

## Transformation of Information Technology Based on Human Computer Interaction Concept

Made Sudarma\*, Ni Wayan Sri Ariyani\*\*

\*Computer System and Informatics, Department of Electrical Engineering,

\*\*Applied Electronic Engineering, Department of Electrical Engineering,  
Engineering Faculty Udayana University

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### ABSTRACT

Transformation technology brings importance consequence to the management system improvement and expansion. In this case exploiting of Information Technology (IT) is hardly required to manage because of it affect to efficiency and effectiveness of the system. The purpose of this paper is to design Integrated Academic Management Information System (IAMIS) with concept of Human Computer Interaction (HCI). The method which be applied is qualitative method by using inductive analysis approach by ignoring initial hypothesis of the research, but to find patterns, forms and themes to expose data systematically. The final result is HCI applied in IAMIS system has been applied, so that found usability and functional system, effective and efficient of AIMIS system are fully be able to carry out well. Furthermore, the analysis results show using IAMIS system affected the staff productivity increasing by 12%, it also means affected in improvement of information services to the academic community. The writer recommended to design system on the concepts of HCI and accommodated is able to online (web-based) system.

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### Corresponding Author:

Computer System and Informatics, Department of Electrical Engineering,  
Engineering Faculty Udayana University, Bali-Indonesia  
Jimbaran campus, Tlp/fax.+62 361703315  
Email: sudarma@ee.unud.ac.id

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## 1. INTRODUCTION

Transformation technology that happened in Udayana University of course brings consequence to the importance of improvement and expansion in management. In this case exploiting of IT is hardly required to manage it more efficient and effective. Problem that often emerges in interaction between human and computer that often happen is the human misperception (user) to the software, so it does not obtain work effectiveness and efficiency, instead it causes ineffective and efficient on the work, user often find difficulties to apply the software because unfamiliar users with it. Integrated Academic Management Information System (IAMIS) that will be success if concepts of human computer interaction are able to be applied in the information system. The application of HCI is succeeded if the user is really able to interact with this information system [1], so it will increase the performance of all personal involved in activity of this academic area.

There are some things that cause the interaction process between human and computer become not efficient and it may be caused by the limitation of human resources in operating software, or also system design that felt not familiar by consumer [11]. In order communication works well, hence character of dialogue opponent need to be concern. In HCI context, hence designer should comprehend human psychology which is the determinant factor in the success of the interaction, that is, how the interaction concept between human and computer is built [2].

### 1.1 Research Objectives

The objectives and benefits of this study aims to:

1. Getting users perception of the academic administration based on IAMIS concept.
2. Getting get increased user productivity, after implementation of academic administration based on IAMIS concept.
3. The results of this study can be used as a reference for the academic application programs development base on human computer interaction.

### 1.2 Research Hypothesis

Whether the IAMIS system can affected to the improvement of information services and increased user productivity.

## 2. RELATED WORK

### 2.1 Framework of Thought

How the concepts in the HCI theory, like, user center design, user interface, user environment, and all the concept that exist can be applied in the academic information system, so the system can run effectively and efficient [12]. Then the researcher design a new system using the concepts in HCI, so it is expected that the new system can be applied more effective and efficient. This concept of thought can be seen in this diagram here under:

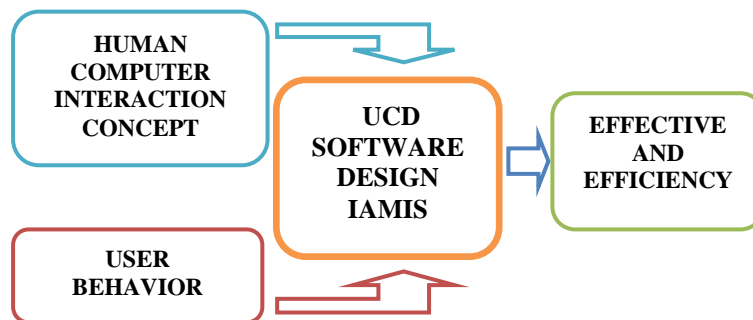


Figure 1. HCI framework and concept design

### 2.2 Design Focused on User

The main aspect in UCD is the involvement of user at the whole process [8]. The user is not only gives comment about design idea. They must intensively involve in all aspects, including how is the implementation of the new system will influence their work. The user also involved in first test and evaluation and design iteratively. But based on the system complexity built, there are some variations in the approach. Moreover, Lowdermilk illustrate four key steps in expansion that is planning, designing, implementation and system management. UCD Method can be seen as illustration here under in Figure 2.[5].

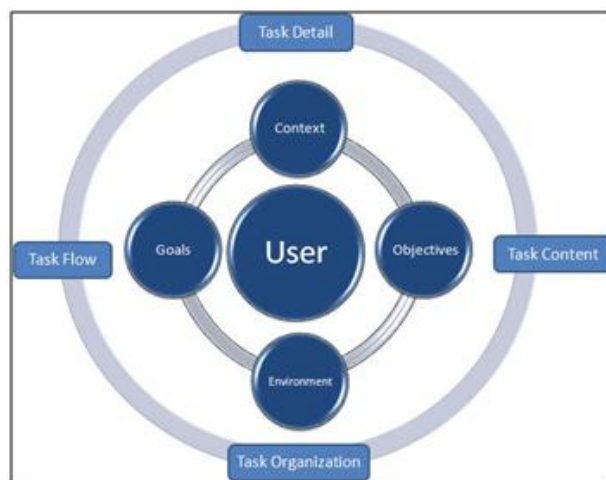


Figure 2. UCD System management

There are various supports types in designing, from paper and pencil to record and express idea up to application support that based on sophisticated computer. From the guide which still unable to explain to a very detail design. The programming written by Ruby on Rails (RoR). It is a framework for building web-based system. Rails is its framework and the Ruby is a programming language [10]. The advantages of RoR framework is the speed of the application development and also practicing self-discipline to write code for programmers because this framework has an elbow strict rules [3]. Furthermore, the existence of this rule will facilitate the process of maintenance depends on the application without a programmer only. In other words, system maintenance can be done by other computer programmers, as long as they understand the rules of RoR, then they will be able to continue the work of previous programmers. Further, in making this application program using the MySQL database management, because of MySQL is popular and easy to use by the computer system engineers [9].

The program is intended for Win32 ® platform for PC users beginner using the operating system such as Windows™ 7, which has good stability thus strongly supports the development of software that is trial-and-error when debugging [6]. Nonetheless, IAMIS application program created using the Indonesian terms computer instructions and can be executed on the system platform.

### 3. RESEARCH METHODS

In this study, a questionnaire was given to users (respondents) interactively using the Mozilla Firefox 18:01 web browser. When a menu item is selected, the respondent filed a dialog that displays the question of the function of the choice question. In the form of multiple choice questions, consist four possible answers for each question. At each appearance questions, randomized sequences response to reduce the things that are not meaningful in the study [7].

The analysis and flow of analysis in this study can be described as the following:

1. Data were analyzed using hypothesis testing goodness-of-fit. Each option is given a value expected response frequency chosen: in which the answer with the highest frequency is considered the most correct answers, while the lowest frequency response is considered correct at least.
2. Tests performed by Chi-Square distribution with a level of significance of 1% ( $\alpha = .01$ ). Hypothesis Null ( $H_0$ ) is the answer of respondents would vote in accordance with the truth value chosen by the author. Truth value of a response is indicated by the expected frequency of the response. Alternative Hypothesis ( $H_1$ ) is generally considered correct answers by the respondents differ with the author.

### 4. RESULTS AND DISCUSSION

#### 4.1 Result of The Research

The result of software reliability analysis as in Figure 3, involving 100 respondents found out that 63% of respondents said that software had very complete feature, accurate and complete information, 72% said that it had good speed of service information, 70% said that was reliable in easy of finding information, and 73% said that it was the system very easy to use. Further, most users 63% said it was very safe and 74% said the documenting was very well.

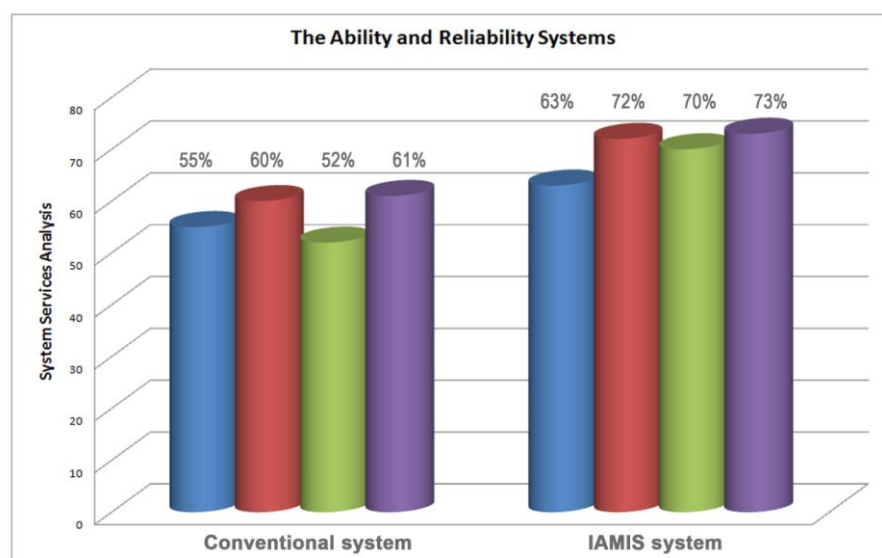


Figure 3. Result analysis of software reliability

In this study, sampling was conducted directly or indirectly due to filling out the questionnaire had to use a computer, so it is much easier if the respondent had known before. Of the 100 respondents who captured the majority of respondents expected. The analysis of Chi-Square value perception respondents were in line with expectations. Of the 30 questions posed to respondents, result in 22 units (72.51%) within their answers to the initial hypothesis. analysis of the range is the lowest 1.78% - the highest is 7.47%. Level of significance used was 1% ( $\alpha = .01$ ), while the three degrees of freedom ( $df = 3$ ), and in accordance with the four possible answers to each question. While 26.49% is the answer to a question which is not in accordance with the initial hypothesis.

Figure 4 presents this study was also conducted on the questionnaire, to know how big the need for user training. As much as 55% of all respondents who wanted more training to improve skills in the IT field, as much as 71% already have the knowledge to use computers, and 66% of respondents want a computer device up to date. As for result obtained from the research done is to find out the perception of the user to IAMIS system that desired in Udayana University. From the data analysis above hence before this system recommended to be implemented, it is need to be carried out training to all user, who later will be responsible to this system. Thereby all staffs involved have to apply recommended system. It is better that the system development refer to the existing activity path, so does with the design of its database, so the data exist is not necessarily to be migration to a new database to make more efficient. So does when there is an expansion, hence the HCI concepts need to be considered by the developer to do design and expansion from existing information system, so that the user is more familiar with the system developed.

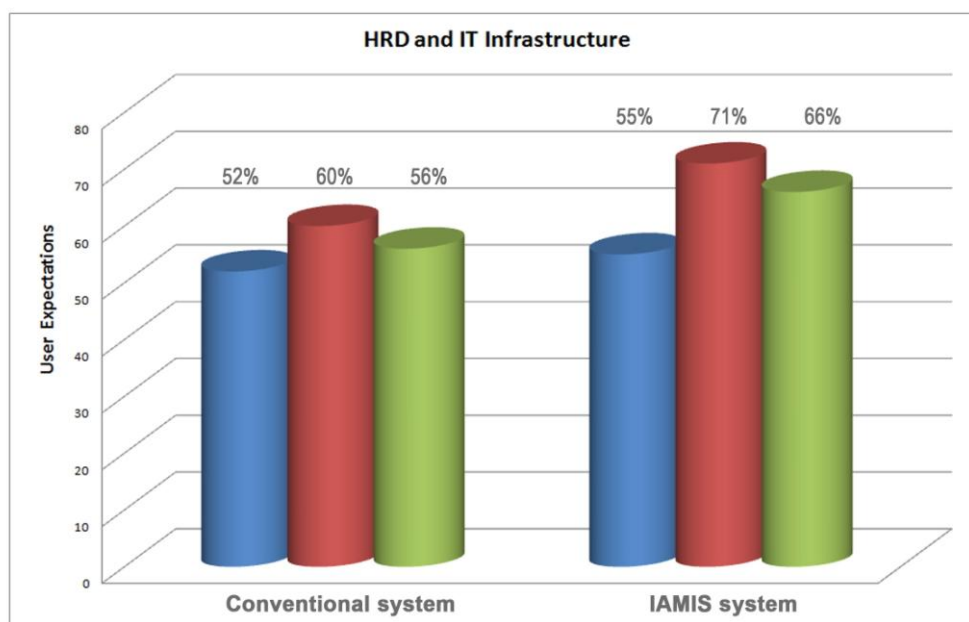


Figure 4. Skill and Infrastructure

#### 4.2 System Design

The IAMIS system programming that we recommended is written by Ruby on Rails (RoR) web-based programming language with MySQL. The design and output schema of link and navigation IAMIS system as shown in Figure 5. Database in this planning remain to apply old database architecture by adding some tables that has not yet exist [13].

This system is designed to be able to on-line (web-based). If this system really would upload, hence element of security still have to be thought and concern maturely, because in this design planning that made by the writer has not yet concern the security element of information system in more detail. This information system is designed by concerning the elements of Human Computer Interaction. Tool Help to user has been integrated in this system, although it still in simple appearance.



Figure 5. Output link and navigation of IAMIS system

The application of HCI in IAMIS system is succeeded if the user is really able to interact with this information system, so it will increase the performance of all personal involved in activity of this academic services area. The analysis of IAMIS system such as Figure 7, which designed base on Human Computer Interface and User Centered Design, then increase of user expectations such as easy access to online systems as much as 82%, the system had been oriented of user interface design as much as 74%, and the users' opinions about interaction, user friendly, and easily to understood by 70%.

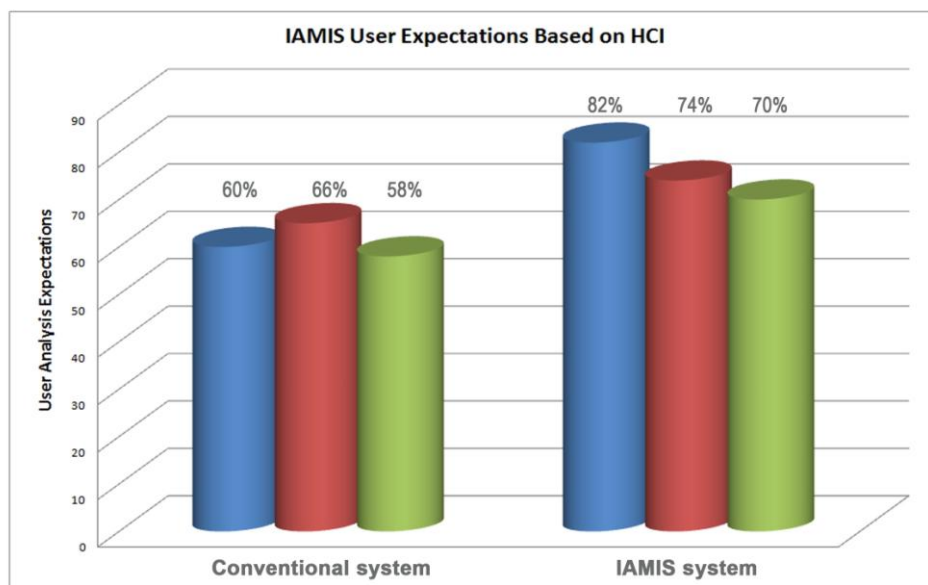


Figure 6. User expectations of IAMIS system

#### 4.3 System Output

This page has function to print data process yielded from various processes that have been done on page data process. While on this output printing of this process consist of; prints distribution of subject, prints learning process participant, prints lecture schedule, prints test schedule, print lecture presence, prints presence middle test, print presence final test, etc. On this page also equipped by icons that have function as symbol from each item, help menu text which exist have easier user functions to find other link and link navigation without have to toward either previous or next pages. Following are some appearances of IAMIS system as in Figure 7.

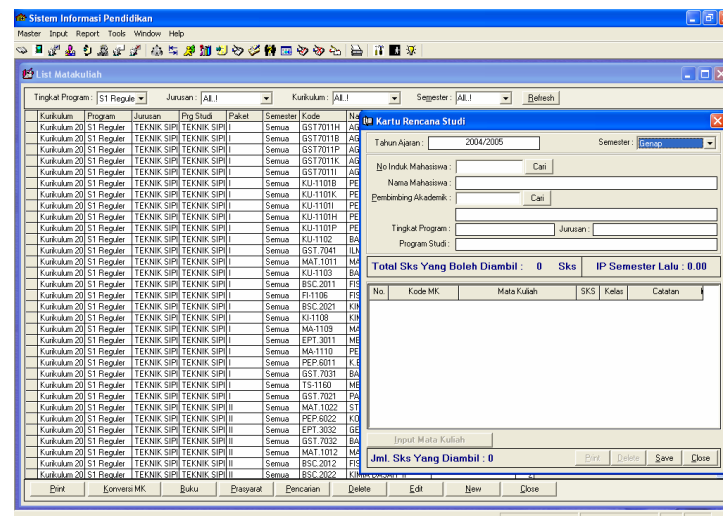


Figure 7. Transaction windows of IAMIS system

In Figure 8 presents the results of IAMIS implementation, such as an increase using of the system in one semester from 54% up to 70%, and user needs for information services academic field. from 62% up to 86%. With this results above as much as 21% of respondents expect to up to date computer infrastructure. This is accordance with their workload so that it should also be supported with adequate facilities and infrastructure.

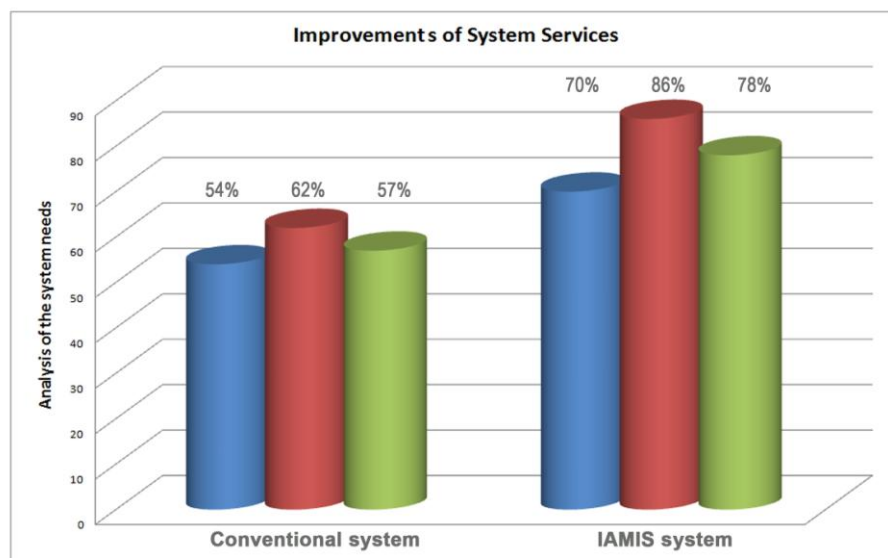


Figure 8. Impact of IAMIS implementation

## 5. CONCLUSION

From description that has been explained, hence can be concluded such as:

1. The previous academics system did not implement UCD and HCI based system design. This can be seen in the perception of the user who less feels users friendly herewith.
2. Writer does the design of Integrated Academic Management Information System (IAMIS) based on evaluation and some insufficient from the HCI concept that accommodated in the system design.
3. By implementing IAMIS there is an increase staff productivity by 12%, it also affects the improvement of information services to the academic community.
4. Recommendation of this design be able to online (web-based); so that if later the system will be implemented it has been based on online. This will facilitate the user to access it anytime and anywhere.



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## BIOGRAPHY OF AUTHORS



**Dr. Ir. Made Sudarma, M.A.Sc.**  
Computer System and Informatics,  
Department of Electrical Engineering,  
Faculty of Engineering, Udayana University.  
Bali, Indonesia. Phone/Fax : 62361703315  
e-mail: [sudarma@ee.unud.ac.id](mailto:sudarma@ee.unud.ac.id)



**Ir. Ni Wayan Sri Ariyani, MM.**  
Applied Electronic Engineering,  
Department of Electrical Engineering,  
Faculty of Engineering, Udayana University.  
Bali, Indonesia. Phone/Fax : 62361703315  
e-mail: [ari@baliyoni.co.id](mailto:ari@baliyoni.co.id)