, the hospital personnel may want to fulfill other objectives that could be achieved by using the hospital information system such as efficient communications with other health service providers, architecture in part of system communication to give the best outcome in using or EPR (Electronic Patient Record).

Therefore, a hospital needs a good information system. The criteria for the quality of infrastructure in the hospital information system must involve 3 following parts:

1. **Quality of Data** – The stored and processed information must contain quality, that is, correctness, integrity, reliability, completeness, accuracy, relevancy, authenticity, availability, confidentiality and safety.

2. **Quality of Processing** – The tools used in the information processing must contain the following characters: appropriateness, availability, multiple usability, efficiency, flexibility, stability and reliability, security, harmlessness, usability, standardization.

3. **Quality of elements in the integration** – The information system must contain flexibility and be able to control the data duplication.

Dr. Thongdee Chaipanich gave an opinion about the desirable characters of hospital information system as follows:

1. Efficiency of transaction handling and record keeping. This efficiency must cover accuracy, completeness and punctuality.

2. Capability of supporting and enhancing the working efficiency of personnel at all levels.

3. The data is stored in a simple structure that is convenient and rapid for searching and calling.

4. The system has flexibility and easy for any modifications to correspond to changes of the hospital and future technologies.

The hospital information system, therefore, takes part in supporting hospital activities, in operational, tactical and strategic levels as listed below.

1. Support the data storage and day-to-day service activities provided to patients.

2. Support working and coordinate the day-to-day activities of the hospital.

3. Support the controls and correct any errors occurred in the activities under the medical and financial policy.

4. Support researches, activities of service quality development and driving the organization to be a learning-based organization.

The elements of hospital information system could be classified into 3 main systems:

1. **Service System** – This directly deals with the medical treatment service for patients, which covers main modules in various departments; namely,

- Medical records
- In-patient wards
- Operating theater
- Delivery Room
- Operating Room
- Out-patient Department / Emergency Room
- Emergency Room
- Radiology Department
- Pharmacy Room/Store
- etc.

2. **Support System** – This is a working system supporting the medical service (back office), which involves the following modules:

- Administration
- Store and supplies
- Maintenance
- Utilities
- Accounting
- Personnel / Salary
- Vehicles
- etc

3. **Administration System** – The information system deriving from the processing of data stored in the system and used to direct, monitor, check and summarize executive reports and other work performance indicators for the in-house management and auditing by other external agency.

Except above systems, there must be other data management systems such as case mix service and number of patients in service to reimburse the medical fees from related funds, as well as utility review in providing the medical service to patients as to check the suitability and efficiency of employing hospital resources to serve the patients.

Acquisition of hospital information system

A hospital information system may be acquired by either of three ways:

1. The program is created by the hospital. Generally, it may be analyzed and designed by the hospital's personnel or the hospital may hire other outsource system analyst while the internal personnel design the program.

2. The hospital hires an outsource company to create the program. In general, the hired company, at first, will analyze the program for the hospital. Despite hiring an outsource company, the stage of program development should involve the hospital's personnel so that these personnel are able to administer and adjust the system in some extent.

3. The hospital buys a HIS system. Although it is a template system, it must be modified to fit to each hospital. This program modification must be involved by the hospital's personnel.

Factors of selecting the types of information system: Whichever type of information system is selected for a hospital, that information system may be successful or unsuccessful. The factors of selecting the information system depend on the following methods:

1. Do the internal personnel have any experience in administrating the computer network and major database (4-5 persons) as the heads of creating the program and maintaining the system in the long term?

2. Is HIS system consistent to the working objectives of each module? In general, the template software relevant to our

requirement at 80% is acceptable. The remaining irrelevant properties may be modified later.

3. Does the company hired to create HIS program have relevant experience?
4. How long is the system development completed?
5. Does the procured company have the good record for its post-sale service?
6. Is the budget of system development enough?

2.4 HIS Planning and Development

In planning and developing the hospital information system (HIS), it may be divided into the following stages:

1. Strategic Planning: This is to set up policies and scope of working system, which may be divided into the following steps:

- Summarizing key problems or essence of the old system
- Compiling all related information
- Summarizing problems and restrictions of system operating
- Setting up objectives and expectations of the new hospital information system such as provision of service, policies, information system, management and practice, etc.
- Setting up the budget to be allocated.

2. System analysis and design. When the policies and objectives of developing the hospital information system are explicit, the system analysis and design must be done by:

- Studying the operating of old information system to find out its advantages and disadvantages, and to find out how it is consistent/ inconsistent to any policies and objectives.
- Setting up the pattern of operating system to be in conjunction with preset objectives and expectations.

- Setting up and data direction and flow as well as content
- Setting up roles of relevant and responsible persons as well as persons who shall input the data and those who receive the data, when, how and for.
- Setting up the mechanism in controlling and guaranteeing the data accuracy
- Setting up the amount and location of tools to be used.
- Setting up critical successful factors or performance or effectiveness indicators.
- Setting up the data structure.
- Estimating the expenses of software development, hardware installation, maintenance and utilization.

3. Operative Planning. This is to set up planning for implementations by:

- Setting the project scope.
- Making decision about the acquisition of hospital information system: made by hospital, purchase or hiring an outsource programmer.
- Setting up the priority of minor systems and steps.
- Allocating existing resources.
- Setting the system installation schedule.

4. Programming. Either making the program by the hospital or hiring an outsource company, it takes time for development. Despite a template program, some program properties must be modified to suit each working. To select any system by buying, hiring the outsource company to make a program or making the program by the hospital, the following factors should be considered:

- Application functionality to be relevant to the hospital's objectives
- Flexibility – Addition or modification should be done easily at some extent

- Easy maintenance
- User friendliness
- Machines and tools attached to the system should be generally placed in the market without particular brands or versions
- Easy installation effort
- Simple document and manual
- Data structure is open and simple, and the data can be transferred to other programs easily.
- In case of program purchase or hiring the outsource programmer, the seller must have some experience in the hospital information system, engage good reputation for its post-sale service, propose the appropriate prices for installation and long-term maintenance.

5. Implementing. Since the hospital information system is a major system comprising various modules, the installation of hardware and software systems must be done in steps:

- Marking good understanding among persons related to any section of that system
- Installing the hardware and software
- Giving training courses to persons related to the utilization of each section of that software. The user interface may be adjusted for convenience
- Setting up the date(s) of transferring the existing data and starting the operating of new system

6. Post-implementation Review. After installing modules of hospital information system for a period (for example, 6 months after installation), it is necessary to review and evaluation the new-installed system under the following issues:

- Benefits gained from the system
- Maintenance and utilization expenses
- Customization

2.5 Standard Hospital Information System

The community medical records and statistics of Thailand had set the Standard Hospital Information System as follow:

Standard 1: Planning and Design.

The information system was appropriated planning and design to meet the need of user.

1.1 To use the planed information technology for support and improving patient care, quality management, education or research.

1.2 The information systems was designed target of plan in accordance with clause1.1

1.3 The information systems were designed by appropriate technology.

1.4 The users have participative in the benefits of planning and designed of information systems.

1.5 The planning of information systems management was prepared and reviewed including:

1.5.1 Standard of data set

1.5.2 Technology standard

1.5.3 Respectively procedures

1.5.4 The criteria for collecting data, time and method to maintaining data.

1.5.5 The criteria to refine the data update and always true.

1.5.6 The security and confidentiality of data.

Standard 2 The Operating information system.

The information system was linked to data and information management for patient care and quality improvement.

1.1 The information system was linked to the other database for the performance of data and information distribution or to reduce the conflict from multiple databases.

1.2 The data was synthesis and interpreting for the purpose of hospital administration, patient care, and quality improvement and to report.

1.3 The data and information need to distribute to the users in the form and standard procedure at the correct time.

1.4 The technical support such as advising, knowledge and training was appropriate available to the user.

Standard 3 Service medical records

The service management of medical record was meeting the need of providers and patients.

1.1 The system index and storage system that was allows for quick search for user require.

1.2 The service of medical record have service search for 24 hours.

1.3 The patient medical records were coded and index record at immediately.

1.4 The medical record was recorded in the system in order to trace it, which was borrowed from the other agency.

Standard 4 The medical records.

All of patient was prepared for medical record to ensure good communication between team provider for continuum of care and evaluation quality of care.

1.1 There are sufficient data and information of patient on medical records of each of patient who get medical service for those objective :

1.1.1 Who are patient

1.1.2 The reason for hospital admission

1.1.3 Data support for the diagnosis

1.1.4 Evaluation of patient care

1.1.5 The change and outcome on patient

1.1.6 Contribute the provider for continuity of care

1.1.7 Correctly coding

1.2 Written the policy and procedure for storage report and recording in the medical record.

2.6 The Evaluation of HIS

The evaluation information system is a process of examine an information system (from planning, development, and implementation through determination of functionality) to determine its effectiveness in meeting the needs users. The purpose of evaluation is to provide the basis for a decision about the IT system investigated in some decision-making context, and that decision-making context is also the context of the evaluation.

The goal for evaluation is to provide the most rigorous and useful information possible to support the established goals of the information system. Evaluation can be defined as “acts related to measurement or exploration of a system’s properties”

The evaluation of the effectiveness of an information system constitutes one of the key issues in information systems research. In research, well-defined outcome measures are needed to ensure that the results from different studies are comparable. They are a prerequisite for information systems research to contribute to IS practice. In practice, success measures are needed to evaluate IS practice, policies and procedures (DeLone & McLean 1992).

Friedman and Wyatt, (1997) was categorized the evaluation method into two approaches as subjective approach and objective approach (Friedman, 1997).

Subjective approach was focus on qualitative method to identifying the issues and the organizational culture that will affect system success. These methods useful to identify technical barriers to system success, to clarify organization issue that may affect the success of the system, and to validate user issues and concerns.

Objective approach was focus on quantitative method, more on a clinical event or an outcome under controlled conditions, rather than on the broader issues addressed by subjective evaluation.

Ammenwerth et al, (2004) defined evaluation as “the act of measuring or exploring properties of health information system (in planning, development, implementation or operation), the result of which informs a decision to be made concerning that system is a specific context”

The evaluation of information system should plan and concern on technical, economic, and organizational issue. An evaluation should be both formative and summative evaluation.

Formative evaluation produces information that can be feed back to management and to system developers during the development and implementation to improve the likelihood of success of the project.

Summative evaluation provides information about the effectiveness of the new information system that has been implemented, or investigates generalize relationship of user satisfaction with other variables that may provide a better understanding of MIS environment.

Since, Hospital Information System (HIS) plays a significant role in providing quality healthcare services. Therefore, the quality of HIS become influences the quality of care by capturing, transferring, storing, managing and displaying medical information. HIS should provide information high quality, which in turn can increase the quality, effectiveness and efficiency of medical decision-making, resulting in improved customers (patient) satisfaction while reduced health related risk. Qualities HIS are needed to sustain high quality healthcare service delivery that meets the needs of the people it serve (Ribiere, 1999).

In this research, we were measures of success at Individual Level as User satisfaction.

2.7 Hua-Hin Hospital Information System (Hua-Hin HIS)

Hua Hin Hospital is a 90-bed community hospital, which first utilized, in 1999, the computer-based information system to store data about the hospital’s activities. The data has been saved on diskettes. Most activity data was collected by the supervisor of each working unit. Later, in 2002, a networking computer system has utilized. It is the Medical 2020 HIS, comprising 2 servers and 90 workstations

machines. The operating programs of the system include Window 98, 2000 and Window XP 2003. The operating program on the network is Medical 2020.

The problems found in running this Medical 2020 system were: insufficient computer tools and devices, limited application regularly used by the Hospital, connecting of accessories, sophisticated operating process, unstable information need from the central part, executives at all levels were not aware of their requirement clearly, some users did not have computer skills, and some users have not been trained to use the information system.

In 2004, the Ministry of Public Health lifted Hua Hin Hospital to be a 200-bed accident and heart attack center hospital; so the Hospital's scope of service was expanded to a new building; the construction was to be completed in 2007. The hospital management placed policies and planning in developing the hospital information system by making an investment in the optic fiber backbone network system, which needed a huge investment amount in the IT infrastructure system. However, the Hospital has never evaluated the success of operating its hospital information system. To initiate the directed and systematic development of hospital information system, the success of Hua Hin Hospital's HIS was evaluated to find out the satisfaction of HIS users at Hua Hin Hospital.

3. The concept of user satisfaction

3.1 Definition of Satisfaction

The Oxford English Dictionary was providing a general definition for satisfaction that the word "satisfaction" originated from two Latin words: *satis*, which means enough, and *facere*, which means to do. It has six meaning variations:

1. The performance of acts of penitence as payment for sin (earliest recorded use in English).

2. The payment in full of a debt or obligation; compensation or reparation.

3. The contented state of mind resulting from some fact, event, or state of things.

4. The fulfillment of wishes, desires, or expectations, so as to put an end to them.

5. The dispelling of doubt, suspense, uncertainty, or uneasiness.

6. The compliance with certain requirements.

Synthesizing these meanings into a general definition, satisfaction is a feeling of contentment that can result from experiencing certain objects, fulfilling certain desires, dispelling certain uncertainties, and/or complying with certain requirements.

Many intellectual gave definition of user satisfaction in different way, which can be presented as follow:

Swanson (1974) defined, user satisfaction as “a set of belief about the relative value of an information system (IS)” in term of providing timely, accurate, and easy to understand information to support his /her decision-making (Swanson, 1974).

Bailey & Peason, (1983:531) defined, user satisfaction is “the sum of one’s positive and negative reactions to a set of factors” (Baily, 1983).

Baroudi et al, (1983:785) defined, user satisfaction is “the extent to which user belief the information system available to them meets their information requirements” (Ives, 1983).

Based upon that statement, it is possible to summarize that user satisfaction is the user perceived positive feeling toward an information system that could available the information to support their decision-making or to perform their task.

The concept of user information satisfaction is the work of Cyert and March (1963), who suggest that an information system, which meets the needs of its user, will reinforce satisfaction with that system. If the system does not provide the needed information, the user will become dissatisfied and look elsewhere. Satisfaction of users with their information systems is a potentially measurable, and generally acceptable, surrogate for utility in decision-making.

User satisfaction is a perceptual or subjective measure of system success: as a substitute for objective determinants of information system effectiveness. The determination of information system value is a matter of economics; the costs of system operations and development are subtracted from the actual benefits to obtain the net value of the system to the organization. However, it is difficult to measure because:

1. Intangible costs and especially benefits of information systems are difficult to recognize and to convert to their monetary equivalent

2. Some decision support systems are used for disparate, relatively unstructured, ad hoc decisions; objectively assessing the benefits of such systems may be nearly impossible

3. Data on system success may be determinable but not recorded by the organization and, therefore, unavailable for research purpose [Edstrom, A. cite in Ives, 1983 #64].

3.2 Dimension of user satisfaction

Sanders and Garrity, (1995) extended the model of IS Success developed by DeLone and McLean (1992) by identifying four dimensions of user satisfaction (US). He used the viewpoint provide with the organization system lead to three dimensions of IS success: Task Support Satisfaction, Quality of Work life Satisfaction, and Interface Satisfaction. Moreover, in the socio-technological system viewpoint provides a task and information processing perspective on IS success: Quality of work life dimension that focus on the quality of work life of individual, which can have important in change management, training and learning, and focus on work processes.

The four dimensions Sanders and Garrity (1995, p. 18) identified are defined as follows:

1. **Task Support Satisfaction** measures the fit between the job and the computer system. Items for this scale attempt to measure the functionality of the system in terms of how the system help individual to get a job done and fulfill task requirements.

2. **Quality of Work life Satisfaction** measures how a computer system affects an individual's quality of work life and job satisfaction. Items for this scale attempt to measure whether the system supports the social needs,

intellectual needs, and/or physiological requirements of the individual in the context of job related activities.

3. **Interface Satisfaction** measures the quality of the computer system interface. Evaluation focuses on the characteristics of the interface in terms of presentation, format, and efficiency. Items for this construct attempt to determine whether the outputs are arranged logically, the presentation media is acceptable, and/or the information is readily accessible.

4. **Decision Making Satisfaction** measures how well a system supports decision and problem solving activities. Items for this construct attempt to determine whether the system supports the individual in recognizing problems, structuring problems, and/or making decisions related to the goal of controlling some business process.

Each of four dimensions identified by Sanders and Garrity can be considering along two additional dimensions: satisfaction/dissatisfaction, process and outcome of an IS. The addition of these dimensions (together with the dimensions identified by Sanders and Garrity) to the Delone & McLean's Model, results as in figure 10.

The word "Satisfaction" in the terms *Task Support Satisfaction*, *Quality of Work life Satisfaction*, *Interface Satisfaction*, and *Decision Making Satisfaction* is re labeled "Dimension" because each of these dimensions could be related to satisfaction or dissatisfaction.

Finally, the term "User Satisfaction" is changed to the more generic term, "User Affective Response" (UAR), allowing the user's response to be either satisfaction or dissatisfaction (Woodroof, 1996).

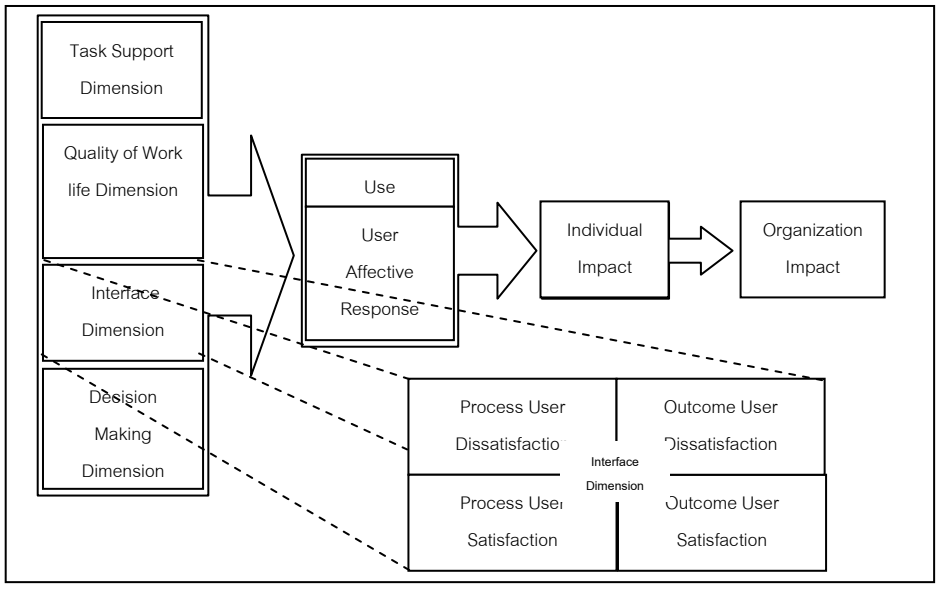


Figure 8 An extension of the Delone & McLean's Model of IS Success, based on the Sanders/Garrity 1995 Modification.

Source: *Garrity & Sanders, 1998:125.* ***Information System Success Measurement***

Woodroof & Kasper (1996) argued that that user satisfaction (US) in IS may be a separate construct from IS user dissatisfaction (UD), and the wording of IS satisfaction instruments (whether posit or negatively) can significantly impact a user's affective response. Concerning the notions of process and outcome, a user's satisfaction with the process of an IS may be significantly different from that user's satisfaction with the outcome of an IS. So, each of the four dimensions identified by Sanders and Garrity can be considered along two additional dimensions: satisfaction / dissatisfaction and process / outcome.

DeLone and McLean, (1992) argued there are many ways information and information systems can be viewed. However, the information systems still have focused on outcome of the interaction between the user and the system and the resulting user satisfaction. DeLone and McLean was reviewed more than 180 papers that study on empirical IS success measures published during 1981-1987. They proposed the temporal process model on IS success (D&M IS Success Model) as it was the first model. This model is an important contribution to the literature on IS success measurement that based on theoretical and empirical research. The created

system contains various features and exhibits various degree of system and information quality. Next, the experience of users and managers using these features are either satisfactory or not. These use of the system and its information impacts and influences collectively result in organization impact. The main purpose of this model was to “Identify those factors that contribute to information system success” (see figure 8), finally identified six most important categories of factors for evaluating IS Success, which are:

System quality refer to the performance of an IS system, that measure of the information processing system itself.

Information quality refer to how good is the output from a particular IS system, that measure of information system output.

Use is used to measure how well the output of IS system such as information or physical reports, are used, that measure of recipient consumption of the output of an information system.

User satisfaction represents users’ over all comments on the IS system, that measure of recipient response to the use of the output of an information system.

Individual impact refers to the influence of outputs of IS system on individual users’ behaviors, that measure of the effect of information on recipient.

Organization impact refers to the effects of the usage of IS systems on organizational performance, that measure of the effect of information on organization performance.

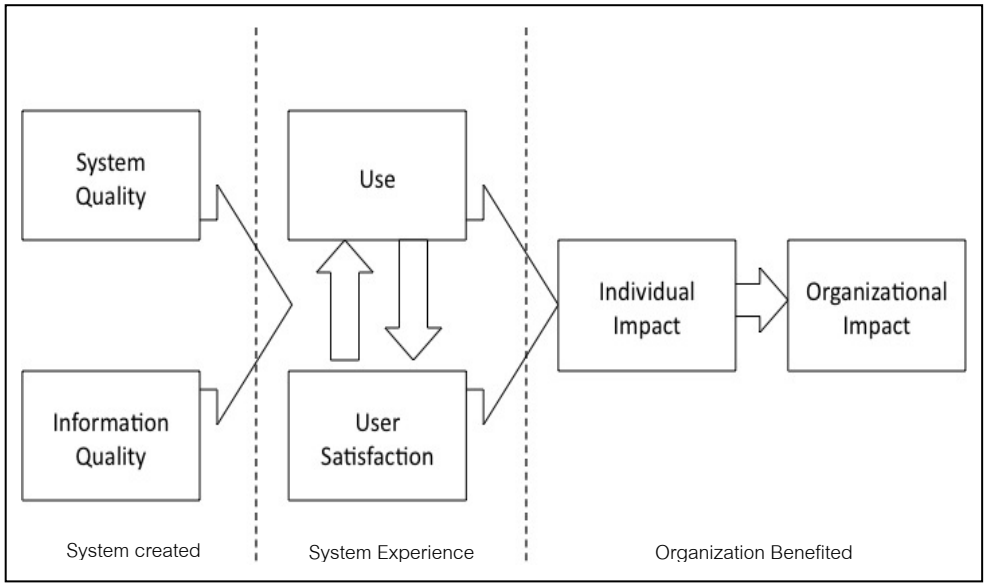


Figure 9 Delone & McLean's Model of IS Success 1992

Source: Delone W.H. & McLean E.R. (1992). ***Information System Success: The Quest for the dependent variables.*** Information system research 3(1):60-95

In 2003, DeLone and McLean was re-evaluate their original IS Success Model, which has been released more than ten years, by taking into consideration the opinions from other scholars and practitioners. They slightly modify their original model by include some factor that are necessary for measuring e-commerce system success. The update model consists of six interrelated dimension of IS success model: information, system and service quality, (intension to) use, user satisfaction, and net benefit. The main changes in the update model are:

Service quality was added as an extra dimension to information quality and system quality, that measure of all support to its user such as; available, responsiveness, understanding, and fair. Several researchers proposed that service quality was a factor as success measure, if service quality is high users are satisfied.

Intension to use was placed alongside 'use'.

Individual impact and organization impact were collapsed into a 'net benefits' dimension.

Arrows were added to demonstrate proposed association in a process sense, as presented in Figure 9.

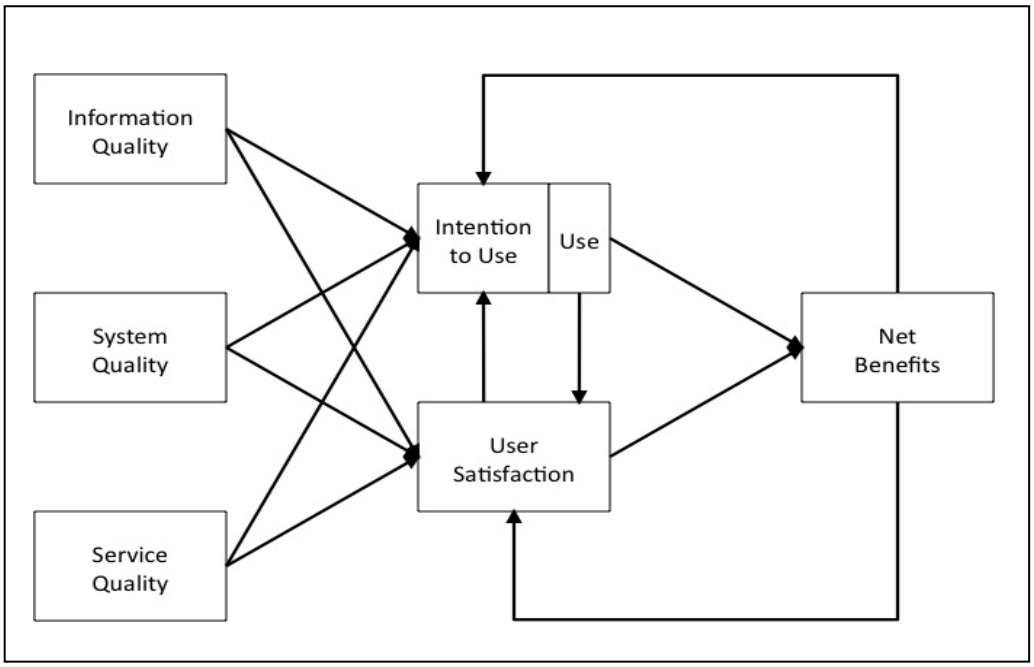


Figure10 Delone & McLean's Model of IS Success 2003

Source: Delone W.H. & McLean E.R. (1992). ***Information System Success: The Quest for the dependent variables.*** Information system research 3(1):60-95

From Delone & McLean's Model of success 2003 User Satisfaction, compose of

1) Information quality refers to how good is the output from a particular IS system, that measure of information system output.

2) System quality refers to the performance of an IS system, that measure of the information processing system itself.

3) Service quality refers to all of support to its user such as; available, responsiveness, understanding, and fair.

The most instruments in measuring service quality has been SERVQUAL method; developed in 1988 by Parasuraman et al. A technique can be used for performing a gap analysis of an organization's service quality performance against customer service quality needs (Zeithaml, 1988). SERVQUAL represents service

quality as the discrepancy between a customer's expectations for a service offering and the customer's perceptions of the service received, requiring respondents to answer questions about both their expectations and their perceptions, and widely used within service industries to understand the perceptions of target customers regarding their service needs. In addition, to provide a measurement of the service quality of the organization. It may also be applied internally to understand employees' perceptions of service quality. With the objective of achieving service improvement. The methodology was originally based around five key dimensions- tangibles, reliability, responsiveness, assurance, and empathy.

In 1991, Parasuraman et al. presented some revisions to the original SERVQUAL measure to remedy problems with high means and standard deviations found on some questions and to obtain a direct measure of the importance of each construct to the customer as follow: **1) Tangibles**: Appearance of physical facilities, equipment, personnel, and communication materials. **2) Reliability:** Ability to perform the promised service dependably and accurately. **3) Responsiveness**: Willingness to help customers and provide prompt service. **4) Competence**: Possession of required skill and knowledge to perform service. **5) Courtesy:** Politeness, respect, consideration and friendliness of contact personnel. **6) Credibility:** Trustworthiness, believability, honesty of the service provider. **7) Feel secure**: Freedom from danger, risk, or doubt. **8) Access**: Approachable and easy of contact. **9) Communication**: Listens to its customers and acknowledges their comments. Keeps customers informed. In a language which they can understand. **10) Understanding the customer**: Making the effort to know customers and their needs.

3.3 A Theoretical Foundation for User Affective Response (UAR)

Landy and Becker, (1987) identify three theories of motivation that use satisfaction as the dependent measure: equity, expectancy, and needs. A theoretical foundation for the UAR construct can be found in the organizational behavior literature. The theoretical foundation for the User Interface dimension of the UAR construct in IS are equity, expectations-confirmation, and needs theories.

Equity Theory

Equity is the result of an individual's evaluation of his or her inputs and rewards in comparison to another's inputs and rewards. People appraise rewards in terms of their fairness (Locke & Latham, 1990). If a discrepancy is perceived between one's efforts and rewards compared to another's efforts and rewards, the individual is motivated to reduce this discrepancy. (Figure 11)

In an information systems context, equity theory focuses on the attention fairness of the process. A user's perception of the inputs required and the results obtained using one system are compared to the inputs required and the results obtained by others using other systems. Inputs are what a user must invest in the system (e.g., training requirements, effort, time, cognitive requirements, costs etc.).

This investment is evaluated in conjunction with the perceived returns, and a comparison to other users of other systems is made to determine relative efficiency. If the returns of the process were greater than the investment required to generate those returns, the process would be considered efficient, and thus fair and satisfying. If the process of converting investment into returns were not efficient, the process would be considered inefficient, and thus unfair and dissatisfying. The user constantly re-evaluates the efficiency of the system, so that the effect on UAR is dynamic. Thus, equity theory emphasizes efficiency.

Person	**:**	**Other**	**Feeling**
$\frac{\text{Outcomes}_p}{\text{Input}_p}$	=	$\frac{\text{Outcomes}_o}{\text{Input}_o}$	**Equity**
$\frac{\text{Outcomes}_p}{\text{Input}_p}$	<	$\frac{\text{Outcomes}_o}{\text{Input}_o}$	**Negative Inequity** "Underpayment"
$\frac{\text{Outcomes}_p}{\text{Input}_p}$	>	$\frac{\text{Outcomes}_o}{\text{Input}_o}$	**Positive Inequity** "Overpayment"

Figure 11 Show concept of Equity Theory

Source: Modified from Joseph E. Champoux. (2006) **Organizational Behavior: Integrating Individuals, Groups and Organization,** (edit 3rd), Thomson, USA. P.175.

Expectation Confirmation Theory

Expectation-confirmation theory posits that expectation, coupled with perceived performance, lead to post-purchases satisfaction. The effect is mediated through positive or negative disconfirmation between expectation and performance. If a product out performs expectation post-purchases satisfaction will result. If a product, falls short of expectation post-purchases dissatisfied will result.

Expectancy theory focuses attention on outcome. Expectancy theory posits that individuals consider alternative outcomes, analyze the costs and benefits of each outcome, and choose an outcome that maximizes their utility

In an IS context, expectancy theory emphasizes the effectiveness of the outcome. For most managers who rely on IS to support decision-making, outcomes are the very reason for the existence of an IS. The importance of the layout and format of reports to decision makers is well-documented (Swanson, 1974; Gallagher, 1974; Igersheim, 1976; Zmud, 1979; O'Reilly, 1982; Jenkins & Ricketts, 1985).

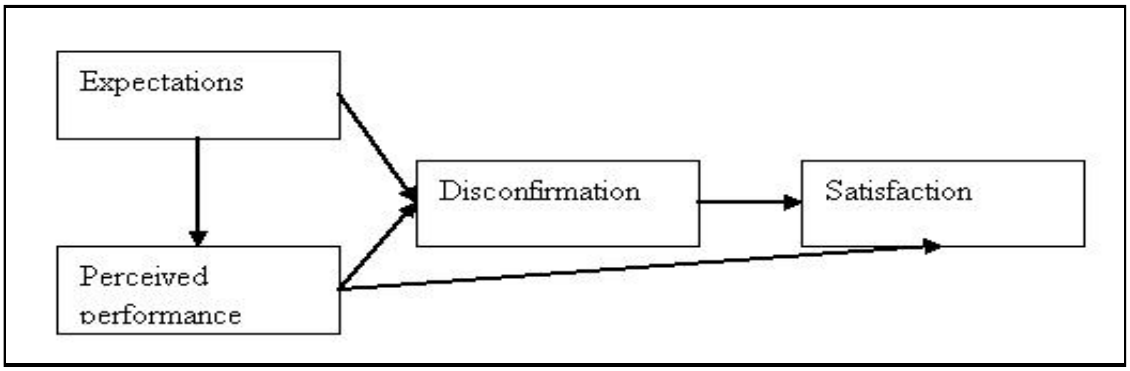


Figure 12 Show "A Cognitive Model of the Antecedents and Consequences of Satisfaction Decisions,"

Source: Oliver R. L, 1980, JMR, Journal of Marketing Research, 17(4), p. 460.

The four main constructs in the model are expectations, performance, disconfirmation, and satisfaction. Expectations reflect anticipated behavior. They are predictive, indicating expected product attributes at some point in the future. Expectations serve as the comparison standard in expectation-confirmation

theory (ECT) that what consumers use to evaluate performance and form a disconfirmation judgment. Disconfirmation is hypothesized to affect satisfaction, with positive disconfirmation leading to satisfaction and negative disconfirmation leading to dissatisfaction.

Need Theory

Abraham Maslow (1964) stated people has difference needs to achieve their satisfaction. There is a hierarchy of people needs, from the lowest level needs move to high-level needs as following:

1. Physiological needs include food, water, clothing and shelter. These are the most basic needs and constitute the lowest level of Maslow's hierarchy.
2. Safety and security concerns protection of the first level needs.
3. Affiliation involves sense of belonging and friendship.
4. Esteem pertains to the need for achievement, success, and recognition.
5. Self-actualization concern need for creativity, self-expression, integrity, and self-fulfillments.

An individual is motivated to satisfy the lowest level of needs before to go through to fulfill the next level.

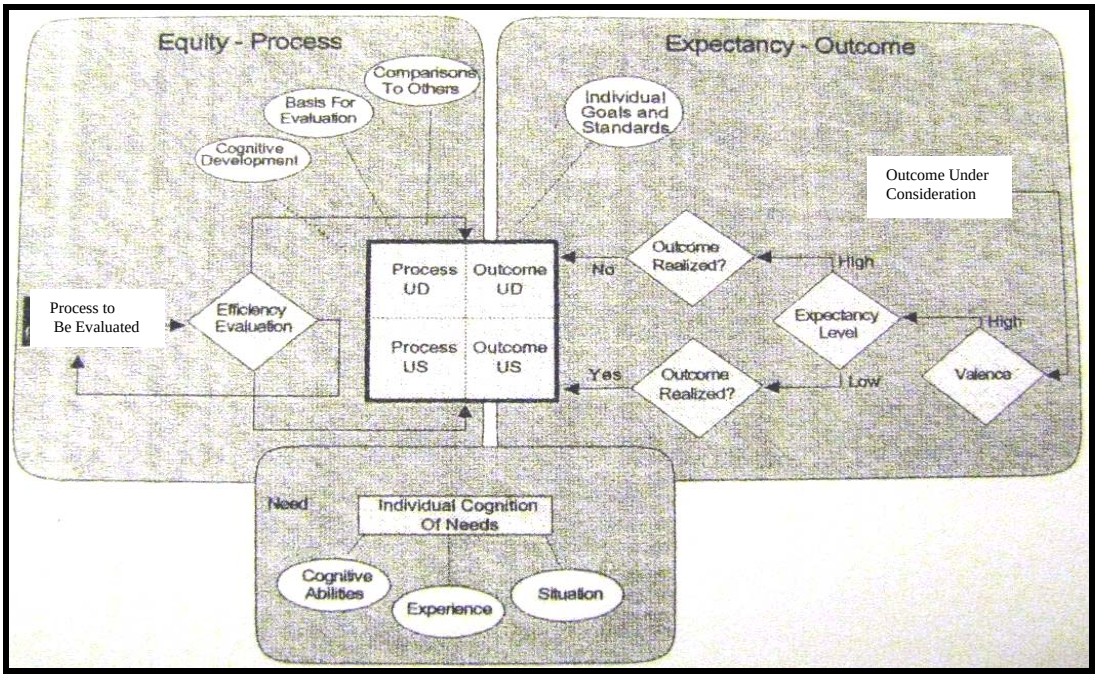


Figure 13 Theory Foundation for the User Affecting Response (UAR) Construct

Source: Garrity & Sanders. (1998). ***Information System Success Measurement*** p. 126.

To many users (upper management and users who do not interact very often with the IS), the outcome of an IS is more important than the processes that produced the outcome.Both.the perceived efficiency of the process and the effectiveness of the outcome have an impact on UAR, and the effects of both equity (process) and expectancy (outcome) are moderated by needs. Both process and outcome must be considered in tight of users' needs.

Landy and Becker (1987) stress the cognitive element in needs theory by arguing that individuals create their own unique needs categories, the creation of these needs categories is influence by an individual’s cognitive abilities, experience, and the situation in which he or she works. Because individuals construct their own unique needs categories, any evaluation of UAR must consider needs theory.

4. The concept of computer knowledge

Definition of Knowledge

Bloom, et al (1971: 271) defined knowledge as the recall of specifics and universals, the recall of methods and processes, or the recall of pattern, structure, or setting. The objective of knowledge emphasizes on psychological process of memory (Bloom, 1971).

Good (1973: 325) defined knowledge as the accumulated facts, truth, principles, and information to which the human mind has access (Good, 1973).

Smith (1977: 531) defined knowledge as the fact or condition of knowing something with a considerable degree of familiarity gained though experience of contact, or association with the individual or thing to known. It is also called acquaintance with or theoretical or practical understanding of some branch of science, art, learning, or others area involving study, research, or practice and the acquisition of skills (Smith, 1799).

In summary, the knowledge can defined as the result of human learning process throughout the fact, truth, principles, and information by observation, experience, awareness and memorize them in to knowledge.

Level of Learning

Bloom (1956) developed a classification of levels of intellectual behavior in learning or the goals of educational process. The three domains educational activities are: the cognitive domain that involve knowledge and the development of attitude and skills, the other domain are the affective domain and psychomotor domain. In the cognitive domain was classified into six levels ranging from a simple one to difficult one as follows:

1. **Knowledge** means the remembering of previously learned materials. This may involve the recall of wide range of material, from facts to complete theories, but all that is required is the bringing to mind of the appropriate information. Knowledge represents the lowest level of outcomes in cognitive domain.

Learning objective of this level are; know common terms, know specific facts, know method and procedures, know basic concepts, know principles.

2. **Comprehension** means the ability to understand the meaning of material and knows what is being communicated to other material. This may be shown by translating material from one form to another, by interpreting or summarizing material, and by estimate future trends. These learning outcomes go the step beyond the simple remembering of material, and represent the lowest level of understanding.

Learning objective of this level are; understand facts and principles, interpret verbal materials, interpret chart and graphs, estimate the future consequences implied in data, justify methods and procedures.

3. **Application** means the ability to use of abstractions in particular or ability to used learned material in new and concrete situations. This may include the application of such things as rules, methods, principles, concepts, laws and theories. Learning outcomes in this are require a higher level of understanding than those under comprehension.

Learning objective of this level is; apply concepts and principles to new situations, apply laws and theories to practical situation, solve problem, demonstrate the correct usage of method or procedure.

4. **Analysis** means the ability to breakdown material into its component parts so that its organizational structure may be understood. This may include the identification of parts, analysis of the relationship between parts, and recognition of the organizational principle involved. Learning outcomes in this step represent a higher intellectual level than comprehension and application because they require an understanding of both the content and the structure form of the material.

Learning objective at this level are; recognize unstated assumptions, recognize logical fallacies in reasoning, distinguish between facts and inferences, evaluate the relevancy of data, analyze the organization structure of work (art, music, writing).

5. **Synthesis** means the ability to putting together of elements and parts to form a new whole. This may involve the production of a unique communication, a plan of operation, or a set of abstract relations. Learning outcomes in this area emphasize creative behaviors, with major emphasis on the formulation of new patterns or structure.

Learning objective of this level are; write a well organized theme, gives a well organized speech, writes a creative short story, integrate learning from difference area into a plan for solving a problem, formulates a new scheme for classifying objects (or events, or ideas).

6. **Evaluation** means the ability to judge the value of material (statement, report, poem, research) and methods for give a purpose. The judgments are to be base on definite criteria. These may be internal criteria or external criteria and may determine the criteria or be given them. Learning outcomes in this area are highest in the cognitive hierarchy because they contain element of all the other categories, and conscious value judgments based on clearly defined criteria.

Learning objective of this level are; judge the logical consistency of written material, judge the adequacy with which conclusions are support by data, judge the value of work by the use of internal criteria, judge the value of work by the use of external standard of excellence.

It may be concluded that knowledge is something that can be learned, it has difference level of meanings, start from basic level which explained by step of memorize to advance levels by pattern of knowing, understanding, applying, analyzing, synthesizing, and evaluating. The categories after knowledge were presented as “skill and abilities” with the understanding that knowledge was the necessary precondition for putting these skills and abilities into practice.

Computer knowledge / Computer literacy

Computers are increasingly used in every sector and have been known to contribute to increased efficiency and competitive advantage (Northrop A., 1990). Today, the use of computer technology on the task was very important in many aspects. The specific technology installed in any hospital setting constantly changes in both sophistication and function. The challenge for hospitals to ensure their staff meets a level of competency when using new constantly changing technology. Raymond McLeod, Jr. argued the development of information system requires certain knowledge and skill (Raymond McLeod, 2007). Therefore, the computer knowledge has revealed computer literacy. Computer knowledge can be defined as the abilities

and skills to work with computer. There are many researchers were defined term of computer literature in widely used, but it is not precisely defined, as follows:

Watt (1980) defined computer literacy as the collection of skills, knowledge, understanding, values and relationships that allow a person to function comfortably as productive citizen in a computer-oriented society (Watt, 1980).

Bitter (1986) posed the ability to work with computer is computer literacy. Computer literacy generally refers to the ability to used applications rather than to program (www.webopedia.com, 2007)**.**

Rochester, J. (1991) stated computer literacy is being knowledgeable about the computer work and how its work in our daily lives. It also means being able to operate and use computer, at least to perform basic task (Rochester, 1991).

Levine & Donitsa-Schmidt (1998) restated the definition of computer literacy, saying it relates not only knowledge about capability, limitations, applications and implication of computers but also to individual attitude and perceptions regarding computers (Levine, 1998).

The Education for the 21st Century (E-21) Act, posed "Computer literacy skills are defined as information gathering, critical analysis, and communication with the latest technology" (Bill, 2005).

Some studies have defined computer literacy that was based on broad or narrow meaning:

Broad definition: computer literacy should contain individual knowledge, skills and attitudes toward using computer, and that it is the same as cognition, feeling and technique in relation to computers.

Narrow definition: computer literacy is limited as the application of computer knowledge and skills in daily activities include the abilities of handling computer problems, operation computers, and programming skills and computer application abilities.

Based on the above definitions, it seems that computer literacy should include computer knowledge and attitude toward computer.

In summary, computer literacy is the ability to used computer resources to accomplish necessary processing. Thus in this research, computer knowledge and/or computer literacy can be means computer literacy emphasizing subjects' computer

related knowledge, skills and application abilities to use computer to support hospital information system (HIS).

The Level of computer literacy

Donald Norman (1984) proposed a scheme for four levels of computer literacy (Norman, 1984).

1. The first level consisted of mastering basic, general concepts, to which the understanding of algorithms, architecture, and databases was key.
2. The second level required an understanding of how to use computer and accomplish something useful with it.
3. The third level of computer literacy was ability to program.
4. The fourth level was the understanding of science of computation.

Beside, he argues that everyone should achieve at least the second level of his or her computer literacy scale.

Brock & Thomson (1992) Stated, there are three levels of computer literacy.

1. Knowledge of what a computer is and how it works. This requires understanding certain terminology because the terms are unique and descriptive.
2. Interaction with a computer. This includes the ability to understand and properly use specific types of software for specific purposes.
3. Computer awareness. This involves understanding the importance, versatility, pervasiveness, and potential uses of computers for both positive and negative purposes within society.

5. The concept of user attitude

An attitude is an important concept to understand human behavior. It is critical important in organization because it affected to organization behavior. The

manager needs to know how attitude of their employee toward organization policy is, that lead to good understand and good communication in organization for the high performance of organization. Generally, it is defined as a complex mental state involving beliefs and feelings. There are many definition of attitude as follow:

Allport G.W.(1935: 8) state that attitude is a mental and nature state of readiness, organized through experience, exerting a direction or dynamic influence upon the individual's response to all objective and situational which it is related (Allport, 1935).

Anastasia A. (1957) defined attitude as a tendency to react in a certain way toward a designed class of stimuli (Anastasia, 1957).

Ajzen & Fishbein (1975) state "Attitude can be described as a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object" (Fishbein, 1975).

The Merriam-Webster's Medical Desk Dictionary defined attitude as "the arrangement of the parts of the body, a mental position with regard to fact or state, a feeling or emotion towards a fact or state, and organismic state of readiness to respond in characteristic way to stimulus (as an object, or situation)(Merriam-Webster, 1996).

According to each meaning above, we can summarize attitude means a mental readiness condition that caused by learning experience which makes the individual to reveal a behavior in response to things or situations, positive or negative, like or dislike.

Attitude toward Hua-Hin Hospital HIS means the status of user's mind including thinking, belief, which activate user on Hua-Hin Hospital HIS.

Attitude component

There are many psychiatrics such as Ajzen & Fishbein, Triandis had opined similar attitude's component that can be classified into three types as following:

1. **Cognitive component** means ingredients of idea and understanding toward stimulus object by themselves, such as: belief, thinking or acknowledgement, which can be positive or negative.

2. **Affective component** means ingredients of emotion or feeling that agree with positive or negative thinking of person.

3. **Behavioral component** means ingredients of behavior or stimulus that readiness to act, resulting from thinking and feeling. It is shows the trend of action, dependent on motivation.

As, the components of attitude are separated into three components: Cognitive, Affective, behavior. If person understood or thought about something, they will have attitude toward them that is show by feeling or acting. The quantities and frequency of show by feeling or acting dependent on understanding with thing, as Figure 14.

Attitudes are judgments. It has developed on ABC model (Affect, Behavior and Cognition).

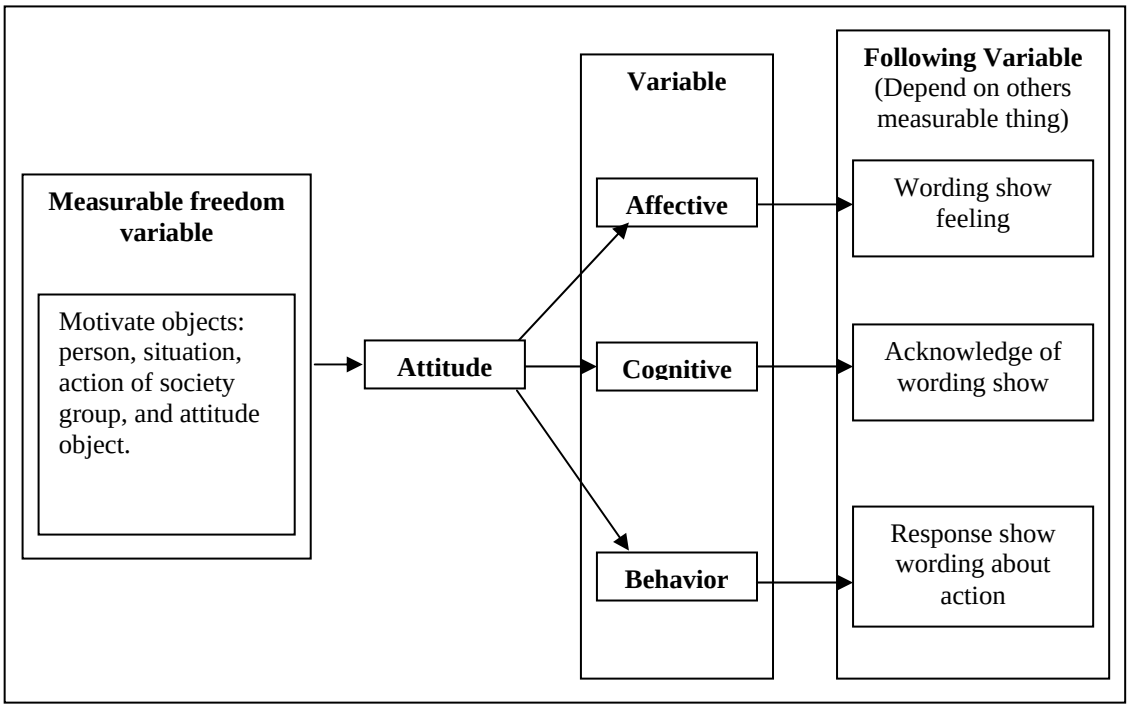


Figure 14 Component of attitude of Triandis

Source: Thurstone LL. (1967) **Attitude Theory and Measurement** New York, Willy and Son Inc.

Significant of Traits of attitude

1. An attitude comes from learning or experience of each person, not inherited from birth.

2. An attitude is a mental state. It has influence on thoughts and actions of a person.

3. Although an attitude is a mental state which is considerably stable, it may be changed due to environmental influences and learning.

Attitude can occur in the following two traits.

1. **Positive attitude** are readiness to response in the trait of satisfaction, agreement and causing person want to do, want to have, want to approach or want to do only good to such things.

2. **Negative attitude** are readiness to response in the trait of dissatisfaction, disagreement, and causing person to be bored and stay away from such objects or conditions.

In conclusion, an attitude is something that comes from learning or experience, not inherited from birth. The attitude towards something be either positive or negative and it has some influence on thoughts and actions of a person. Although an attitude is something that occurred and not stable, it can be change.

Factor effecting occurrence and change attitude

1. **Individual factors:** i.e. difference age, education and personality normally cause difference attitude of person. That is the high educate person may be induce to change the attitude easier than the low educate person.

2. **Communication with other person:** The person will have an attitude when communication with other person. A person's attitude may vary with his/her group's attitude i.e. peer group and the group of people in the society. People with similar attitude will do their activities together; their similar opinion will cause them to have satisfaction with one another. That is the cause making them thinks similarly about a certain thing.

3. **Institute factors.** All institutes have their own rules, regulation, order, convention and guidelines for their personal to follow. A person will have an attitude because of the influence of the institute involved.

4. **Reception of specific experiences.** The person will have and attitude towards something when they has experienced in that thing by themselves, so they has been constantly and long impressed by such experience. This may be positive or negative impression.

Methods of Measuring Attitudes

Attitude measurement is commonly refered to as scaling. The measurements techniques that have been widely use are:

1. **Thurstone Scales:** It is one of the multi items scales develop by L.L. Thurstone's method of equal appearing interval on the concept that, even though people could not assign quantitative measures to their own attitudes, they could tell the deference between the attitudes represented by two deference statements and could identify items that were approximately half way between the two.

2. **Likert Scales:** These scales are sometimes refered to as summated scales. It requires a respondent to indicate a degree of agreement or disagreement with each of a series of statements related to the attitude object.

Comparison of Thurstone and Likert Scale

It is obvious that these two scales have a lot in common. They have been widely used in the past. Due to the ordinal nature of the Likert scales, many individuals feel they it may be more reliable than the Thurstone scale.

Since the attitude measurement had been the measure of trend that seems be a private feeling or subjective, the result of measurement may not be truth. People's acting against something, either speaking or writing, will be appropriately meditated depending on social trend such as normal tradition, preference, acceptation and non-acceptation, approve and non approve of people in society. Therefore, we measure the user attitude by Likert scales.

6. The concept of user participation

Before a system is designed and implemented the future user must know it is going to influence their jobs. The implementation of an information system may be considered as political process where the user's acceptance of the new system will play an important role on its success. The role of users in information system design attempted to prove that greater participation leads to an improvement in system success. The importance of involving users in the development of information system was support by many articles such as user participation is the most important factors influencing implement success or failure (Mumford, 1983). Other researchers have been investigating the link between user participation and successful system implementation (Doll & Torkzadeh, 1988). Therefore, they try to develop the method to help improve and measure user participation in system development, and assess subsequent satisfaction with the working systems (Doll & Torkzadeh, 1988; Barki & Hartwick, 1989; Baroudi et al., 1986).

User participation in the information system development (ISD) process would be expected to be a positive influence on ISD success. By participating in the ISD process, user should become familiar with the tools, techniques, and methods used to build system and to discover that. By being part of the change process, it is believed that the resistant to change will be lowered. User participation should increase the user's ownership of the business system because they are "invested" in the computer – based information system used to support the business processes.

Kappelman & McLean (1991) hypothesized that IS success in directly influenced by user participation and meditated by user involvement, user participation and system use developed and test by Barki & Hartwick (1994, 2001)

Ives & Olson (1984) defined user participation as user representatives' participation in IS development process, with reference to a series of specific activities undertaken by users (Baroudi et al., 1986). The term user participation used interchangeably with user involvement until clear distinction was made between the two by Barki and Hartwick (1989; 1994).

Barki and Hartwick (1994) defined user participation as the participative behaviors, whereas an involvement deal with a psychological state that users consider IS important and personally relevant. They argued that user participation is one of the

more important antecedents of user involvement contingent on a number of factors, which are said to influence the strength of the relationship. Implicit in this conceptualization is the notion that users who do not participate either directly or indirectly in the development process, but whose views are represented by individuals or group of other users, who do participate, are in fact involved in the development process (Barki, 1994).

According to each meaning above, we can summarize user participation means the participative behavior of user that participate either directly or indirectly in the development process of Hua Hin HIS.

Type and Degree of User Participation

The participative approach to systems developments is founded on the belief that the development process is heavily influence by social and economic factor rather than technical factor.

Mumford: (1979) suggests that there are three types of participation and the "degree" of involvement ranging from "no involvement" to involvement by "strong control". The degree of involvement refers to the amount of influence the user has over the final product (Mumford, 1979).

1. *Consultative*: the system group makes the design decisions, but the objectives and form of the system are influence by the need of the user department.

2. *Representative*: All level and function of the affected user group are representing in the systems design team.

3. *Consensus*: An attempt is made to involve all workers in the user department, at least through communications and consultation, throughout the system design process.

The following categories provide examples of increase degree of user involvement.

1. *No involvement*: users are unwilling or not invited to participate.

2. *Symbolic Involvement:* User input is requested but ignored.

3. *Involvement by Advice:* User advice is solicited through interviews or questionnaires.

4. *Involvement by Weak Control:* Users have “sign off” responsibility at each stage of the system development process.

5. *Involvement by Doing:* A user as design team member or as the official liaison with the information systems development group.

6. *Involvement by Strong Control:* Users may pay directly for new development out of their own budgets, or the user’s overall organizational performance evaluation is dependent on the outcome of the development effort.

Cohen and Uphoff (1977) argue that there are many kinds of participation they have focused on four that seem to be most important: a) Participation in decision-making b) Participation in implementation c) Participation in benefits d) Participation in evaluation.

Ives and Olson (1984) argues that there are several degree’s of participation, range from no participation at all, to symbolic participation, participation by weak control, participation by doing, and participation by strong control.

Greenbaum (1993) point out that user participation may be view from several perspectives: *Pragmatic* it is a means to specific ends; *Theoretical* it provides a mechanism for sharing “world views”; *Political* it allow user to influence and shape their working lives (Greenbaum, 1993).

In 2001, Barki & Hartwick define four dimensions of user participation:

1. ***Responsibility***: the performance of activities and assignments reflecting overall leadership or accountability for the project;

2. ***User -IS relationship***: the performance of development activities reflecting users' formal view, evaluation, and approval of work done by the IS staff;

3. ***Hand On Activity***: the performance of specific physical design and implementation task;

4. ***Communication activity***: Activity involving formal or informal exchanges of facts, needs, opinions, visions, and concerns regarding the project among the users, and between users and project stakeholders (Barki, 2001).

7. The related Information System Researches

7.1 Tafti (1992) studied "A theoretical explanation of the evolving role of users in reshaping corporate information systems"

Since, user's need for information is beginning on only one dimension of IS user satisfaction. Users expect more than only information from a system the same way human needs extend beyond consumption food. In addition, all dimensions of user satisfaction do not necessary receive in the same priority by a user during difference periods of the system utilization. He divided user satisfaction into three dimensions: information satisfaction, system satisfaction, Support-Group satisfaction. He proposed the hierarchy of user requirement information based on Maslow's hierarchy needs that start with the basic information need upon to super-user needs. Maslow's framework is utilized to identify the hierarchy of user requirement information in the following; 1) Information Needs 2) System Needs 3) Need for Active Involvement 4) End User Needs and 5) Super-User Needs. The framework proposed for the analysis of various element of user satisfaction, and for the analysis of the relative importance of each element during different periods of system utilization. Specifically, it provides a context within which the following propositions may be investigated:

1. The users' needs and priorities during the course of system utilization are dynamic and changing. As their needs for information are further satisfied, they become more demanding on IS features. From his study indicated that users with a higher level of information satisfaction tend to allocate more resources on enhancing systems features than user with less information satisfaction. On the other hand, the user with a lower level of information satisfaction are likely to allocate more on enhancing system to provide better information in term of information quality. A user preference to allocate resource**s** for future systems improvement may, therefore,

depend on the extent to which the user's present needs for various IDS feature are satisfied.

2. A user's propensity to involve in IS activities appears to be function of the extent of his satisfaction with IS. As the users' information and system needs are fulfilled, they tend to desire a higher level of involvement in various IS related decision.

3. Higher levels of user involvement, the proliferation of end user computing **,** and the resulting surge for downsizing lead to a higher level of users' propensity to gain more control over the corporate information resources and IS strategy.

7.2 McKeen et al (1994) studied "The relationship between User Participation and User Satisfaction: An Investigation of Four Contingency Factors"

This study was analyzed of 151 independent systems development projects in eight different organizations indicated that user participation has a direct relationship with user satisfaction. In addition, the four contingency factors were found to play key roles on this relationship. Task complexity and system complexity proved to be pure moderators. That is, the strength of the participation-satisfaction relationship depended on the level of these factors. In projects where there was a high level of task complexity or system complexity, the relationship between user participation and user satisfaction was significantly stronger than in projects where task complexity or system complexity was low. User influence and user-developer communication were shown to be independent predictors of user satisfaction. That is, user influence, or user-developer communication, was positively related to user satisfaction regardless of the level of participation. The results help explain the relationship between user participation and user satisfaction by suggesting the nature of the relationship under different sets of conditions.

7.3 Linda M. Roth (1994) studied "The Relationship between User Participation in the Development of an Information System and User Satisfaction"

This study was conducted at Hewlett-Packard, Spokane, Washington. The instrument that composed of the following components for collected data: Respondent's Profile, User Participation, System Usage, System Satisfaction, and Information Satisfaction. The analysis of variance was used to measure differences between the perceived degree of user participation and perceived degree of user influence during the four the systems development life cycle. Stepwise multi regression was used to determine which variables predicted the user's satisfaction with the system and with the information. This study found 1. The perceived degree of user participation perceived degree of user influence during the systems development life cycle was not statistically significant for intended and actual system usage. 2. The perceived degree of user participation and the perceived degree of user influence during the systems development life cycle were not statistically significant for system satisfaction.3. The perceived degree of user participation and the perceived degree of user influence during the systems development life cycle were not statistically significant for Information Satisfaction A or B. 4. Information Satisfaction was the better variable of System Satisfaction. 5. System Satisfaction was the better predictor variable of Information Satisfaction.

7.4 M. J. van der Meijden et al, 2003 studied "Determinants of Success of Inpatient Clinical Information Systems: A Literature Review"

The objectives of this study were to identify attributes that were used to assess the success of such systems and to test the ability of a framework developed by Delone and McLean for management information systems to categorize these attributes correctly. The study found a variety of relevant attributes could be assigned to the six dimensions in the Delone and McLean framework, but some attributes, predominantly in cases of failure, did not fit any of the categories. They related to contingent factors, such as organizational culture.

7.5 Guimaraes L, et al (2004) Studied "Important human factors for system development success: a user focus"

This study empirically test the importance of user participation, user experience, user/developer communication, user training, user influence, and user conflict encountered during the system development process. Samples of 228 system users were used for a multivariate regression model testing the importance of these factors. The results indicate that user participation, user training, and user expertise can explain 61% of variance in user satisfaction with their systems.

7.6 James D.McKeen & Tor Guimasaes (1997) studied "Successful Strategies for User Participation in System Development"

This study aimed to investigate the contexts within which user participation can be used to improve user satisfaction. This study builds on this past body of research by examining the relationship between specific user participative behaviors and user satisfaction in different contextual situations in order to identify the most successful participative behaviors. The data were collected from 151 independent system development projects in eight different organizations. The context of development was described by two factors--task complexity and system complexity. The result indicate that the relationship between specific participative behaviors and user satisfaction was depending on the level of task complexity and system complexity, and the specific user participative behaviors most beneficial under different contexts.

7.7 Jun He & William King (2008) Studied "The Role of User Participation in Information Systems Development: Implications from a Meta-Analysis"

This study synthesizes the research findings of 82 empirical studies on user participation in information systems development (ISD). Since the current status of research in the broad area of participation is that the effects of participation are considered to be problematic, that status and the results of this study suggest that user participation alone may not be sufficient to achieve significantly improved ISD outcomes, and that different strategies should be employed based on the specific goals

of ISD projects. If system acceptance is the ultimate goal, user participation should be designed to induce more psychological involvement among potential users. If productivity benefits are the focus, user participation should be designed to provide developers the needed domain knowledge. In sum, user participation should be treated as one of a number of means for ISD projects to be more successful.

7.8 Ammenwerth E. et al. (2006) studied "HIS-monitor: An approach to assess the quality of information processing in hospitals"

Systematic monitoring of HIS quality is an important task; however, this task is often seen to be insufficiently supported. To support systematic HIS monitoring, he developed HIS-Monitor, comprising about 107 questions, focusing on how a hospital information system does efficiently support clinical and administrative tasks. Results of the feasibility study show that HIS-Monitor was able to highlight certain HIS problems such as insufficiently supported cross-departmental communication, legibility of drug orders and other paper-based documents, and overall time needed for documentation. He discussed feasibility of HIS-Monitor and the reliability and validity of the results. Further refinement and more formal validation of HIS-Monitor are planned.

7.9 Palm et al, 2006 studied "Determinants of User Satisfaction with a Clinical Information System"

Clinical Information Systems (CIS) implementation has faced user resistance. Consequently, this study aimed to assess the acceptability of an integrated CIS. An electronic survey instrument was developed based on two theoretical models: Delone and McLean Model, and Technology Acceptance Model. The survey instrument consisted of 42- 56 questions, depended on whether the respondent was physician, nurse or secretary. Questions were selects among items of previous published, validated instrument and used seven-point Likert scales. The survey was designed to measure user characteristics, user satisfaction, CIS use, quality, usefulness, and service quality. The questionnaire was administered to physicians, nurses and medical secretaries of the Georges Pompidou European university Hospital (HEGP) in Paris. The survey population consisted of all physician (n=600), nurse

(n=1,300), and secretary (n=180) that believed regular used of CIS at the time on survey. The questionnaires were sent to those populations by e-mail. The survey was conducted between April 2004 and May 2004. Answers were obtained from 324 users (93 physicians=16%, 174 nurses=13%, and 57 secretaries=32%). Most (79%) respondents were females, and age between 31-45 years (49%). Over all CIS satisfaction, means score 4.50 SD 1.38). Over all CIS quality, means score 4.06 SD 1.38). Over all CIS service quality, means score 3.90 SD 1.42). Cronbach's alpha coefficients showed a correct reliability within each dimension. Secretaries and nurses were more satisfied with the CIS than physicians. Except for CIS use, after adjustment for confounders, female gender, perceived CIS quality, usefulness, and service quality were strongly correlated with user satisfaction.

This study reinforces the necessity of several models and dimensions to evaluate the acceptability of a complex CIS, with a specific approach for different user profile.

7.10 Sook Lim, 2002 studied "Impacts of Personal Characteristics on Computer Attitude and Academic User Information System Satisfaction"

This study evaluated the relationships between three personal characteristics on computer attitude and user satisfaction. The three personal characteristics tested were gender, computer experience, and overall academic performance. The results found that computer experience and gender make a significant difference in the computer attitude of the respondents. However, the three personal characteristics did not make a significant difference in academic computer system user satisfaction. Also found is a significant moderating effect of the three personal characteristics on the relationship between computer attitude and user satisfaction. Women, those with moderate computer experience, and those with low academic performance tend to show stronger relationships between computer attitude and computer user information system satisfaction than their counterparts.

7.11 Hui-Mei Hsu et al, (2008) studied "Factors Influencing Computer literacy of Taiwan and South Korea Nurse"

Hospitals are adopting information technology (IT) to reduce costs and increase competitiveness. IT applications in healthcare are trending towards electronic

patient records and even health records. Therefore, practices in nursing are also affected by IT. The purposes of this study are to examine current computer literacy levels of nurses and to indicate what variables influence their computer literacy. The results revealed that personal innovativeness in IT, computer education, and age are significant factors that affected computer literacy levels. These factors serve as reference for administrators and executives in hospitals, or nursing educators seeking the data necessary to make decisions on curriculum.

7.12 Nor Azan Mat Zin et al, (2000) studied "Gender Difference in Computer literacy Level among Undergraduate Students in University Kebangsaan Malaysia"

This study was conducted to assess gender differences in computer literacy levels of undergraduate students in UKM. The result found a significant difference in computer literacy level between male and female students. Male students had greater computer experience and use computer more frequently. They also reported a higher computer ability and slightly higher percentage of them own a computer. Males had greater self-perceived control and higher programming skills and better ability in computer repair and maintenance than females. Other factors such as computer experience and computer ownership also affect computer literacy level. This study indicates that increasing the computer experience and encouraging students to own a computer will give more opportunity to female students to achieve a higher level of computer literacy.

7.13 Juhani Iivari & Magid Igbaria (1997) Studied "Determinants of User Participation: a Finish Survey"

The relationship between user participation and information systems success has intrigued researchers for two decades. Despite this history there is minimal research on the antecedents of user participation. The tenet of the present paper is that the conditions of user participation are essentially changing. Especially, the European tradition of user participation has focused on blue-collar workers rather than professionals and managers. Users are normally assumed to be computer illiterate. The North American tradition has almost exclusively focused on the impact of user

participation on information systems success. The present paper examined the significance of organizational level of users, their task variety and computer experience as determinants of user participation including age, gender, education, computer training, organizational tenure and job tenure as control variables. The three determinants were found to have a significant positive effect on user participation, computer experience emerging as the most dominant factor. Gender, education and computer training were discovered to have significant effects mediated by organizational level, task variety and computer experience.

CHAPTER III
MATERIALS AND METHODS

This chapter will outline materials and method used in the research, which consist of;

3.1 Research Design

3.2 Population and Sample

3.3 Research Instrument

3.4 Validity and Reliability

3.5 Data Collection Procedure

3.6 Data Analysis

3.1 Research Design

This study was a cross-sectional survey research, which was aimed to study information system success by investigating the dimensions of user satisfactions level, and to find the association between user characteristics, computer knowledge, attitude toward hospital information system, user participation and user satisfaction on the information system in Hua-Hin Hospital.

3.2 Population and Sample

Population

The population of this study were the persons who were working in Hua-Hin Hospital in Prachuapkirikhun Province during the study. The inclusion criteria for the population were those who were working in the hospital and had been using the information system for more than a period of six months (or had been working before November 2007), which included 206 persons who fulfilled the criteria.

Sample

The sample size was selected using simple random sampling method. The sample size was estimated and calculated using the formula (Vanichbuncha, 2548: 25) shown below.

Sample Size Formula

$$n = \frac{NZ^2\sigma^2}{NE^2 + Z^2\sigma^2}$$

When n = sample size

N = Population

Z = Level of statistical significance at 0.05 = 1.96

E = Standard Error of the data collection from the sample, set at 5%

σ^2 = Population Variance from pilot study = 0.599 or 0.6.

$$\textbf{Sample Size} = \frac{206\ (1.96)^2\ (0.60)^2}{206(0.0003)^2 + (1.96)^2(0.60)^2}$$

So the sample size were = 190 persons

Protection of Human Rights

The Associate Dean of Research from the Faculty of Public Health firstly reviewed this study. Then the research proposal was sent to The Committee on Human Rights Related to Human Experimentation Mahidol University for reviewing and determining in the ethic committee of human research. The research proposal was approved to conduct on 10th October 2007.

3.3 Research Instrument (See Appendix C)

The instruments used in this study were questionnaires developed by the researcher based on theory and literature reviewed from textbooks, articles, reviews,

publication, theses and other related research works. The questionnaires were consisted of five sections as follows:

Section 1 The general information

The personnel factor questionnaire was developed for collecting subject general information including of gender, age, unit of working, working position, education, professional occupation, computer experience, computer learning, hospital information system training, and period of system usage.

Section 2 Computer knowledge

The knowledge about computer that was focused on the basic concept on computer, working on Windows, and general skills on computer. Questions contained 20 questions, which were closed-ended type with multiple-choice answers of four possible of choices and assigned to have only one of correct answer for each question. For each of correct answer, a score of 1 point was given and 0 point was given for incorrect answer.

The total score of 20 points was categorized into three levels of computer knowledge as follow: (Somwang, 2537)

Scores higher than 16 points (>80%) indicated high knowledge level

Scores between 10-15 points (50-80%) indicated average knowledge level

Scores less than 10 points (<50%) indicated low knowledge level

Section 3 Attitude towards hospital information system

This section was aimed to measure the attitudes of user towards the hospital information system using five levels Likert scale. The questions contained both of positive and negative items with closed-end questions for the total of 14 items. The details of the items and scoring were as follows:

There were 8 positive questions (items 1, 2, 4, 5, 8, 10, 11, and 13). Scoring criteria for positive question are:

Strongly disagree = 1 points
Disagree = 2 points
Undecided = 3 points
Agree = 4 points
Strongly agree = 5 points

There were 6 negative questions (items3, 6, 7, 9, 12, and 14). Scoring criteria for negative question are:

Strongly disagree = 5 points
Disagree = 4 points
Undecided = 3 points
Agree = 2 points
Strongly agree = 1 points

Attitude toward hospital information system in this study has score range from 1 -5 scores. Interpretation by divided into three levels of mean score as follows: (Prakong, 2542)

- The score range 3.67-5.00 referred the user with positive attitude toward hospital information system.
- The score range 2.34-3.66 referred the user with neutral attitude toward hospital information system.
- The score 1.00-2.33 referred the user with negative attitude toward hospital information system.

Section 4 User Participation

The questionnaire on user participation was developed based on Barki & Hartwick (1994), its contained 14 items. Each item has score range from 0 - 4 rating scale.

- Scoring meaned

0 = Never participation, the user feel no participate in hospital information system

1 = Sometime participation, the user feel some participate in hospital information system

2 = Vary often participation, the user feel often participate in hospital information system

3 = Always participation, the user feel usual participate in hospital information system

Interpretation by divided into three levels of mean score as follows: (Prakong, 2542)

- The score range 2.01-3.00 referred to the user has high participation in hospital information system.
- The score 1.01-2.00 referred to the user has moderate participation in hospital information system.
- The score 0.00-1.00 referred to the user has low participation in hospital information system.

Section 5 User Satisfaction

The user satisfaction questionnaire was developed based on Doll & Torkzadeh (1988), Baroudi & Orlikoski (1988) and consisted of 14 items with positive and negative items. Each item was divided into 5 Likert's scale.

- Scoring meaned

1 = Disagreeable, the relevant statement unconformity at all to the respondent's feeling, thinking and belief

2 = Less agreeable, the relevant statement conform slightly to the respondent's feeling, thinking and believing

3 = Agreeable, the relevant statement conform neutrality to the respondent's feeling, thinking and believing

4 = Strong agreeable, the relevant statement conform considerable to the respondent's feeling,

thinking and believing

5 = Most agreeable, the relevant statement conform wholly to the respondent's feeling, thinking and believing

Interpretation by divided into three levels of mean score as follows: (Sa-ardsre, 2534: 111)

- The score range 3.67-5.00 referred the user was high satisfaction
- The score range 2.34-3.66 referred the user was average satisfaction
- The score range 1.00-2.33 referred the user was low satisfaction

3.4 Validity and Reliability

Content Validity

The assessing instruments particularly the computer knowledge questionnaire, attitude toward hospital information system questionnaire, and user participation questionnaire. User satisfaction questionnaire was initially submitted, for testing their validities of the contents and language. The contents of the instrument were revised by expert's suggestion and were tested by three experts.

Reliability

All of the instrument were initially tried out among 32 subjects which had similar characteristics as sample at Prachuapkirikhun Hospital. After that, the instruments were calculated for their reliability. K-R 20 Method was used to test reliability of computer knowledge and Cronbach's Alpha Method was used to test reliability of the attitude towards hospital information system, user participation, and user satisfaction.

The results of reliability were as follows:

- Computer Knowledge was 0.703
- Attitude toward hospital information system was 0.866
- User Participation was 0.909
- User Satisfaction was 0.743.

3.5 Data Collection Procedure

The collection of data was prepared by the researcher on these following steps:

1. Requesting a letter from the Dean of Faculty of Graduate Study, Mahidol University to the director of Hua-Hin Hospital Prachuabkirikhun Province in order to ask for permission of data collection.

2. After receiving permission, the researcher presented the study objectives to the director of Hua-Hin Hospital and requested their cooperation for data collections from the involved users.

3. In each of the questionnaire's envelops, the researcher explained the research objectives, protection of participant's rights and asked for participation.

4. After that, the questionnaires were sent to the head office of each unit by herself and made appointment with them to collect the questionnaires back. The participating users were given four weeks for complete the questionnaires.

5. The questionnaires were returned 174 questionnaires out of 190 questionnaires yielding the overall response rate of 91.57%.

3.6 Data Analysis

1. The researcher checked the completeness of all returned questionnaires and encoded them. The return questionnaires were 165 questionnaires out of 190 questionnaires were completed yielding the overall response rate of 86%.

2. The data from the questionnaire were processed using Microsoft Excel program first and data were cleaned using double-checked.

3. Data were analyzed using a statistical software to analyze and test research hypothesis as follows:

3.1 User characteristics such as gender, age, unit of working, working position, education, professional occupation, computer experience, computer learning, hospital information system training, and period of system usage were analyzed by using frequency distributions, percentages, means, and standard deviations for described demographic of users.

3.2 Computer knowledge, attitude toward hospital information system, user participation and user satisfaction were analyzed by using range, percentages, means, and standard deviations.

3.3 The relationships between independent and dependent variables were analyzed as follow:

3.3.1 The relationships between user characteristics such as gender, computer experience, computer learning, hospital information system training were analyzed by using Chi-Square tests.

3.3.2 The relationships between user characteristics such as age, period of system usage, computer knowledge, attitude toward hospital information system, user participation and user satisfaction were analyzed by using partial correlation coefficient.

3.3.3 All statistical testing was set on 0.05 statistical significant levels. The level of correlation used in this study was based on Pearson's Product Moment Correlations. The values of Pearsons' Correlation coefficient was interpreted as follows (Antonius, 2003: 149);

0.00-0.30	means very weak positive correlations
0.40-0.80	means strong positive correlations
0.90-1.00	means perfect positive correlations

CHAPTER IV
RESULTS

The main purposes of this study were to study information system success by investigating the dimensions of user satisfactions level and to find the association between user characteristics, computer knowledge, attitude toward HIS, user participation, and user satisfactions on Hua-Hin HIS. One hundred and ninety subjects were selected using simple random sampling from November to December 2007. Results were data from 165(86.8%) of 190 returned questionnaires as presented in six sections below.

Section 1 Characteristics of users in Hua-Hin HIS, Nov. – Dec. 2007

Section 2 Computer knowledge of users in Hua-Hin HIS, Nov. – Dec. 2007

Section 3 Attitude of users in Hua-Hin HIS, Nov. – Dec. 2007 toward Hua- Hin HIS

Section 4 Participation of users in Hua-Hin HIS, Nov. – Dec. 2007

Section 5 User satisfaction on Hua-Hin HIS, Nov. – Dec. 2007

Section 6 Association between user Characteristics, computer knowledge, user attitude, user participation and user satisfaction on Hua-Hin HIS, Nov.-Dec. 2007

Section 1 Characteristics of users in Hua-Hin HIS, Nov. – Dec. 2007

Table 1 shows characteristics of users in Hua-Hin HIS who returned the questionnaires. About 90 percent of them were females. The average age was about 35 years and about three-quarters aged between 26-45 years. Most of them had been working as practitioners and about 70 percent had bachelor degree. About 60 percent were nurses, about 35 percent were pharmacists, technicians and others, and about 9 percent were dentists and doctors.

Table 1 Characteristics of users in Hua-Hin HIS, Nov. - Dec. 2007

Characteristics	Number (n=165)	Percent
Gender		
- male	19	11.5
- female	146	88.5
Age, years		
- less than 25	19	11.5
- 26 - 35	74	44.8
- 36 - 45	50	30.3
- 46 - 55	22	13.3
- Mean = 34.6 years, S.D.= 8.3, Min-max = 19 - 55		
Educational level		
- Undergraduate	40	24.2
- Bachelor Degree	114	69.1
- Master Degree	11	6.7
Working position		
- Managers	14	8.5
- Practitioners	151	91.5
Professional Occupation		
- Doctor	5	3.0
- Dentists	9	5.5
- Pharmacists	12	7.3
- Nurses	94	57.3
- Technicians	10	6.1
- Others	35	21.2

Most of them reported ever had been learning and using computers at time of filling the questionnaire. About 90% had duration to used computer less than 5 to ten years with mean of 5.6±4.8 years. Most of them had duration to learned computer less than 25 to 50 hours, median 14 hours. However about two-thirds had never been trained about hospital information system. About 46% had been using HIS in the previous 12 months, about 25 % had been using HIS 13-36 months and 28% reported had been using HIS for more than 37 months mean of 26.35±18.13 months (Table 2).

Table 2 Computer experience of users in Hua-Hin HIS, Nov. - Dec. 2007

Characteristics	Number (n=165)	Percent
Ever used Computer		
- no	17	10.3
- yes	148	89.7
Learning in computer		
- no	24	14.5
- yes	141	85.5
Length of computer used, years		
- less than 5	79	47.9
- 6 - 10	70	42.4
- 11 - 15	9	5.5
- 15 - 20	7	4.2
- Mean = 5.6, S.D.= 4.8, Min-Max = 0-20		
Length of computer learn, hours		
- less than 25	138	83.6
- 26 - 50	20	12.1
- 51- 75	4	2.4
- 76 - 100	1	.6
- more than 100	2	1.2
- Median = 14.1hours	10	6.1
Had been trained in Hua-Hin HIS		
- no	105	63.6
- yes	60	36.4
Length of Hua-Hin HIS use, months		
- less than 12	76	46.1
- 13 - 24	21	12.7
- 25 - 36	22	13.3
- more than 37	46	27.9
- Mean =26.35, S.D.=18.13		

Section 2: Computer knowledge of users in Hua-Hin HIS, Nov.-Dec.2007

The computer knowledge among users in Hua-Hin HIS, was scored ranged from 4 to 18 with an average of 11.81±2.7. More than three-quarters had moderate level of computer knowledge and less than 5% had high level of computer knowledge as shown in Table 3.

Table 3 Computer knowledge level of users in Hua-Hin HIS, Nov.-Dec.2007

Factors	Number (n=165)	Percent
Computer Knowledge		
0 - 9	30	18.2
10 - 15	127	77.0
more than 15	8	4.8
Mean = 11.8, S.D.= 2.7, Min-Max = 4-18		

Section 3: Attitude of users in Hua-Hin HIS, Nov.-Dec.2007

The attitude of users toward Hua-Hin HIS was scored ranged from 2 to 5 with an average of 3.69. Nearly half had neutral attitude 2.34 – 3.66, and nearly half had positive attitude 3.67 – 5.00 as shown in Table 4.

Table 4 Attitude level of users in Hua-Hin HIS, Nov.-Dec.2007

User attitude	Number (n=161)	Percent
score		
- 1.00 - 2.33	2	1.2
- 2.34 - 3.66	79	49.1
- 3.67 - 5.00	80	49.7
- Mean = 3.69, S.D.= 0.62, Min-Max = 2-5		

Section 4 Participation of users in Hua-Hin HIS, Nov.-Dec.2007

The participation of users in Hua-Hin HIS, Nov.-Dec.2007 was scored ranged from 0.21 to 2.43 with an average of 1.02. Nearly 60%, had low-level participation, and 37% had moderate level participation, less than 5% had high level score as shown in Table 5.

Table 5 Participation level of users in Hua-Hin HIS, Nov.-Dec.2007

User Participation	Number (n=165)	Percent
score		
- 0.00 - 1.00	96	58.2
- 1.01 - 2.00	61	37.0
- 2.01 - 3.00	8	4.8
- Mean = 1.02, S.D.= 0.46, Min-Max = 0.21 - 2.43		

The participation in decision of users in Hua-Hin HIS, Nov.-Dec.2007 was scored ranged from 1.00 to 3.00 scores with an average of 1.19. About 90%, had low-level participation in decision, and 11% had moderate level participation in decision, less than 5% had high level score as shown in Table 6.

Table 6 Participation in decision level of users in Hua-Hin HIS, Nov.-Dec.2007

Factors	Number (n=165)	Percent
User Participation in decision		
- 0.00 - 1.00	140	84.8
- 1.01 - 2.00	19	11.5
- 2.01 - 3.00	6	3.6
- Mean = 1.19, S.D.= 0.47, Min-Max = 1.00 - 3.00		

The participation in implementation of users in Hua-Hin HIS, Nov.-Dec.2007 was scored ranged from 1.00 to 3.00 scores with an average of 1.56. About half of them had low-level participation in implementation, and moderate level

participation, less than 5% had high-level participation in implementation, as shown in Table 7.

Table 7 Participation on implementation level of users in Hua-Hin HIS, Nov.-Dec.2007

Factors	Number (n=165)	Percent
User Participation in implementation		
- 0.00 - 1.00	79	47.9
- 1.01 - 2.00	79	47.9
- 2.01 - 3.00	7	4.2
- Mean = 1.56, S.D.= 0.57, Min-Max = 1.00 - 3.00		

The participation in benefits of users in Hua-Hin HIS, Nov.-Dec.2007 was scored ranged from 1.00 to 3.00 scores with an average of 1.78. More than half, had moderate level participation in benefit, and 30% low-level participation in benefit, More than 10% had high level, as shown in Table 8.

Table 8 Participation in benefits level of users in Hua-Hin HIS, Nov.-Dec.2007

Factors	Number (n=165)	Percent
User Participation in benefits		
- 0.00 - 1.00	57	34.5
- 1.01 - 2.00	87	52.7
- 2.01 - 3.00	21	12.7
- Mean = 1.78, S.D.= 0.65, Min-Max = 1.00 - 3.00		

The participation in evaluation of users in Hua-Hin HIS, Nov.-Dec.2007 was scored ranged from 1.00 to 3.00 scores with an average of 1.10. More than 90% had low-level participation in evaluation, and 5% moderate level participation, less than 3 % had high-level participation, as shown in Table 9.

Table 9 Participation in evaluation level of users in Hua-Hin HIS, Nov.-Dec.2007

Factors	Number (n=165)	Percent
User Participation on evaluation		
- 0.00 - 1.00	152	92.1
- 1.01 - 2.00	9	5.5
- 2.01 - 3.00	4	2.4
- Mean = 1.10, S.D.= 0.38, Min-Max = 1.00 -3.00		

Section 5: User Satisfaction on Hua-Hin HIS, Nov.-Dec. 2007

The satisfaction among users in Hua-Hin HIS, Nov.-Dec. 2007 was scored ranged from 1.13 to 4.0 scores with an average of 2.81. More than 80 % of them had average level of satisfaction; however about 14 % had low level and less than 3% of them had high level of satisfaction as shown in Table 10.

Table 10 Satisfaction level of users in Hua-Hin HIS, Nov.-Dec. 2007

Factors	Number (n=165)	Percent
User Satisfaction		
- 1.00 - 2.33	24	14.5
- 2.34 - 3.66	137	83.0
- 3.67 - 5.00	4	2.4
- Mean = 2.81, S.D.= 0.47, Min-Max = 1.13 - 4.09		

The score of satisfaction on information quality among users in Hua-Hin HIS, Nov.-Dec. 2007 ranged from 1.0 to 4.63 scores with an average of users 2.89±.65. About 70 % of them had average level of satisfaction on information quality, about 17 % had low level and less than 10% of them had high level of satisfaction quality as shown in Table 11.

Table 11 Information Satisfaction level of users in Hua-Hin HIS, Nov.-Dec. 2007

Factors	Number (n=165)	Percent
Satisfaction on information quality of user		
- 1.00 - 2.33	28	17
- 2.34 - 3.66	121	73.3
- 3.67 - 5.00	16	9.7
- Mean = 2.89, S.D.= 0.65, Min-Max = 1.00 - 4.63		

The score of satisfaction on system quality among users in Hua-Hin HIS, Nov.-Dec. 2007 ranged from 1.24 to 4.06 scores with an average of users 2.75±.47. About 70 % of them had average level of satisfaction on system quality, and about 20 % had low level and less than 2% of them had high level of satisfaction on system quality as shown in Table 12.

Table 12 System Satisfaction level of users in Hua-Hin HIS, Nov.-Dec. 2007

Factors	Number (n=165)	Percent
Satisfaction on system quality of user		
- 1.00 - 2.33	33	20
- 2.34 - 3.66	130	78.8
- 3.67 - 5.00	2	1.2
- Mean = 2.75, S.D.= 0.47, Min-Max = 1.24 - 4.06		

The score of satisfaction on service quality among users in Hua-Hin HIS, Nov.-Dec. 2007 ranged from 1.0 to 4.43 scores with an average of users 2.87±.58. Nearly 80 % of them had high level of satisfaction on service quality, however about 18 % of them had low level of satisfaction as shown in Table 13.

Table 13 Service Satisfaction level of users in Hua-Hin HIS, Nov.-Dec. 2007

Factors	Number (n=165)	Percent
Satisfaction on service quality of user		
- 1.00 - 2.33	31	18.8
- 2.34 - 3.66	0	0
- 3.67 - 5.00	134	81.2
- Mean = 2.87, S.D.= 0.58, Min-Max = 1.00 - 4.43		

Section 6: Association between user characteristics, computer knowledge, user attitude, user participation and user satisfaction on Hua-Hin HIS, Nov.-Dec. 2007

The relationship between user characteristics (such as gender, working unit, department unit, working position, education level, professional occupation, computer used, computer learned, system training) and user satisfaction level on Hua-Hin HIS, Nov-Dec. 2007, by chi-squared test. The result found system training association with user satisfaction significantly. The user who had system training had high-level of satisfaction more than these who did not have system training about 20%, as shown in Table 14.

Table 14 The relationship between system training and satisfaction level of users in Hua-Hin HIS, Nov.-Dec. 2007(n=165)

System Training	User Satisfaction Level					
	Low	Moderate	High	Total	χ^2	p.
No	18 (17.1%)	78 (74.3%)	9 (8.6%)	105 (100%)	14.75	0.001
Yes	6 (10.0%)	35 (58.3%)	19 (31.7%)	60 (100%)		
Total	24 (14.5%)	113 (68.5%)	28 (17.0%)	165 (100%)		

Note: Significant $\alpha = 0.05$, Chi-Squared = 14.75, df = 2, p = 0.001

The analysis on the relationship between system used, and user satisfaction on Hua-Hin HIS**,** Nov.-Dec. 2007, by chi-squared test. The result shows computer use was not association with user satisfaction. However, the user who had computer use had higher-level on satisfaction than those who did not have computer use about 5 %, as shown in Table 15.

Table 15 The relationship between computer used and satisfaction level of users in Hua-Hin HIS, Nov.-Dec. 2007(n=165)

Computer used	**User Satisfaction Level**					
	Low	**Moderate**	**High**	**Total**	χ^2	**p.**
No	3 (17.6%)	12 (70.6%)	2 (11.8%)	17 (100%)	.44	0.802
Yes	21 (14.2%)	101 (68.2%)	26 (17.6%)	148 (100%)		
Total	24 (14.5%)	113 (68.5%)	28 (17%)	165 (100%)		

Note: Significant $\alpha = 0.05$, Chi-Squared = 0.44, df = 2, p = 0.802

The analysis on the relationship between computer learned, and user satisfaction on Hua-Hin HIS**,** Nov.-Dec. 2007, by chi-squared test. The result shows computer learned was not association with user satisfaction. However, the user who had computer learned was high-level user satisfaction more than the user who did not have computer learned 10%, as shown in Table 16.

Table 16 The relationship between computer learned and satisfaction level of users in Hua-Hin HIS, Nov.-Dec. 2007(n=165)

Computer learned	User Satisfaction Level				χ^2	p.
	Low	Moderate	High	Total		
No	3	19	2	24	1.78	0.410
	(17.6%)	(79.2%)	(8.3%)	(100%)		
Yes	21	94	26	141		
	(14.2%)	(66.7%)	(18.4%)	(100%)		
Total	24	113	28	165		
	(14.5%)	(68.5%)	(17%)	(100%)		

Note: Significant $\alpha = 0.05$, Chi-Square = 1.78, df = 2, p = 0.410

The analysis on the relationship between system used, and user satisfaction on Hua-Hin HIS**,** Nov.-Dec. 2007, by chi-squared test. The result shows system used was not association with user satisfaction. However, the user who had system used was high-level user satisfaction in the first year and was moderate level satisfaction was subside in the third year, as shown in Table 17.

Table 17 The relationship between system used and satisfaction level of users in Hua-Hin HIS, Nov.-Dec. 2007(n=165)

System used	User Satisfaction Level				χ^2	p.
	Low	Moderate	High	Total		
< 12 months	6	68	2	76	9.45	0.150
	(7.9%)	(89.5%)	(2.6%)	(100%)		
13-24 months	3	18	0	21		
	(14.3%)	(85.7%)	(0%)	(100%)		
25-36 months	7	14	1	22		
	(31.8%)	(63.6%)	(4.5%)	(100%)		
> 37 months	8	37	1	46		
	(17.4%)	(80.4%)	(2.2%)	(100%)		
Total	24	137	4	165		
	(14.5%)	(83%)	(2.4%)	(100%)		

Note: Significant $\alpha = 0.05$, Chi-Square = 9.45, df = 6, p = 0.150

The analysis on the relationship between computer knowledge, attitudes of user, participation of user and user satisfaction on Hua-Hin HIS**,** Nov.-Dec. 2007, by the Pearson's Product Moment Correlation Coefficient. We found the weak positive correlation, between attitudes of user and user satisfaction was statistically significant ($r = 0.301$, p-value < 0.01) and between participation of user and user satisfaction was statistically significant ($r = 0.364$, p-value < 0.01) as shown in Table 18.

Table 18 The Pearson's Product Moment Correlation Coefficient between attitudes of user, participation of user with user satisfaction (n=165)

Factors	Correlation Coefficient Value	P-value
Attitude of user	0.301**	0.001
Participation of user	0.364**	0.001

** *Correlation is significant at α = 0.01 Level 2-tailed*

The analysis on the relationship between users, participation on decision, on implement, on benefit and on evaluation with user satisfaction on Hua-Hin HIS**,** Nov.-Dec. 2007, by the Pearson's Product Moment Correlation Coefficient. The analysis found the weak positive correlation, between user participation on decision and user satisfaction was statistically significant ($r = 0.243$, p-value < 0.01), between user participation on implement and of user satisfaction was statistically significant ($r = 0.198$, p-value < 0.05), between user participation on benefit and of user satisfaction was statistically significant ($r = 0.381$, p-value < 0.01), and between user participation on evaluation and user satisfaction was statistically significant ($r = 0.283$, p-value < 0.05) as shown in Table 19.

Table 19 Pearson's Product Moment Correlation Coefficient between participation of user with user satisfaction on Hua-Hin HIS**,** Nov.-Dec. 2007 (n=165)

Factors	Correlation Coefficient Value	P-value
Participation of user	0.364**	0.001
- Participation in decision	0.243**	0.002
- Participation in implementation	0.198*	0.012
- Participation in benefit	0.381**	0.001
- Participation in evaluation	0.283**	0.001

*** Correlation is significant at α = 0.01 Level 2-tailed*

** Correlation is significant at α = 0.05 Level 2-tailed*

CHAPTER V
DISCUSSION

This study was aimed to study Hua-Hin HIS success. The purposed of this study were to measure user satisfaction level and to find the association between user characteristics, computer knowledge, attitude toward HIS, user participation, and user satisfactions on Hua-Hin HIS. The participant were the users who had used Hua-Hin HIS at least six months. The study results are discussed as follows:

5.1 User's characteristics factors

5.2 User's computer knowledge factors

5.3 User's attitude factors

5.4 User's participation factors

5.5 User's satisfaction factors

5.1 User's characteristics factor

The Research Hypotheses 1: User's characteristics related to user satisfaction in Hua-Hin Hospital Information System.

***From the Research Hypotheses 1*:** found that user's characteristics that consist of gender, age, education level, working position, professional occupation, computer experience and computer learning did not association with user satisfaction. Where as, training in HIS was correlated with user satisfaction.

Gender, age, working position, professional occupation, education level computer experience, computer-learning found not relationship between user satisfaction that consist of the study of Igbaria (1990).

This study found HIS training was correlated user satisfaction. This result was consistent with the study of Guimaraes, Igbaria and Lu (1992), confirms that user training is directly related to user satisfaction, and believed

that training program are likely to increase user confidence and the ability to use computers. The lack of training is a major reason for information system lack of success [Bergersen, 183). Furthermore, training has been suggested as an important means of improving computer self-efficacy (Torkzadeh, 1999: 190). Training has been seen to be an important method to increase IS usage and to improve abilities to use IS. The impact of training on the usage skills has been assumed so direct, that it has been used even as surrogate for skills (cite in T. Auer (1988).

Computer experience: The results from the study found user computer experience did not associate with user satisfaction. The researcher expected that the users who more computer experience and computer learning would satisfaction on Hua-Hin HIS. Alavi and Joachimsthaler (1992) found about the important of experience as a factor affecting information system success. The Yield Shift theory is the satisfaction response that defined as a valenced affective arousal with respect to some object that has reference to some state or outcome desired by individual. The satisfaction response is a single construct that encompasses both positive feelings, commonly called satisfaction, and negative feelings, commonly called dissatisfaction (Briggs and Vreede, 2008). The study of Bandura (1982, 1986) found computer experience increase users' sense of self-efficacy related to computer. Computer experience may also more directly indicate an individual interest in computers and motivation to participate. There may also be social pressure in the work environment for participation of more experienced people. It is possible that none of user computer experiences is equal in their ability to participate meaningfully with in the information system, and the number of user computer experience to participate in Hua-Hin HIS is too small. If the number of user computer experience more participative in Hua-Hin HIS we assumed the experience should be affect positively end user satisfaction.

5.2 User's computer knowledge factors

The Research Hypotheses 2: Computer knowledge related to user satisfaction in Hua-Hin Hospital Information System

From the research hypothesis 2: found computer knowledge of users in Hua-Hin HIS found that 77% of the users were at moderate level of computer knowledge. About 18% had low level. It indicate that the overall computer knowledge of the user still need to be improved and the score for understanding computer processing and the structure of database was at low level. This result consist Kijsanayothin B. (2006) had surveyed health information technology of health center in Thailand to evaluated IT knowledge found 76 % of total responsedents had moderate level of IT knowledge mean±SD = 13.24±4.47 (Kijsanayotin, 2006). Whare as, in this study the computer knowledge of user were 11.8±2.7. Moreover, Liu JE et al (2000) who study in Beijing Medical University to assess the computer knowledge, attitude, and skill of nurse in the hospital, the study found that the overall computer knowledge and skills of nurses were at moderate levels (Liu, 2000: 191).

However, the research expected that computer knowledge should correlate with user satisfaction since the user who had good computer knowledge usually understand in technical term and computer system. Besides, they can make the smooth communication between the system programmer and other user. Those are more support the user participation and increase user satisfaction. Havelka (2002), state that the user who had computer literate they should understand in computers, software, and technology in general. If users are more computer literate, communication between IS personal and user may increase because the users can understand some of the computer jargon. In addition, as computer literacy increases users may be more likely to accept new technology. The result in this study shown that Computer knowledge did not associate with user satisfaction. It is possible that the user had low participation in HIS (table 5) especially the participation in decision and participation in evaluation (table 6 and table 9).

5.3 User's attitude factors

The Research Hypotheses 3: User attitude related to user satisfaction in Hua-Hin Hospital Information System.

***From the Research Hypotheses 3*:** found that user attitude toward Hua-Hin HIS related to user satisfaction (r =0.301, p-value < 0.01). Based on user attitude among users in Hua-Hin HIS found 49.1% of users were neutral and 49.1% were positive attitude, however about 1.2% had negative. This result was consist of the study of Kailash Joshi (1992) that found some alternate causal path models of user information satisfaction involving traditional factors such as quality of information products, since the user concern on data processing of hospital information system to get information quality for decision making on their patient. This may due to the most of user in this studied had moderate satisfaction on information quality, system quality and service quality. Furthermore, attitude toward IS has been found to be important with respect to the way individual utilized IT and skills. Therefore, favorable attitudes are assumed to increase both IS usage and skills. IS usage is antecedent of user satisfaction as Delone & McLean's Model success 2003. In addition, Davis et al (1989) who developed Technology Acceptant Model (TAM) has been used user attitudes toward IS and intention to use to predict user behavior on IS. This results indicated that user with neutral and positive attitude toward IS were satisfaction and accepted on Hua-Hin HIS.

5.4 User's participation factors

The Research Hypotheses 4: User participation related to user satisfaction in Hua-Hin Hospital Information System.

From the Research Hypotheses 4: found that the overall of user participation in Hua-Hin HIS related to user satisfaction (r =0.364, p-value < 0.001). Moreover user participation in decision (r = .245, p-value = 0.002), participation in implement (r = .198, p-value = 0.012), participation in benefit (r = .381, p-value = 0.001) and participation in evaluation (r = .283, p-value = 0.001) was correlated with user satisfaction. Based on user's participation in Hua-Hin HIS found about 95% had low to moderate participation**.** Especially, about 84% of them had low-level participation in decision and 92% had low participation in evaluated on Hua-Hin HIS.

It is possible that about 91% of users are practitioners, and they are not opportunity to meeting or comment in the decision and evaluations on Hua-Hin HIS. However, about 47% had low-level and 47% had moderated participation in implement on Hua-Hin HIS. It is possible that most of users are practitioners who are representative perform directly in Hua-Hin HIS, and they has amount of time spent on the activities in Hua-Hin HIS. The user participation in benefit on Hua-Hin HIS found about 52% had moderate participation that may be the user's responsibility and user attitude concerning to use Hua-Hin HIS and take advantage in their work. As, Mumford, (1971, 1983) is the best-known socio-technical approach to system development. User participation in ETHICS is largely argued on ethical reasons, as the right of user to control their own destinies also in the work situation. The socio-technical approach is assumed to contribute to effective organizational change (cited in Iivari & Igbaria, 1997).

5.5 User's satisfaction factors

The overall of user satisfaction on Hua-Hin HIS had 83% at average level of satisfaction, about 14% had low and 2% had high level of satisfaction. This was probably because the user was evaluated qualitative outcome rather than focus on quantitative. Mostly of them moderate satisfaction on system quality same as service quality (78.8%), and moderate satisfaction on information quality (73.3%).That might be the policy of Hua-Hin HIS was focus on quality which was the important of the HIS successes and due to the system is small, not complexity. This result indicated the satisfaction response (the respect) of user on Hua-Hin HIS as Briggs & Reinig (2008) had study on Yield Shift theory state the satisfaction response is a single construct that encompasses both positive feelings, commonly called satisfaction and negative feelings called dissatisfaction. Satisfaction and dissatisfaction are not to ends of continuum with a neutral point in the middle. The Delone & McLean's Model 2003 state user satisfaction compose of information quality, system quality and service quality which correlation with user satisfaction as: Information quality ($r = .873$, p-value = 0.0001), system quality ($r = .928$, p- value = 0.0001), and service quality ($r = .745$, p- value = 0.0001)

The limitation of this research

The limitations for this study were required comment such as:

1. This study was conducted in Hua-Hin HIS only and the data collections were collected from the user and some factor that – related to user.

2. It should be studied on user's need of data from the user outside Hua-Hin Hospital in each level it might be complete such as collected data from chiefs information officer of Ministry of Public Health, Regional Public Health inspector, Public Health provincial officer, programmer, chiefs financial officer etc.

3. The sampling should use a cluster sampling on users who had well training, user who had computer literacy or user who had been HIS user for long time.

4. The instrument should be clear or describe clear definitions for user understanding or in depth interview.

5. The study may be cohort study for observe the change of Hua-Hin HIS.

The strength of this research

This study had been raised for very well cooperation from users with high response of returned filled questionnaires. The study on hospital information system success by investigating of user satisfactions in Hua-Hin hospital should have key findings from the study that should challenge the information system manager or the user to raise user satisfaction to high level for the success of hospital information system in the future.

CHAPTER VI
CONCLUSION

This study was a cross-sectional survey research, which aimed to study Hua-Hin HIS success by measuring user satisfaction level and to find the association between user characteristics, computer knowledge, attitude toward HIS, user participation and user satisfactions on Hua-Hin HIS among 190 users who had used Hua-Hin HIS for more than six months with high response rate at 86.8 percents.

There were key findings that could lead to conclusions and recommendations as described as follow.

Conclusion

Most of users in Hua-Hin HIS were females with average age of 34.6 years. More than half had bachelor degree or lower. Most of them were working as practitioners, more than half were nurses and others were pharmacists, technicians, dentists, doctors and others. Half of them ever had been using computer and learning computer with average duration of computer use about 5.6 years. However, two-thirds had never been trained in HIS and half had been using HIS in the previous 12 months with mean of 26 months.

Since about two – thirds never been trained in the class of Hua-His HIS but they can worked on Hua-Hin HIS by the other user who has experienced and well trained in Hua-His HIS. Therefore, it is recommended to have training in HIS among those who never had this training.

The result of computer knowledge level, two-thirds of them were in moderate level. About 85% of user had computer learning experienced, it can be explained that the user who are nurse had knowledge gained from learning in the classroom instruction in the subject of information technology; the other user had

knowledge from learning in computer program that they have interested in the others computer program.

The result of user attitude level, about of them had neutral and about half had positive attitude with mean 3.7. It is possible that the ages of the user are different. This can be seen that about 43% of user had age between 36-55 years; who are in baby boomer age who had not change habit sometimes been seen as conservatives where as about 55% of them had age between 19-35 years; who are in generation x, they had risk habit, willing to change and use technology to work well.

The result of user participation level found nearly 60 % were in low level, and 37% were in moderate level with average of 1.02. About 84.8% of user participation in decision was in low level with mean of 1.19. About 47.9% of user participation in implementation was in low to moderate level with mean of 1.56. More than 50% had moderated level and 34% had low-level participation in benefit, with average of 1.78. About 92% of user participation in evaluation was in low level, with average of 1.10. Since there are only 14 person of the user who had participation in evaluation the HIS were the managers.

The result of user satisfaction level, about more than 80% had moderate level, about 14% had low level and less than 3% had high level with average of 2.81. User satisfaction level on information system found 73% had moderate level, about 17% had low level and less than 10% had high level with mean 2.89. User satisfaction level on system quality, nearly eighty percent had moderate level, about 20% had low level, and less than 2% had high level with average 2.75. User satisfaction level on service quality, more than eighty percent had high level, about 18% had low level with average 2.81.

The analysis of association between user characteristic factors found significant relationship between system training (χ^2 = 14.75, p-value = 0.001), duration of system used (r = -.187, p-value < 0.05). The relationship between computer knowledge, user attitude, user participation and user satisfaction found significant relationship between user attitudes (r = .301, p-value < 0.01), user participation (r = .364, p-value < 0.01) and user satisfaction.

Recommendations

Recommendations based on the findings of this study.

1. The user perceived participation in information system with low level that meant user had less activity to participation, the manager should motivate the user through strategic plan of Hua-Hin hospital that could be enhanced to increase participation in decision, implementation, benefit and evaluation to increase positive user satisfaction in Hua-Hin HIS.

2. The user in Hua-Hin HIS should be trained by experienced users as facilitators on HIS development. This would help to increase user attitude on and user participation to use Hua-Hin HIS. This might allow users to feel free to use and have increased the HIS ownership and result in higher user satisfaction and might lead to higher user positive attitude.

Recommendation for further researches

1. There are other variables that might be related to information system success from the other perspective or approaches such as social factors, or technical factors as well as organization context should be examined in other future studies.

2. The other methodology to study hospital information system success would be considered for investigating user satisfactions in Hua-Hin hospital such as in-depth interview or focus group discussion with the users that might obtain more qualitative information on the success of hospital information system. Moreover, other methodology such as a cohort study might be suggested to be performed to measure the success of hospital information system through user who had involved in HIS for along time in order to make all result more realistic.

3. This research was conducted only in Hua-Hin hospital; it should be studied at other hospital in different size or level to examine the differences of the success of HIS in other size. It could be beneficial in planning and developing the success of HIS at national level.

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APPENDICES

APPENDIX A
THE NAME OF THE EXPERT WHO EXAMINED THE RESEARCH INSTRUMENT

1. Assoc. Prof. Dr. Chardsumon Prutipinyo
2. Dr. Suchitra Ninlerd
3. Mr. Punnavit Wongwiwattananont

APPENDIX B

DOCUMENT OF ETHICAL CLEARANCE

COA. No. MU-IRB 2008/206.2511

Documentary Proof of Mahidol University Institutional Review Board

Title of Project. The Relationship between user Characteristics, Participation and user Satisfaction of Information System in Hua-Hin Hospital: Case Study (Thesis for Master Degree)

Principle Investigator. Miss Sirima Sangsuwan

Name of Institution. Faculty of Public Health

Approval includes. Annual Report version received date 7 November 2008

Mahidol University Institutional Review Board is in full compliance with International Guidelines for Human Research Protection such as Declaration of Helsinki, The Belmont Report, CIOMS Guidelines and the International Conference on Harmonization in Good Clinical Practice (ICH-GCP)

Date of Renewal (1st). 10 October 2008

Date of Expiration. 9 October 2009

Signature of Chairman. .....
(Professor Shusee Visalyaputra)

Signature of Head of the Institute. .....
(Associate Professor Sansanee Chaiyaroj)
Vice President for Research and Academic Affairs

Office of the President, Mahidol University, 999 Phuttamonthon 4 Rd., Salaya, Phuttamonthon District, Nakhon Pathom 73170. Tel. (662) 8496223-5 Fax. (662) 8496223

APPENDIX C

แบบสอบถาม

คำชี้แจง เพื่อให้การประเมินความพึงพอใจของผู้ใช้ระบบสารสนเทศโรงพยาบาลหัวหิน ใกล้เคียงความเป็นจริงมากที่สุดขอให้ท่านปฏิบัติดังนี้

1. โปรดตอบคำถามแต่ละข้อให้ใกล้เคียงความเป็นจริงที่สุด
2. หากมีข้อความบางข้ออาจไม่ตรงกับความรู้สึกของท่าน ขอให้เลือกคำตอบที่ใกล้เคียงความรู้สึกของท่านมากที่สุด
3. คำตอบทุกคำตอบของท่านมีความสำคัญ และเป็นประโยชน์ต่อท่านและต่อการพัฒนาระบบเทคโนโลยีสารสนเทศของโรงพยาบาลหัวหิน ให้มีประสิทธิภาพต่อไป
4. แบบสอบถามนี้มี 10 หน้า แบ่งเป็น 5 ส่วน คือ

ส่วนที่ 1 ข้อมูลพื้นฐานทั่วไปของผู้ใช้ระบบ จำนวน 10 ข้อ
ส่วนที่ 2 วัดความรู้และทักษะด้านคอมพิวเตอร์ จำนวน 20 ข้อ
ส่วนที่ 3 การวัดทัศนคติของผู้ใช้ระบบ จำนวน 14 ข้อ
ส่วนที่ 4 การวัดการมีส่วนร่วมของผู้ใช้ระบบ จำนวน 14 ข้อ
ส่วนที่ 5 การวัดความพึงพอใจของผู้ใช้ระบบ จำนวน 32 ข้อ

ขอขอบคุณที่ให้ความร่วมมือในการตอบแบบสอบถาม

แบบสอบถามเลขที่.....

ส่วนที่ 1 ข้อมูลทั่วไป

<u>คำชี้แจง</u> โปรดทำเครื่องหมาย ✓ ลงใน ☐ หน้าคำตอบ และ หรือเติมข้อความลงในช่องว่าง

1. เพศ

   ☐ 1. ชาย ☐ 2. หญิง

2. อายุ.....ปี (บริบูรณ์)

3. หน่วยงานที่ท่านปฏิบัติงาน ตึก.....ฝ่าย

4. ตำแหน่ง

   ☐ 1. ผู้บริหาร ☐ 2. ผู้ปฏิบัติงานประจำ

5. ระดับการศึกษาสูงสุด

   ☐ ปวช. ☐ ปวส.

   ☐ อนุปริญญา ☐ ปริญญาตรี หรือเทียบเท่า

   ☐ ปริญญาโท หรือเทียบเท่า ☐ สูงกว่าปริญญาโท

   ☐ อื่น ๆ โปรดระบุ.....

6. ท่านจบการศึกษาจากสายวิชาชีพใด

   ☐ แพทยศาสตร์ ☐ ทันตแพทยศาสตร์

   ☐ เภสัชศาสตร์ ☐ พยาบาลศาสตร์

   ☐ วิทยาศาสตร์การแพทย์ ☐ อื่น ๆ โปรดระบุ.....

7. ท่านมีประสบการณ์ในการใช้คอมพิวเตอร์

   ☐ 1. ไม่เคย ☐ 2. เคย ระยะเวลา.....เดือน.....ปี

8. ท่านเคยมีประสบการณ์ในการเรียนคอมพิวเตอร์เบื้องต้น

   ☐ 1. ไม่เคย ☐ 2. เคย ระยะเวลา.....ชั่วโมง

9. ท่านเคยได้รับการฝึกอบรมเกี่ยวกับการใช้ระบบสารสนเทศที่ใช้ในหน่วยงานของท่านหรือไม่

   ☐ 1. ไม่เคย ☐ 2. เคย

10. ท่านมีประสบการณ์การใช้งานระบบสารสนเทศโรงพยาบาลหัวหินนาน.....เดือน.....ปี

ส่วนที่ 2 ความรู้และทักษะด้านคอมพิวเตอร์

<u>คำชี้แจง</u> โปรดขีดเครื่องหมาย ○ ลงในข้อที่ท่านเห็นว่า **ถูกต้องที่สุด** เพียงข้อเดียว

1. Input, Processing, and Output และ Storage เป็นกระบวนการของเรื่องใด
   ก. วงจรของสารสนเทศ ข. วงจรในการประมวลผลสารสนเทศ
   ค. วงจรของข้อมูล ง. วงจรในการประมวลข้อมูล
2. โปรแกรมใดต่อไปนี้ช่วยให้โปรแกรมอื่นๆติดตั้งและทำงานได้อย่างราบรื่น
   ก. โปรแกรมไมโครซอฟท์เวิร์ด ข. โปรแกรมไมโครซอฟท์เอ็กซ์เซล
   ค. โปรแกรมระบบปฏิบัติการ ง. โปรแกรมเพาเวอร์พอยท์
3. คำว่า “ซอฟท์แวร์” เป็นชุดของการทำงานในเรื่องใด
   ก. ชุดของสารสนเทศ ข. ชุดของการจัดลำดับความสำคัญ
   ค. ชุดของ การประมวลผลคำ ง. ชุดของคำสั่งให้ทำงาน
4. อุปกรณ์ใดที่มีไว้เพื่อควบคุมแรงดันไฟฟ้าและจ่ายไฟสำรองให้ในขณะทำงานด้วยคอมพิวเตอร์แล้วไฟฟ้าดับ
   ก. USB ข. UPS
   ค. Hub ง. UPC
5. หากท่านเปิดเครื่องคอมพิวเตอร์แล้วเครื่องไม่ติดและไม่สามารถทำงานได้ท่านจะทำสิ่งใดเป็นอันดับแรก
   ก. ตรวจสอบ UPC ข. ตรวจสอบ USB
   ค. แจ้งเจ้าหน้าที่ IT ง. ตรวจสอบสายไฟของเครื่อง กับ Power Supply
6. หากท่านเปิดคอมพิวเตอร์ที่หน่วยงานของท่านแล้ว แต่ไม่สามารถเข้าทำงานในระบบสารสนเทศของโรงพยาบาลได้ท่านจะดำเนินการเบื้องต้นอย่างไร
   ก. ตรวจสอบกับหน่วยงานข้างเคียง ข. รอไปก่อนยังไม่ต้องทำอะไร
   ค. ตรวจสอบการเชื่อมต่อของสาย LAN ง. แจ้งหัวหน้าตึกของท่าน
7. ชื่อของโปรแกรมที่ท่านกำลังใช้งานอยู่จะปรากฏอยู่ในส่วนใดของ Window
   ก. Scroll Bar ข. Status Bar
   ค. Menu Bar ง. Title Bar
8. ท่านสามารถมองเห็นโปรแกรมการใช้งานที่ Minimize แล้วได้จากส่วนใดของ Window
   ก. Format Toolbar ข. Taskbar
   ค. Title bar ง. Menu bar

9. หากท่านจะทำการติดตั้งซอฟท์แวร์ของPrinterจะต้องเข้าไปที่ใดต่อไปนี้

ก. My Computer ข. Accessories

ค. System Tool ง. Control Panel

10. ท่านสามารถทำการเคลื่อนย้าย window ไปมาบน Desktop ได้โดย วิธีใด

ก. Click mouse ค้างที่แถบ Tool Bar แล้วลากไปในที่ต้องการแล้วปล่อย

ข. Click mouse ค้างที่ window แล้วลากไปในที่ต้องการแล้วปล่อย

ค. Click mouse ค้างที่แถบ Title Bar แล้วลากไปในที่ต้องการแล้วปล่อย

ง. Click mouse ค้างที่แถบ Menu Bar แล้วลากไปในที่ต้องการแล้วปล่อย

11. หากท่านต้องการเลื่อนหน้าจอขึ้น-ลง หรือเลื่อนไปทางซ้าย-ขวา ท่านต้องทำอย่างไร

ก. Click mouse ที่ลูกศร บริเวณแถบ Tool Bar แล้วเลื่อนตามที่ต้องการ

ข. Click mouse ที่ลูกศร บริเวณแถบ Scroll Bar แล้วเลื่อนตามที่ต้องการ

ค. Click mouse ที่ลูกศร บริเวณแถบ Status Bar แล้วเลื่อนตามที่ต้องการ

ง. Click mouse ที่บริเวณแถบ Task Bar แล้วเลื่อนตามที่ต้องการ

12. ประโยชน์ของ Screen Saver มีไว้เพื่อ….

ก. ความสวยงาม และเพลิดเพลิน ข. รักษาหน้าจอภาพ

ค. การพักผ่อนสายตา ง. การประหยัดไฟฟ้า

13. วิธีใดเป็นวิธีที่ถูกต้องในการปิดเครื่องคอมพิวเตอร์

ก. กดปุ่ม Off ที่เครื่องได้เลย ข. ดึงปลั๊กไฟออกจากเต้าเสียบได้เลย

ค. ปิดแฟ้ม ปิดโปรแกรมที่ใช้งาน ง. ข้อ ค. และไปที่ปุ่ม Start → Shut Down → OK

14. ปุ่ม **Ctrl** ที่ปรากฏอยู่บนคีย์บอร์ดมีลักษณะการใช้งานอย่างไร

ก. ใช้ในการสลับตัวอักษรเล็ก – ใหญ่ ข. ใช้ในการทำงานร่วมกับคีย์อื่น

ค. ใช้ในการสลับภาษาไทย – อังกฤษ ง. ใช้ในการยกเลิกการใช้งานในขณะนั้น

15. ในโปรแกรมประมวลผลคำท่านสามารถเปิดหรือ บันทึกแฟ้มได้จากที่ใด

ก. คำสั่งView → Drop down menu ข. คำสั่งFile → Drop down menu

ค. คำสั่งEdit → Drop down menu ง. คำสั่งFormat → Drop down menu

16. นายสมชายได้จัดทำเอกสาร 1 เรื่อง ไว้ตั้งแต่อาทิตย์ที่แล้ว ด้วยโปรแกรมประมวลผลคำ วันนี้ นายสมชายต้องการพิมพ์เอกสารดังกล่าว เขาจะต้องทำสิ่งใดก่อนจึงจะสั่งพิมพ์งานได้

ก. ไม่ต้องทำอะไร สั่งพิมพ์ได้เลย ข. ตรวจสอบกับเอกสารที่เขียนด้วยลายมือ

ค. จัดเก็บเอกสารเรื่องนั้น ง. ค้นคืนเอกสารเรื่องนั้น

17. ในการพิมพ์งานที่เป็นตัวเลขโดยใช้คีย์บอร์ด ที่เป็นกลุ่มปุ่มตัวเลขและเครื่องหมายคำนวณ โดยการใช้โปรแกรมไมโครซอฟท์เอ็กซ์เซล หากท่านป้อนตัวเลขลงในเซลล์ไม่ได้ท่านจะทำสิ่งใดเป็นสิ่งแรก

ก. ตามช่างมาดู ข. หยุดใช้โปรแกรม

ค. ตรวจปุ่มแสดงสถานะNum Lock ง. แจ้งหัวหน้างานIT

18. ในกรณีที่ท่านมี Password สำหรับเข้าใช้งานระบบสารสนเทศโรงพยาบาล ในฐานะผู้ใช้ระบบท่านต้องทำอย่างไรเพื่อช่วยให้ระบบสารสนเทศของโรงพยาบาลมีความปลอดภัย

ก. Log in และ Log out ทุกครั้งที่เข้าใช้งาน ข. Log in แต่ไม่ต้อง Log outทุกครั้ง

ค. ใช้เฉพาะ Log out เท่านั้น ง. Log in และ Log out เป็นบางครั้ง

19. นาย ก. ต้องการตรวจสอบสิทธิในการรักษาพยาบาลของตนเอง หากเจ้าหน้าที่ประจำหน่วยให้บริการตรวจสอบสิทธิได้ตรวจสอบสิทธิให้แล้ว และได้หันหน้าจอคอมพิวเตอร์ไปให้นาย ก. ดู ท่านคิดว่ามีความเหมาะสมหรือไม่

ก. เหมาะสม เพราะเป็นการอำนวยความสะดวก

ข. ไม่เหมาะสม เพราะเป็นการรักษาสิทธิและรักษาข้อมูลความลับของผู้ป่วย

ค. ไม่เหมาะสม เพราะทำให้เสียเวลาในการให้บริการผู้ป่วยรายอื่น

ง. เหมาะสม เพราะเป็นการยืนยันที่ดี

20. โครงสร้างของฐานข้อมูลในระบบคอมพิวเตอร์มีการจัดเรียงตามลำดับชั้นในรูปแบบใด

ก. ไฟล์, เรกคอร์ด, ฟิลด์, ฐานข้อมูล ข. ฟิลด์, ไฟล์, เรกคอร์ด, ฐานข้อมูล

ค. ฟิลด์, เรกคอร์ด, ไฟล์, ฐานข้อมูล ง. เรกคอร์ด, ฟิลด์, ไฟล์, ฐานข้อมูล

ส่วนที่ 3 ทัศนคติของผู้ใช้ต่อระบบสารสนเทศ

<u>คำชี้แจง</u> โปรดขีดเครื่องหมาย ✓ลงในช่องว่าง ตามความคิดเห็นของท่านที่มีต่อระบบสารสนเทศของโรงพยาบาล

ข้อ	ข้อความคิดเห็น	ระดับความเห็นด้วย				
		น้อยที่สุด	น้อย	ปานกลาง	มาก	มากที่สุด
1.	การนำคอมพิวเตอร์มาใช้ในระบบสารสนเทศโรงพยาบาลมีความจำเป็น และมีความสำคัญอย่างยิ่ง					
2.	ระบบสารสนเทศโรงพยาบาลมีประโยชน์อย่างยิ่ง ในการสนับสนุนการบริหาร และการพัฒนาคุณภาพบริการของโรงพยาบาล					
3.	การจัดเก็บ/บันทึกข้อมูลเข้าสู่ระบบสารสนเทศโรงพยาบาลนับเป็นการเพิ่มงานของท่านอย่างยิ่ง					
4.	ระบบสารสนเทศช่วยทำให้ท่านเข้าใจ ถึงสภาพการณ์และผลการดำเนินงานของโรงพยาบาลได้อย่างชัดเจน					
5.	การที่ท่านใช้งานคอมพิวเตอร์ได้จะเป็นประโยชน์ต่องานระบบสารสนเทศโรงพยาบาลเป็นอย่างยิ่ง					
6.	ท่านคิดว่าการเก็บ/บันทึกข้อมูลลงในระบบสารสนเทศโรงพยาบาลไม่ใช่หน้าที่ของท่าน					
7.	ระบบสารสนเทศโรงพยาบาลมีประโยชน์เฉพาะผู้บริหารเท่านั้น					
8.	ระบบสารสนเทศโรงพยาบาลช่วยให้ท่านมีความพึงพอใจในการให้บริการผู้ป่วยมากขึ้น					
9.	ท่านรู้สึกว่าการนำคอมพิวเตอร์มาช่วยในการเก็บข้อมูลเป็นเรื่องที่มีความยุ่งยากมาก					
10.	การนำระบบสารสนเทศมาใช้จะช่วยลดขั้นตอนและลดความซ้ำซ้อนในการให้บริการ					
11.	ระบบสารสนเทศโรงพยาบาลช่วยเพิ่มประสิทธิภาพในการให้บริการของโรงพยาบาล					

ข้อ	ข้อความคิดเห็น	ระดับความเห็นด้วย				
		น้อยที่สุด	น้อย	ปานกลาง	มาก	มากที่สุด
12.	ระบบสารสนเทศโรงพยาบาลสร้างความสับสนในการรับบริการแก่ผู้ป่วย/ผู้มารับบริการ					
13.	การใช้คอมพิวเตอร์ช่วยให้งานด้านการสื่อสาร และข้อมูลข่าวสารเป็นไปอย่าง ถูกต้อง และรวดเร็ว					
14.	การนำระบบสารสนเทศโรงพยาบาลมาใช้ไม่ได้ช่วยให้ภาระงานของท่านลดลงเลย					

ส่วนที่ 4 การมีส่วนร่วมของผู้ใช้ระบบสารสนเทศ

<u>คำชี้แจง</u> โปรดขีดเครื่องหมาย ✓ลงในช่องว่างตามการรับรู้ของท่านต่อการมีส่วนร่วมในระบบสารสนเทศ

ข้อ	ข้อความคิดเห็น	ระดับการมีส่วนร่วม			
		ไม่มีส่วนร่วม	บางครั้ง	บ่อยครั้ง	ทุกครั้ง
1.	ท่านมีส่วนร่วมในการศึกษาปัญหาและความต้องการพัฒนาระบบสารสนเทศของโรงพยาบาล				
2.	ท่านมีส่วนร่วมในการแสดงความคิดเห็นถึงความสำคัญในการพัฒนาระบบสารสนเทศโรงพยาบาล				
3.	ท่านมีส่วนร่วมในการประชุมและตัดสินใจในการนำระบบเทคโนโลยีสารสนเทศมาใช้ในโรงพยาบาล				
4.	ท่านมีส่วนร่วมในการกำหนดสารสนเทศที่ท่านต้องการจากระบบสารสนเทศโรงพยาบาล				
5.	ท่านเข้ารับการอบรมถึงวิธีปฏิบัติ และเข้าใจวิธีการทำงานกับระบบสารสนเทศของโรงพยาบาล				
6.	ท่านเต็มใจให้ความร่วมมือในการจัดเก็บและบันทึกข้อมูลลงในระบบสารสนเทศโรงพยาบาลอย่างครบถ้วนทุกครั้ง				
7.	ท่านมีโอกาสในการชี้แจงปัญหาและข้อเสนอแนะปรับปรุงในการดำเนินงานระบบสารสนเทศ				
8.	ท่านให้ความร่วมมือในการดูแล และบำรุงรักษาเครื่องคอมพิวเตอร์ รวมทั้งอุปกรณ์ที่เกี่ยวข้อง ให้มีความปลอดภัยและพร้อมใช้งานอยู่เสมอ				
9.	ท่านภาคภูมิใจที่ได้มีส่วนร่วมในการดำเนินงานระบบสารสนเทศ ทำให้โรงพยาบาลสามารถวัดผลการดำเนินงานในแต่ละหน่วยงานของโรงพยาบาล (KPI) ได้ชัดเจนขึ้น				
10.	การมีส่วนร่วมในการดำเนินงานระบบสารสนเทศทำให้ท่านรู้สึกทำงานง่าย และเข้าใจระบบมากขึ้น				

ข้อ	ข้อความคิดเห็น	ระดับการมีส่วนร่วม			
		ไม่มีส่วนร่วม	บางครั้ง	บ่อยครั้ง	ทุกครั้ง
1.1	การมีส่วนร่วมในการดำเนินงานระบบสารสนเทศทำให้ท่านรู้สึกมีคุณค่าในตนเอง				
12.	ท่านมีส่วนร่วมในการกำหนดเกณฑ์การประเมินผลการดำเนินงานระบบสารสนเทศโรงพยาบาล				
13.	ท่านมีส่วนร่วมในการวิเคราะห์และประเมินผลการดำเนินงานระบบสารสนเทศโรงพยาบาล				
14.	ท่านมีส่วนร่วมในการเป็นกรรมการประเมินผลการดำเนินงานระบบสารสนเทศ				

ตอนที่ 5 ความพึงพอใจของผู้ใช้ต่อระบบสารสนเทศ

<u>คำชี้แจง</u> โปรดขีดเครื่องหมาย ✓ ลงในช่องว่างตามระดับความรู้สึกพึงพอใจของท่านต่อระบบสารสนเทศของโรงพยาบาล

ข้อ	ข้อความคิดเห็น	ระดับความเห็นด้วย				
		น้อยที่สุด	น้อย	ปานกลาง	มาก	มากที่สุด
1.	เนื้อหาของสารสนเทศที่ท่านได้รับจากระบบมีความถูกต้อง แม่นยำสูง					
2.	ระบบสารสนเทศสามารถผลิตสารสนเทศได้ทันเวลาที่ท่านต้องการ					
3.	สารสนเทศที่ท่านได้รับมีประโยชน์ต่อการตัดสินใจในการปฏิบัติงานของท่าน					
4.	สารสนเทศที่ท่านได้รับจากระบบมีความสมบูรณ์ครบถ้วน ทุกครั้ง					
5.	สารสนเทศที่ท่านได้รับมีรูปแบบในการนำเสนออย่างเหมาะสม					
6.	สารสนเทศที่ท่านได้รับจากระบบสารสนเทศมีความเป็นปัจจุบันเสมอ					
7.	สารสนเทศที่ท่านได้รับจากระบบมีความน่าเชื่อถือสูง					
8.	สารสนเทศที่ท่านได้รับมีความสอดคล้อง ตรงประเด็นตามท่านต้องการ					
9.	เครื่องคอมพิวเตอร์มีจำนวนเพียงพอที่จะสนับสนุนการทำงานในหน่วยงานของท่าน					
10.	เครื่องคอมพิวเตอร์ที่ใช้อยู่ปัจจุบันสามารถเพิ่มพื้นที่ฮาร์ดดิสได้					
11.	สถานที่จัดวางเครื่องคอมพิวเตอร์ เครือข่ายระบบสารสนเทศของโรงพยาบาลมีความเหมาะสมและสะดวกในการใช้งาน					
12.	โปรแกรมระบบงานในหน่วยงานของท่านตอบสนองความต้องการใช้งานของท่านได้ดี					

ข้อ	ข้อความคิดเห็น	ระดับความเห็นด้วย				
		น้อยที่สุด	น้อย	ปานกลาง	มาก	มากที่สุด
13.	การออกแบบการใช้งานหน้าจอโดยรวมทำให้ท่านเข้าใจและสามารถใช้งานได้ง่าย					
14.	โปรแกรมระบบงานในหน่วยงานของท่านทำให้ท่านเรียนรู้การใช้โปรแกรมได้ดี					
15.	โปรแกรมระบบงานในส่วนของการติดต่อกับผู้ใช้ระบบสามารถ เข้าใจได้ง่าย					
16.	โปรแกรมระบบงานในหน่วยงานของท่าน ในส่วนของการติดต่อกับผู้ใช้ระบบ มีขั้นตอนที่ยุ่งยาก ซับซ้อน					
17.	โปรแกรมระบบงานในหน่วยงานใช้งานได้ง่ายจนท่านเกิดทักษะในการใช้งาน					
18.	ท่านรู้สึกพึงพอใจต่อการตอบสนองโดยรวมของโปรแกรมระบบงานที่ยอดเยี่ยม					
19.	ท่านสามารถเข้าถึงข้อมูลที่ท่านต้องการได้อย่างรวดเร็ว					
20.	ระบบสารสนเทศที่ท่านใช้มีความยืดหยุ่นสูง และสามารถปรับแต่งได้ตามต้องการ					
21.	ระบบสารสนเทศที่ท่านใช้มีระบบป้องกันเกี่ยวกับความปลอดภัยของข้อมูลสูง					
22.	ระบบสารสนเทศช่วยให้ท่านมีเวลาในการทำงานอย่างอื่นเพิ่มขึ้น					
23.	ระบบสารสนเทศที่ท่านใช้มีระบบป้องกันเป็นพิเศษเพื่อลดความผิดพลาดที่เกิดจากผู้ใช้					
24.	ระบบสารสนเทศช่วยให้การทำงานของท่านง่ายขึ้น					
25.	ท่านเชื่อมั่น และมั่นใจว่าระบบสารสนเทศมีความพร้อมใช้งานตลอดเวลาที่ต้องการ					
26.	ระบบสารสนเทศมีอุปกรณ์อำนวยความสะดวกที่เห็นได้อย่างชัดเจน					

ข้อ	ข้อความคิดเห็น	ระดับความเห็นด้วย				
		น้อยที่สุด	น้อย	ปานกลาง	มาก	มากที่สุด
27.	เจ้าหน้าที่ผู้ดูแลระบบสารสนเทศมีความรู้ และทักษะสูง จนท่านมั่นใจในการให้บริการ					
28.	เมื่อเกิดปัญหาเจ้าหน้าที่ผู้ดูแลระบบสารสนเทศ ให้ความใส่ใจช่วยเหลืออย่างจริงจัง					
29.	มีเจ้าหน้าที่ผู้ดูแลระบบอยู่ประจำตลอด 24 ชั่วโมง และพร้อมให้บริการทันที ในกรณีที่ระบบสารสนเทศเกิดปัญหาขัดข้อง					
30.	เจ้าหน้าที่ผู้ดูแลระบบสารสนเทศมีความยินดี และเต็มใจที่จะแนะนำให้ความช่วยเหลือผู้ใช้ระบบเสมอ					
31.	เจ้าหน้าที่ผู้ดูแลระบบสารสนเทศเข้าใจในความต้องการของผู้ใช้ที่มีลักษณะเฉพาะที่แตกต่างกัน					
32.	เจ้าหน้าที่ผู้ดูแลระบบสารสนเทศมีความสามารถ ในการแก้ปัญหาและให้บริการได้ทันเวลาตามที่ได้ให้ข้อตกลงกับผู้ใช้					

APPENDIX D

Computer Knowledge ตารางแสดงค่า จำนวน ร้อยละ การตอบคำถามถูก

ข้อ	รายการคำถาม	รายการที่ตอบ				
		ก	ข	ค	ง	ไม่ตอบ
1.	Input, Processing, and O.....	26 15.8%	***46*** ***27.9%***	24 14.5%	68 41.2%	1. 6%
2.	โปรแกรมใดต่อไปนี้ช่วยให้.....	23 13.9%	9 5.5%	***131*** ***79.4***%	1 .6%	1. 6%
3.	คำว่า “ซอฟท์แวร์” เป็นชุด.....	28 17.0%	7 4.2%	30 18.2%	***99*** ***60%***	1. 6%
4.	อุปกรณ์ใดที่มีไว้เพื่อ……..….....	11 6.7%	***123*** ***74.5%***	5 3.0%	26 15.8%	0
5.	หากท่านเปิดเครื่องคอมพิวเตอร์แล้วเครื่องไม่ติดและไม่สามารถทำงานได้	7 4.2%	9 5.5%	9 5.5%	***140*** ***84.8%***	0
6.	หากท่านเปิดเครื่องคอมพิวเตอร์ที่หน่วยงานไม่สามารถเข้าระบบได้	49 29.7%	1 .6%	***105*** ***63.6%***	10 6.1%	0
7.	ชื่อของโปรแกรมที่ท่านกำลังใช้งานอยู่	12 7.3%	45 27.3%	46 27.9%	***62*** ***37.6%***	0
8.	ท่านสามารถมองเห็นโปรแกรมใช้งานอยู่	8 4.8%	**73** **44.2%**	53 32.1%	31 18.8%	
9.	หากท่านจะทำการติดตั้งซอฟท์แวร์	27 16.4%	13 7.9%	21 12.7%	***104*** ***63%***	0
10.	ท่านสามารถเคลื่อนย้าย windows ไปมา	19 11.5%	84 50.9%	***36*** ***21.8%***	25 15.2%	1. 6%
11.	หากท่านต้องการเลื่อนหน้าจอขึ้นลง	24 14.5%	***94*** ***57%%***	16 9.7%	31 18.8%	

ข้อ	รายการคำถาม	รายการที่ตอบ				
		ก	ข	ค	ง	ไม่ตอบ
12.	ประโยชน์ของScreen Saver	9 5.5%	***97*** ***58.8%***	17 10.3%	42 25.5%	
13.	วิธีการปิดเครื่องที่ถูกต้อง	0	***164*** ***99.4%***	0	0	1. 6%
14.	การใช้ปุ่ม Ctrl.	8 4.8%	***140*** ***84.8%***	3 1.8%	13 7.9%	1. 6%
15.	การเปิดปิดแฟ้ม บันทึกข้อมูล	10 6.1%	***133*** ***80.6%***	7 4.2%	15 9.1%	0
16.	การเรียกใช้แฟ้มข้อมูล	12 7.3%	11 6.7%	15 9.1%	***127*** ***77%***	
17.	การใช้คีย์บอร์ด	5 3.0%	1 .6%	***155*** ***93.9%***	4 2.4%	
18.	การใช้ Password เพื่อความปลอดภัยข้อมูล	***139*** ***84.2%***	23 13.9%	1 .6%	2 1.2%	
19.	จริยธรรมเรื่องการให้ข้อมูล	7 4.2%	***97*** ***58.8%***	20 12.1%	41 24.8%	
20.	โครงสร้างฐานข้อมูล	52 31.5%	***41*** ***24.8%***	24 14.5%	48 29.1%	

APPENDIX E

ตารางแสดงค่า จำนวน ร้อยละ ในแต่ละตัวแปร

Attitude ทัศนคติของผู้ใช้ระบบสารสนเทศโรงพยาบาล

ข้อ	ข้อความคิดเห็น	ระดับความเห็นด้วย				
		1	**2**	**3**	**4**	**5**
1.	การนำคอมพิวเตอร์มาใช้ในระบบสารสนเทศโรงพยาบาลมีความจำเป็น และมีความสำคัญอย่างยิ่ง	0 0%	1 .6%	15 9.1%	72 43.6%	77 46.7%
2.	ระบบสารสนเทศโรงพยาบาลมีประโยชน์อย่างยิ่ง ในการสนับสนุนการบริหาร และการพัฒนาคุณภาพบริการของโรงพยาบาล	0 0%	2 1.2%	21 12.7%	71 43%	71 43%
3.	การจัดเก็บ/บันทึกข้อมูลเข้าสู่ระบบสารสนเทศโรงพยาบาล นับเป็นการเพิ่มงานของท่านอย่างยิ่ง	10 6.1%	47 28.5%	63 38.2%	36 21.8%	9 5.5%
4.	ระบบสารสนเทศช่วยทำให้ท่านเข้าใจ ถึงสภาพการณ์และผลการดำเนินงานของโรงพยาบาลได้อย่างชัดเจน	4 2.4%	16 9.7%	47 28.5%	67 40.6%	31 18.8%
5.	การที่ท่านใช้งานคอมพิวเตอร์ได้จะเป็นประโยชน์ต่องานระบบสารสนเทศโรงพยาบาลเป็นอย่างยิ่ง	0 0%	4 2.4%	20 12.1%	81 49.1%	60 36.4%
6.	ท่านคิดว่าการเก็บ/บันทึกข้อมูลลงในระบบสารสนเทศโรงพยาบาลไม่ใช่หน้าที่ของท่าน	7 4.2%	13 7.9%	32 19.4%	56 33.9%	57 43.5%
7.	ระบบสารสนเทศโรงพยาบาลมีประโยชน์เฉพาะผู้บริหารเท่านั้น	3 1.8%	9 5.5%	40 24.2%	52 31.5%	61 37%
8.	ระบบสารสนเทศโรงพยาบาลช่วยให้ท่านมีความพึงพอใจในการให้บริการผู้ป่วยมากขึ้น	9 5.5%	25 15.2%	50 30.3%	55 33.3%	26 15.8%

ข้อ	ข้อความคิดเห็น	ระดับความเห็นด้วย				
		1	**2**	**3**	**4**	**5**
9.	ท่านรู้สึกว่าการนำคอมพิวเตอร์มาช่วยในการเก็บข้อมูลเป็นเรื่องที่มีความยุ่งยากมาก	2 1.2%	14 8.5%	65 39.4%	43 26.1%	41 24.8%
10.	การนำระบบสารสนเทศมาใช้จะช่วยลดขั้นตอนและลดความซ้ำซ้อนในการให้บริการ	10 6.1%	20 12.1%	49 29.7%	56 33.9%	30 18.2%
11.	ระบบสารสนเทศโรงพยาบาลช่วยเพิ่มประสิทธิภาพในการให้บริการของโรงพยาบาล	10 6.1%	9 5.5%	48 29.1%	56 33.9%	42 25.5%
12.	ระบบสารสนเทศโรงพยาบาลสร้างความสับสนในการรับบริการแก่ผู้ป่วย/ผู้มารับบริการ	5 3%	28 17%	48 29.1%	52 31.5%	32 19.4%
13.	การใช้คอมพิวเตอร์ช่วยให้งานด้านการสื่อสารและข้อมูลข่าวสารเป็นไปอย่างถูกต้อง และรวดเร็ว	3 1.8%	7 4.2%	45 27.3%	71 43.0%	39 23.6%
14.	การนำระบบสารสนเทศโรงพยาบาลมาใช้ไม่ได้ช่วยให้ภาระงานของท่านลดลงเลย	17 10.3%	32 19.4%	63 38.2%	33 20%	20 12.1%

Participation การมีส่วนร่วมของผู้ใช้ระบบสารสนเทศโรงพยาบาล

ข้อ	ข้อความคิดเห็น	ระดับการมีส่วนร่วม			
		0	**1**	**2**	**3**
1.	ท่านมีส่วนร่วมในการศึกษาปัญหาและความต้องการพัฒนาระบบสารสนเทศของโรงพยาบาล	49 29.7%	93 56.4%	17 10.3%	6 3.6%
2.	ท่านมีส่วนร่วมในการแสดงความคิดเห็นถึงความสำคัญในการพัฒนาระบบสารสนเทศโรงพยาบาล	56 33.9%	88 53.3%	15 9.1%	61 3.6%
3.	ท่านมีส่วนร่วมในการประชุมและตัดสินใจในการนำระบบเทคโนโลยีสารสนเทศมาใช้ในโรงพยาบาล	87 52.7%	63 38.2%	12 7.3%	3 1.8%
4.	ท่านมีส่วนร่วมในการกำหนดสารสนเทศที่ท่านต้องการจากระบบสารสนเทศโรงพยาบาล	62 37.6%	80 48.5%	16 9.7%	7 4.2%
5.	ท่านเข้ารับการอบรมถึงวิธีปฏิบัติ และเข้าใจวิธีการทำงานกับระบบสารสนเทศของโรงพยาบาล	72 43.6%	79 47.9%	14 8.5%	0 0%
6.	ท่านเต็มใจให้ความร่วมมือในการจัดเก็บและบันทึกข้อมูลลงในระบบสารสนเทศโรงพยาบาลอย่างครบถ้วนทุกครั้ง	2 1.2%	47 28.5%	53 32.1%	63 38.2%
7.	ท่านมีโอกาสในการชี้แจงปัญหาและข้อเสนอแนะปรับปรุง ในการดำเนินงานระบบสารสนเทศ	42 25.5%	90 54.5%	26 15.8%	7 4.2%
8.	ท่านให้ความร่วมมือในการดูแล และบำรุงรักษาเครื่องคอมพิวเตอร์ รวมทั้งอุปกรณ์ที่เกี่ยวข้อง ให้มีความปลอดภัยและพร้อมใช้งานอยู่เสมอ	8 4.8%	51 30.9%	56 33.9%	50 30.3%
9.	ท่านภาคภูมิใจที่ได้มีส่วนร่วมในการดำเนินงานระบบสารสนเทศ ทำให้โรงพยาบาลสามารถวัดผลการดำเนินงานในแต่ละหน่วยงานของโรงพยาบาล (KPI) ได้ชัดเจนขึ้น	3 1.8%	7 4.2%	45 27.3%	71 43.0%
10.	การมีส่วนร่วมในการดำเนินงานระบบสารสนเทศทำให้ท่านรู้สึกทำงานง่าย และเข้าใจระบบมากขึ้น	10 6.1%	92 55.8%	47 28.5%	16 9.7%
11.	การมีส่วนร่วมในการดำเนินงานระบบสารสนเทศทำให้ท่านรู้สึกมีคุณค่าในตนเอง	16 9.7%	86 52.1%	42 25.5%	21 12.7%
12.	ท่านมีส่วนร่วมในการกำหนดเกณฑ์การประเมินผลการดำเนินงานระบบสารสนเทศโรงพยาบาล	82 49.7%	67 40.6%	10 6.1%	6 3.6%

ข้อ	ข้อความคิดเห็น	ระดับการมีส่วนร่วม			
		0	**1**	**2**	**3**
13.	ท่านมีส่วนร่วมในการวิเคราะห์และประเมินผลการดำเนินงานระบบสารสนเทศโรงพยาบาล	103 62.4%	52 31.5%	10 6.1%	0 0%
14.	ท่านมีส่วนร่วมในการเป็นกรรมการประเมินผลการดำเนินงานระบบสารสนเทศ	118 71.5%	37 22.4%	9 5.5%	1 .6%

Satisfaction ความพึงพอใจของผู้ใช้ระบบสารสนเทศโรงพยาบาล

ข้อ	ข้อความคิดเห็น	ระดับความพึงพอใจ				
		1	**2**	**3**	**4**	**5**
1.	เนื้อหาของสารสนเทศที่ท่านได้รับจากระบบมีความถูกต้อง แม่นยำสูง	3 4.8%	33 20%	92 55.8%	30 18.2%	2 1.2%
2.	ระบบสารสนเทศสามารถผลิตสารสนเทศได้ทันเวลาที่ท่านต้องการ	11 6.7%	45 27.3%	77 46.7%	27 16.4%	5 3%
3.	สารสนเทศที่ท่านได้รับมีประโยชน์ต่อการตัดสินใจในการปฏิบัติงานของท่าน	11 6.7%	27 16.4%	83 50.3%	43 26.1%	1 .6%
4.	สารสนเทศที่ท่านได้รับจากระบบมีความสมบูรณ์ครบถ้วน ทุกครั้ง	12 7.3%	38 23.0%	94 57.0%	20 12.1%	1 .6%
5.	สารสนเทศที่ท่านได้รับมีรูปแบบในการนำเสนออย่างเหมาะสม	14 8.5%	24 14.5%	105 63.6%	20 12.1%	2 1.2%
6.	สารสนเทศที่ท่านได้รับจากระบบสารสนเทศมีความเป็นปัจจุบันเสมอ	7 4.2%	31 18.8%	80 48.5%	39 23.6%	8 4.8%
7.	สารสนเทศที่ท่านได้รับจากระบบมีความน่าเชื่อถือสูง	13 7.9%	17 10.3%	105 63.6%	28 17%	29 1.2%
8.	สารสนเทศที่ท่านได้รับมีความสอดคล้อง ตรงประเด็นตามท่านต้องการ	12 7.3%	31 18.8%	89 53.9%	28 17%	5 3%
9.	เครื่องคอมพิวเตอร์มีจำนวนเพียงพอที่จะสนับสนุนการทำงานในหน่วยงานของท่าน	33 20%	63 38.2%	55 33.3%	13 7.9%	1 .6%
10.	เครื่องคอมพิวเตอร์ที่ใช้อยู่ปัจจุบันสามารถเพิ่มพื้นที่ฮาร์ดดิสได้	19 11.7%	43 26.4%	82 50.3%	19 11.7%	0 0%
11.	สถานที่จัดวางเครื่องคอมพิวเตอร์ เครือข่ายระบบสารสนเทศของโรงพยาบาลมีความเหมาะสมและสะดวกในการใช้งาน	28 17%	45 27.3%	79 47.9%	12 7.3%	1 .6%
12.	โปรแกรมระบบงานในหน่วยงานของท่านตอบสนองความต้องการใช้งานของท่านได้ดี	11 6.7%	41 24.8%	96 58.2%	14 8.5%	3 1.8%
13.	การออกแบบการใช้งานหน้าจอโดยรวมทำให้ท่านเข้าใจและสามารถใช้งานได้ง่าย	6 3.6%	24 14.5%	105 63.6%	28 17.7%	2 1.2%

ข้อ	ข้อความคิดเห็น	ระดับความพึงพอใจ				
		1	**2**	**3**	**4**	**5**
14.	โปรแกรมระบบงานในหน่วยงานของท่านทำให้ท่านเรียนรู้การใช้โปรแกรมได้ดี	7 4.2%	29 17.6%	103 62.4%	25 15.2%	1 .6%
15.	โปรแกรมระบบงานในส่วนของการติดต่อกับผู้ใช้ระบบสามารถ เข้าใจได้ง่าย	11 6.7%	35 21.2%	97 58.8%	21 12.7%	1 .6%
16.	โปรแกรมระบบงานในหน่วยงานของท่าน ในส่วนของการติดต่อกับผู้ใช้ระบบ มีขั้นตอนที่ยุ่งยาก ซับซ้อน	6 3.6%	23 13.9%	101 61.2%	33 20%	2 1.2%
17.	โปรแกรมระบบงานในหน่วยงานใช้งานได้ง่ายจนท่านเกิดทักษะในการใช้งาน	14 8.5%	24 14.5%	97 58.8%	29 17.6%	1 .6%
18.	ท่านรู้สึกพึงพอใจต่อการตอบสนองโดยรวมของโปรแกรมระบบงานที่ยอดเยี่ยม	12 7.3%	30 18.2%	101 61.2%	20 12.1%	2 1.2%
19.	ท่านสามารถเข้าถึงข้อมูลของท่านได้อย่างรวดเร็ว	9 5.5%	36 21.8%	94 57.0%	25 15.2%	1 .6%
20.	ระบบสารสนเทศที่ท่านใช้มีความยืดหยุ่นสูง และสามารถปรับแต่งได้ตามต้องการ	22 13.3%	46 27.9%	80 48.5%	16 9.7%	1 .6%
21.	ระบบสารสนเทศที่ท่านใช้มีระบบป้องกันเกี่ยวกับความปลอดภัยของข้อมูลสูง	10 6.1%	39 23.6%	98 59.4%	15 9.1%	3 1.8%
22.	ระบบสารสนเทศช่วยให้ท่านมีเวลาในการทำงานอย่างอื่นเพิ่มขึ้น	22 13.3%	40 24.2%	85 51.5%	15 9.1%	3 1.8%
23.	ระบบสารสนเทศที่ท่านใช้มีระบบป้องกันเป็นพิเศษเพื่อลดความผิดพลาดที่เกิดจากผู้ใช้	11 6.7%	46 27.9%	96 58.2%	9 .5%	3 1.8%
24.	ระบบสารสนเทศช่วยให้การทำงานของท่านง่ายขึ้น	10 6.1%	19 11.5%	95 57.6%	37 22.4%	4 2.4%
25.	ท่านเชื่อมั่น และมั่นใจว่า ระบบสารสนเทศมีความพร้อมใช้งานตลอดเวลาที่ต้องการ	15 10.3%	44 19.4%	79 38.2%	23 20%	4 12.1%
26.	ระบบสารสนเทศมีอุปกรณ์อำนวยความสะดวกที่เห็นได้อย่างชัดเจน	11 6.7%	38 23%	90 54.5%	24 14.5%	2 1.2%

ข้อ	ข้อความคิดเห็น	ระดับความพึงพอใจ				
		1	**2**	**3**	**4**	**5**
27.	เจ้าหน้าที่ผู้ดูแลระบบสารสนเทศมีความรู้ และทักษะสูง จนท่านมั่นใจในการให้บริการ	5 3%	27 16.4%	94 57%	37 22%	2 1.2%
28.	เมื่อเกิดปัญหาเจ้าหน้าที่ผู้ดูแลระบบสารสนเทศให้ความใส่ใจช่วยเหลืออย่างจริงจัง	8 4.8%	28 17%	79 47.9%	44 26.7%	6 3.6%
29.	มีเจ้าหน้าที่ผู้ดูแลระบบอยู่ประจำตลอด 24 ชั่วโมง และพร้อมให้บริการทันทีในกรณีที่ระบบสารสนเทศเกิดปัญหาขัดข้อง	27 16.4%	57 34.5%	61 37%	19 11.5%	1 .6%
30.	เจ้าหน้าที่ผู้ดูแลระบบสารสนเทศมีความยินดีและเต็มใจที่จะแนะนำให้ความช่วยเหลือผู้ใช้ระบบเสมอ	7 4.2%	33 20%	79 47.9%	44 26.7%	2 1.2%
31.	เจ้าหน้าที่ผู้ดูแลระบบสารสนเทศเข้าใจในความต้องการของผู้ใช้ที่มีลักษณะเฉพาะที่แตกต่างกัน	7 4.2%	27 16.4%	104 63%	26 15.8%	10 .6%
32.	เจ้าหน้าที่ผู้ดูแลระบบสารสนเทศมีความสามารถในการแก้ปัญหาและให้บริการได้ทันเวลาตามที่ได้ให้ข้อตกลงกับผู้ใช้	10 6.1%	37 22.4%	85 51.5%	31 18.8%	2 1.2%

APPENDIX F

ตารางแสดงค่าเฉลี่ย ค่าเบี่ยงเบนมาตรฐาน การแปลผลในแต่ละตัวแปร

Attitude ทัศนคติของผู้ใช้ระบบสารสนเทศโรงพยาบาล

ข้อ	รายการ	N	Mean	S.D.	Interpretation
1.	การนำคอมพิวเตอร์มาใช้ในระบบสารสนเทศโรงพยาบาลมีความจำเป็น และมีความสำคัญอย่างยิ่ง	165	4.36	.673	High
2.	ระบบสารสนเทศโรงพยาบาลมีประโยชน์อย่างยิ่ง ในการสนับสนุนการบริหาร และการพัฒนาคุณภาพบริการของโรงพยาบาล	165	4.28	.729	High
3.	การจัดเก็บ/บันทึกข้อมูลเข้าสู่ระบบสารสนเทศโรงพยาบาล นับเป็นการเพิ่มงานของท่านอย่างยิ่ง	165	2.92	.981	Moderate
4.	ระบบสารสนเทศช่วยทำให้ท่านเข้าใจ ถึงสภาพการณ์และผลการดำเนินงานของโรงพยาบาลได้อย่างชัดเจน	165	3.64	.976	Moderate
5.	การที่ท่านใช้งานคอมพิวเตอร์ได้จะเป็นประโยชน์ต่องานระบบสารสนเทศโรงพยาบาลเป็นอย่างยิ่ง	165	4.19	.740	High
6.	ท่านคิดว่าการเก็บ/บันทึกข้อมูลลงในระบบสารสนเทศโรงพยาบาลไม่ใช่หน้าที่ของท่าน	165	3.87	1.107	High
7.	ระบบสารสนเทศโรงพยาบาลมีประโยชน์เฉพาะผู้บริหารเท่านั้น	165	3.96	.999	High
8.	ระบบสารสนเทศโรงพยาบาลช่วยให้ท่านมีความพึงพอใจในการให้บริการผู้ป่วยมากขึ้น	165	3.39	1.091	Moderate
9.	ท่านรู้สึกว่าการนำคอมพิวเตอร์มาช่วยในการเก็บข้อมูลเป็นเรื่องที่มีความยุ่งยากมาก	165	3.65	.987	Moderate

ข้อ	รายการ	N	Mean	S.D.	Interpretation
10.	การนำระบบสารสนเทศมาใช้จะช่วยลดขั้นตอนและลดความซ้ำซ้อนในการให้บริการ	165	3.46	1.107	Moderate
11.	ระบบสารสนเทศโรงพยาบาลช่วยเพิ่มประสิทธิภาพในการให้บริการของโรงพยาบาล	165	3.67	1.100	High
12.	ระบบสารสนเทศโรงพยาบาลสร้างความสับสนในการรับบริการแก่ผู้ป่วย/ผู้มารับบริการ	165	3.47	1.080	Moderate
13.	การใช้คอมพิวเตอร์ช่วยให้งานด้านการสื่อสารและข้อมูลข่าวสารเป็นไปอย่างถูกต้อง และรวดเร็ว	165	3.82	.904	High
14.	การนำระบบสารสนเทศโรงพยาบาลมาใช้ไม่ได้ช่วยให้ภาระงานของท่านลดลงเลย	165	3.04	1.139	Moderate

Participation การมีส่วนร่วมของผู้ใช้ระบบสารสนเทศโรงพยาบาล

ข้อ	รายการ	N	Mean	S.D.	Interpretation
1.	ท่านมีส่วนร่วมในการศึกษาปัญหาและความต้องการพัฒนาระบบสารสนเทศของโรงพยาบาล	165	.88	.731	Low
2.	ท่านมีส่วนร่วมในการแสดงความคิดเห็นถึงความสำคัญในการพัฒนาระบบสารสนเทศโรงพยาบาล	165	.82	.740	Low
3.	ท่านมีส่วนร่วมในการประชุมและตัดสินใจในการนำระบบเทคโนโลยีสารสนเทศมาใช้ในโรงพยาบาล	165	.58	.708	Low
4.	ท่านมีส่วนร่วมในการกำหนดสารสนเทศที่ท่านต้องการจากระบบสารสนเทศโรงพยาบาล	165	.81	.780	Low
5.	ท่านเข้ารับการอบรมถึงวิธีปฏิบัติ และเข้าใจวิธีการทำงานกับระบบสารสนเทศของโรงพยาบาล	165	.65	.633	Low
6.	ท่านเต็มใจให้ความร่วมมือในการจัดเก็บและบันทึกข้อมูลลงในระบบสารสนเทศโรงพยาบาลอย่างครบถ้วนทุกครั้ง	165	2.07	.845	High
7.	ท่านมีโอกาสในการชี้แจงปัญหาและข้อเสนอแนะ ปรับปรุง ในการดำเนินงานระบบสารสนเทศ	165	.99	.765	Low
8.	ท่านให้ความร่วมมือในการดูแล และบำรุงรักษาเครื่องคอมพิวเตอร์ รวมทั้งอุปกรณ์ที่เกี่ยวข้อง ให้มีความปลอดภัยและพร้อมใช้งานอยู่เสมอ	165	1.90	.895	Moderate
9.	ท่านภาคภูมิใจที่ได้มีส่วนร่วมในการดำเนินงานระบบสารสนเทศ ทำให้โรงพยาบาลสามารถวัดผลการดำเนินงานในแต่ละหน่วยงานของโรงพยาบาล (KPI) ได้ชัดเจนขึ้น	165	1.43	.850	Moderate

ข้อ	รายการ	N	Mean	S.D.	Interpretation
10.	การมีส่วนร่วมในการดำเนินงานระบบสารสนเทศทำให้ท่านรู้สึกทำงานง่าย และเข้าใจระบบมากขึ้น	165	1.42	.750	Moderate
11.	การมีส่วนร่วมในการดำเนินงานระบบสารสนเทศทำให้ท่านรู้สึกมีคุณค่าในตนเอง	165	1.41	.834	Moderate
12.	ท่านมีส่วนร่วมในการกำหนดเกณฑ์การประเมินผลการดำเนินงานระบบสารสนเทศโรงพยาบาล	165	.64	.758	Low
13.	ท่านมีส่วนร่วมในการวิเคราะห์และประเมินผลการดำเนินงานระบบสารสนเทศโรงพยาบาล	165	.44	.608	Low
14.	ท่านมีส่วนร่วมในการเป็นกรรมการประเมินผลการดำเนินงานระบบสารสนเทศ	165	.35	.613	Low

Satisfaction ความพึงพอใจของผู้ใช้ระบบสารสนเทศโรงพยาบาล

ข้อ	รายการ	N	Mean	S.D.	Interpretation
1.	เนื้อหาของสารสนเทศที่ท่านได้รับจากระบบมีความถูกต้อง แม่นยำสูง	165	2.91	.787	Moderate
2.	ระบบสารสนเทศสามารถผลิตสารสนเทศได้ทันเวลาที่ท่านต้องการ	165	2.82	.892	Moderate
3.	สารสนเทศที่ท่านได้รับมีประโยชน์ต่อการตัดสินใจในการปฏิบัติงานของท่าน	165	2.98	.848	Moderate
4.	สารสนเทศที่ท่านได้รับจากระบบมีความสมบูรณ์ ครบถ้วน ทุกครั้ง	165	2.76	.782	Moderate
5.	สารสนเทศที่ท่านได้รับมีรูปแบบในการนำเสนออย่างเหมาะสม	165	2.83	.793	Moderate
6.	สารสนเทศที่ท่านได้รับจากระบบสารสนเทศมีความเป็นปัจจุบันเสมอ	165	3.06	.888	Moderate
7.	สารสนเทศที่ท่านได้รับจากระบบมีความน่าเชื่อถือสูง	165	2.93	.797	Moderate
8.	สารสนเทศที่ท่านได้รับมีความสอดคล้องตรงประเด็นตามท่านต้องการ	165	2.90	.874	Moderate
9.	เครื่องคอมพิวเตอร์มีจำนวนเพียงพอที่จะสนับสนุนการทำงานในหน่วยงานของท่าน	165	2.31	.901	Low
10.	เครื่องคอมพิวเตอร์ที่ใช้อยู่ปัจจุบันสามารถเพิ่มพื้นที่ฮาร์ดดิสได้	165	2.62	.840	Moderate
11.	สถานที่จัดวางเครื่องคอมพิวเตอร์ เครือข่ายระบบสารสนเทศของโรงพยาบาลมีความเหมาะสมและสะดวกในการใช้งาน	165	2.47	.880	Moderate
12.	โปรแกรมระบบงานในหน่วยงานของท่านตอบสนองความต้องการใช้งานของท่านได้ดี	165	2.74	.780	Moderate
13.	การออกแบบการใช้งานหน้าจอโดยรวมทำให้ท่านเข้าใจและสามารถใช้งานได้ง่าย	165	2.98	.715	Moderate
14.	โปรแกรมระบบงานในหน่วยงานของท่าน	165	2.90	.718	Moderate

ข้อ	รายการ	N	Mean	S.D.	Interpretation
	ทำให้ท่านเรียนรู้การใช้โปรแกรมได้ดี				
15.	โปรแกรมระบบงานในส่วนของการติดต่อกับผู้ใช้ระบบสามารถ เข้าใจได้ง่าย	165	2.79	.769	Moderate
16.	โปรแกรมระบบงานในหน่วยงานของท่านในส่วนของการติดต่อกับผู้ใช้ระบบ มีขั้นตอนที่ยุ่งยาก ซับซ้อน	165	3.01	.732	Moderate
17.	โปรแกรมระบบงานในหน่วยงานใช้งานได้ง่ายจนท่านเกิดทักษะในการใช้งาน	165	2.87	.820	Moderate
18.	ท่านรู้สึกพึงพอใจต่อการตอบสนองโดยรวมของโปรแกรมระบบงานที่ยอดเยี่ยม	165	2.82	.783	Moderate
19.	ท่านสามารถเข้าถึงข้อมูลของท่านได้อย่างรวดเร็ว	165	2.84	.767	Moderate
20.	ระบบสารสนเทศที่ท่านใช้มีความยืดหยุ่นสูงและสามารถปรับแต่งได้ตามต้องการ	165	2.56	.865	Moderate
21.	ระบบสารสนเทศที่ท่านใช้มีระบบป้องกันเกี่ยวกับความปลอดภัยของข้อมูลสูง	165	2.77	.770	Moderate
22.	ระบบสารสนเทศช่วยให้ท่านมีเวลาในการทำงานอย่างอื่นเพิ่มขึ้น	165	2.62	.894	Moderate
23.	ระบบสารสนเทศที่ท่านใช้มีระบบป้องกันเป็นพิเศษเพื่อลดความผิดพลาดที่เกิดจากผู้ใช้	165	2.68	.757	Moderate
24.	ระบบสารสนเทศช่วยให้การทำงานของท่านง่ายขึ้น	165	3.04	.826	Moderate
25.	ท่านเชื่อมั่น และมั่นใจว่า ระบบสารสนเทศมีความพร้อมใช้งานตลอดเวลาที่ต้องการ	165	2.74	.896	Moderate
26.	ระบบสารสนเทศมีอุปกรณ์อำนวยความสะดวกที่เห็นได้อย่างชัดเจน	165	2.81	.811	Moderate
27.	เจ้าหน้าที่ผู้ดูแลระบบสารสนเทศมีความรู้และทักษะสูง จนท่านมั่นใจในการให้บริการ	165	3.02	.749	Moderate

ข้อ	รายการ	N	Mean	S.D.	Interpretation
28.	เมื่อเกิดปัญหาเจ้าหน้าที่ผู้ดูแลระบบสารสนเทศให้ความใส่ใจช่วยเหลืออย่างจริงจัง	165	3.07	.880	Moderate
29.	มีเจ้าหน้าที่ผู้ดูแลระบบอยู่ประจำตลอด 24 ชั่วโมง และพร้อมให้บริการทันที ในกรณีที่ระบบสารสนเทศเกิดปัญหาขัดข้อง	165	2.45	.920	Moderate
30.	เจ้าหน้าที่ผู้ดูแลระบบสารสนเทศมีความยินดีและเต็มใจที่จะแนะนำให้ความช่วยเหลือผู้ใช้ระบบเสมอ	165	3.01	.830	Moderate
31.	เจ้าหน้าที่ผู้ดูแลระบบสารสนเทศเข้าใจในความต้องการของผู้ใช้ที่มีลักษณะเฉพาะที่แตกต่างกัน	165	2.92	.716	Moderate
32.	เจ้าหน้าที่ผู้ดูแลระบบสารสนเทศมีความสามารถ ในการแก้ปัญหาและให้บริการได้ทันเวลาตามที่ได้ให้ข้อตกลงกับผู้ใช้	165	2.87	.830	Moderate

Hua-Hin HIS
Correlations

		Age(yr)	Period Sys Use(m)	TotalAtt	Total_Parti	T_Knowledge	TotalSAT
Age(yr)	Pearson Correlation	1	.243(**)	-.112	-.132	.069	-.081
	Sig. (2-tailed)		.002	.151	.091	.376	.307
	N	165	165	165	165	165	163
Period Sys Use(m)	Pearson Correlation	.243(**)	1	-.062	-.014	.235(**)	**-.176(*)**
	Sig. (2-tailed)	.002		.430	.858	.002	**.025**
	N	165	165	165	165	165	163
TotalAtt	Pearson Correlation	-.112	-.062	1	.366(**)	.214(**)	**.301(**)**
	Sig. (2-tailed)	.151	.430		.000	.006	**.000**
	N	165	165	165	165	165	163
Total_Parti	Pearson Correlation	-.132	-.014	.366(**)	1	.079	**.364(**)**
	Sig. (2-tailed)	.091	.858	.000		.311	**.000**
	N	165	165	165	165	165	163
T_Knowledge	Pearson Correlation	.069	.235(**)	.214(**)	.079	1	-.029
	Sig. (2-tailed)	.376	.002	.006	.311		.714
	N	165	165	165	165	165	163
TotalSAT	Pearson Correlation	-.081	-.176(*)	.301(**)	.364(**)	-.029	1
	Sig. (2-tailed)	.307	.025	.000	.000	.714	
	N	163	163	163	163	163	163

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Correlations

		TotalSAT	T_Knowledge	TotalAtt	Total_Parti
TotalSAT	Pearson Correlation	1	-.029	**.301(**)**	**.364(**)**
	Sig. (2-tailed)		.714	.000	.000
	N	163	163	163	163
T_Knowledge	Pearson Correlation	-.029	1	.214(**)	.079
	Sig. (2-tailed)	.714		.006	.311
	N	163	165	165	165
TotalAtt	Pearson Correlation	**.301(**)**	.214(**)	1	.366(**)
	Sig. (2-tailed)	.000	.006		.000
	N	163	165	165	165
Total_Parti	Pearson Correlation	**.364(**)**	.079	.366(**)	1
	Sig. (2-tailed)	.000	.311	.000	
	N	163	165	165	165

** Correlation is significant at the 0.01 level (2-tailed).

HUA-HIN HIS
Variables Entered/Removed(b)

Model	Variables Entered	Variables Removed	Method
1	Total_Parti, Period Sys Use(m), T_Knowledge, Age(yr), TotalAtt(a)	.	**Enter**

a All requested variables entered.
b Dependent Variable: TotalSAT

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.440(a)	.194	.168	13.90191	2.034

a Predictors: (Constant), Total_Parti, Period Sys Use(m), T_Knowledge, Age(yr), TotalAtt
b Dependent Variable: TotalSAT

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7303.232	5	1460.646	7.558	.000(a)
	Residual	30342.314	157	193.263		
	Total	37645.546	162			

a Predictors: (Constant), Total_Parti, Period Sys Use(m), T_Knowledge, Age(yr), TotalAtt
b Dependent Variable: TotalSAT

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	67.999	9.020		7.539	.000
	Age(yr)	.046	.137	.025	.334	.739
	Period Sys Use(m)	-.125	.064	-.150	-1.972	.050
	T_Knowledge	-.317	.406	-.059	-.782	.436
	TotalAtt	.347	.138	.198	2.510	.013
	Total_Parti	.694	.180	.298	3.850	.000

a Dependent Variable: TotalSAT

Residuals Statistics(a)

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	75.7099	110.2754	90.1227	6.71429	163
Residual	-50.18011	34.04438	.00000	13.68569	163
Std. Predicted Value	-2.147	3.001	.000	1.000	163
Std. Residual	-3.610	2.449	.000	.984	163

a Dependent Variable: TotalSAT

Multiple Regressions Stepwise
Descriptive Statistics

	Mean	Std. Deviation	N
TotalSAT	90.1227	15.24401	163
Age(yr)	34.59	8.332	163
Period Sys Use(m)	26.24	18.290	163
T_Knowledge	12.6442	2.84514	163
TotalAtt	51.6196	8.71015	163
Total_Parti	14.3067	6.54173	163

Correlations

		TotalSAT	Age(yr)	Period Sys Use(m)	T_Knowledge	TotalAtt	Total_ Parti
Pearson Correlation	TotalSAT	1.000	-.081	-.176	-.029	**.301**	**.364**
	Age(yr)	-.081	1.000	.245	.069	-.117	-.140
	Period Sys Use(m)	-.176	.245	1.000	.233	-.068	-.016
	T_Knowledge	-.029	.069	.233	1.000	.208	.076
	TotalAtt	.301	-.117	-.068	.208	1.000	.361
	Total_Parti	.364	-.140	-.016	.076	.361	1.000
Sig.(1-tailed)	TotalSAT	.	.153	.012	.357	.000	.000
	Age(yr)	.153	.	.001	.191	.069	.038
	Period Sys Use(m)	.012	.001	.	.001	.196	.422
	T_Knowledge	.357	.191	.001	.	.004	.169
	TotalAtt	.000	.069	.196	.004	.	.000
	Total_Parti	.000	.038	.422	.169	.000	.
N	TotalSAT	163	163	163	163	163	163
	Age(yr)	163	163	163	163	163	163
	Period Sys Use(m)	163	163	163	163	163	163
	T_Knowledge	163	163	163	163	163	163
	TotalAtt	163	163	163	163	163	163
	Total_Parti	163	163	163	163	163	163

Variables Entered/Removed(a)

Model	Variables Entered	Variables Removed	Method
1	Total_Parti	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	TotalAtt	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
3	Period Sys Use(m)	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a Dependent Variable: TotalSAT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
	R Square Change	F Change	df1	df2	Sig. F Change	R Square Change	F Change	df1	df2
1	.364(a)	.132	.127	14.24471	.132	24.527	1	161	.000
2	.406(b)	.165	.155	14.01461	.033	6.330	1	160	.013
3	.436(c)	.190	**.175**	13.84513	.025	4.941	1	159	.028

a Predictors: (Constant), Total_Parti

b Predictors: (Constant), Total_Parti, TotalAtt

c Predictors: (Constant), Total_Parti, TotalAtt, Period Sys Use(m)

ANOVA(d)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4976.773	1	4976.773	24.527	.000(a)
	Residual	32668.773	161	202.912		
	Total	37645.546	162			
2	Regression	6220.064	2	3110.032	15.834	.000(b)
	Residual	31425.482	160	196.409		
	Total	37645.546	162			
3	Regression	7167.218	**3**	2389.073	**12.463**	.000(c)
	Residual	30478.328	**159**	191.688		
	Total	37645.546	162			

a Predictors: (Constant), Total_Parti
b Predictors: (Constant), Total_Parti, TotalAtt
c Predictors: (Constant), Total_Parti, TotalAtt, Period Sys Use(m)
d Dependent Variable: TotalSAT

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	78.001	2.690		28.997	.000
	Total_Parti	.847	.171	.364	4.952	.000
2	(Constant)	62.741	6.617		9.481	.000
	Total_Parti	.683	.180	.293	3.786	.000
	TotalAtt	.341	.136	.195	2.516	.013
3	(Constant)	67.187	6.836		9.828	.000
	Total_Parti	.687	.178	.295	3.853	.000
	TotalAtt	.321	.134	.184	2.394	.018
	Period Sys Use(m)	-.133	.060	-.159	-2.223	.028

a Dependent Variable: TotalSAT

Excluded Variables (d)

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics
1	Age(yr)	-.030(a)	-.409	.683	-.032	.981
	Period Sys Use(m)	-.170(a)	-2.353	.020	-.183	1.000
	T_Knowledge	-.057(a)	-.769	.443	-.061	.994
	TotalAtt	.195(a)	2.516	.013	.195	.870
2	Age(yr)	-.017(b)	-.236	.814	-.019	.975
	Period Sys Use(m)	-.159(b)	-2.223	.028	-.174	.995
	T_Knowledge	-.096(b)	-1.298	.196	-.102	.957
3	Age(yr)	.023(c)	.305	.761	.024	.919
	T_Knowledge	-.058(c)	-.772	.441	-.061	.895

a Predictors in the Model: (Constant), Total_Parti
b Predictors in the Model: (Constant), Total_Parti, TotalAtt
c Predictors in the Model: (Constant), Total_Parti, TotalAtt, Period Sys Use(m)
d Dependent Variable: TotalSAT

BIOGRAPHY

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