

University of Science & Technology

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**A Comparative Study between Object Oriented Analysis
and Design and Structured Analysis and Design**

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Degree of Master of Information System

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ABSTRACT

When we need (as system analyst) to analyze and design a system we have to choose the suitable method to construct the system from the analysis to applying the system, this seems easy but there are many challenges faces systems analysts when they begin their jobs for many reasons, the mainly reasons are the different methodologies that appears in this field, the physics of the enterprise or business that they need to construct information systems to.

The existing methodology used primarily in systems industry for long years in building computer-based applications is known as structured systems analysis and design (SSAD). This methodology came into existence as a result of the structured programming techniques introduced in the 1970's. This structured systems development methodology (SDM) has been developed and used for many years in the real world with a great role played by systems analysts. For the last several years object-oriented languages have become increasingly more popular and more widely used in industrial organizations as well

as university institutions. This type of programming understand and form the problem in object concept and change it to applicable concept differs from SSAD concept. This methodology has become known as object-oriented analysis and design (OOAD). The OOAD strategy approaches the problem from an object perspective which is different from the traditional structured development methodology. During the last few years the increasing use of OOAD over the traditional structured development methodology has spread significantly, We found the systems analysts use the SSAD methodology to benefit from the advantages found in them and avoid the disadvantages in OOAD. As newer and more sophisticated object-oriented languages are created, there appears to be an even greater need for an object-oriented approach to develop business applications. In this thesis I made a scientific comparison for the two methods, definition, use, advantages, disadvantages and the possibility of use for each methodology.

مستخلص البحث

عندما نرغب كمحللي نظم فى تحليل وتصميم نظام يجب ان نختار المنهج المناسب لبناء النظام من التحليل الى تطبيق النظام، هذا يبدو سهلا ولكن هناك الكثير من التحديات التى تواجه محللى النظم عندما يبدأون عملهم للعديد من الاسباب، الاسباب الاساسيه تتمثل فى المناهج المختلفه وطبيعة نظم الاعمال التى نرغب فى بناء نظام معلومات لها، المنهج الموجود والمتبع فى صناعة الانظمه لسنوات طويله لصناعة التطبيقات المبنيه على الحاسب يسمى منهج التصميم المهيكل، هذا المنهج اتى الى الوجود كنتيجه لتقنيات لغات البرمجه المهيكله التى بدأ إستخدامها فى السبعينات، هذا المنهج المهيكل تم استخدامه لعدد من السنوات فى مجال الاعمال مع الدور الكبير لمحللى النظم، فى السنوات الاخيره تم استخدام لغة البرمجه الكائنيه بصوره رائجه وواسعه فى مجال الاعمال والمؤسسات والجامعات والمعاهد، ومع استمرار هذا الاتجاه من نوع البرمجه الذى ساعد المبرمجين على البرمجه بإستخدام البرمجه الكائنيه، هذا المنهج عرف بالتحليل والتصميم الكائنى ، إن إستراتيجية التحليل والتصميم الكائنى تقوم بفهم وصياغة المشكله من مفهوم كائنى الى مفهوم عملى تطبيقى بطريقه مختلفه عن منهج التحليل المهيكل، فى السنوات الاخيره ازداد إستخدام المنهج الكائنى على المنهج المهيكل وذلك لمميزات موجوده فى هذا النوع ولكن هناك بعض الحالات التى يتم فيها الى الان لتفاعدى العيوب او

للاستفادة من مزايا المنهج الكائنى. وبالتالي ظهرت الحاجة الكبيره الى استخدام المنهج الكائنى لتطوير تطبيقات الاعمال. فى هذا البحث قمت بتعريف كل المنهجين المستخدمين فى التحليل والتصميم والادوات المستخدمه فيهما ومزاياهما وعيوبهما والمخاطر عند استخدام المنهج الكائنى كما قمت بالمقارنه العلميه بينهما وإمكانية استخدام كل طريقه منهما.



Introduction

1.1 An Overview

The goal of systems analysis & design

It is often difficult to explain what is achieved by System Analysis and Design, especially when talking to a user who wants a system tomorrow and does not know what System Development Life Cycle (SDLC) is.

Systems analysis and design, as performed by systems analysts, seeks to understand what humans need to analyze data input or data flow systematically, process or transform data, store data, and output information in the context of a particular organization or enterprise. By doing thorough analysis, analysts seek to identify and solve the right problems. Furthermore, systems analysis and design is used to analyze, design, and implement improvements in the support of users and the functioning of businesses that can be accomplished through the use of computerized information systems.[1]

Installing a system without proper planning leads to great user dissatisfaction and frequently causes the system to fall into disuse. Systems analysis and design lends structure to the

analysis and design of information systems, a costly endeavor that might otherwise have been done in a haphazard way. It can be thought of as a series of processes systematically undertaken to improve a business through the use of computerized information systems. Systems analysis and design involves working with current and eventual users of information systems to support them in working with technologies in an organizational setting.

User involvement throughout the systems project is critical to the successful development of computerized information systems. Systems analysts are the other essential component in developing useful information systems.

Users are moving to the forefront as software development teams become more international in their composition. This means that there is more emphasis on working with software users; on performing analysis of their business, problems, and objectives; and on communicating the analysis and design of the planned system to all involved.

System Development Life Cycle Concept (SDLC):

System Development Life Cycle (SDLC) is the procedure which declares and illustrates how can a programming system

support the current system? Analysis and design means achieving the requirement of the software system. The user may have his own home computer or has a friend and knows that a system can be developed which will solve a problem in a few time, if systems are easy to develop, why do systems in the business environment take so long, need these special methods and become very expensive?

To give a simple example, consider that you have an area of land; wish to build a house, a villa, a huge building or you need to build a factory, university or any other enterpriseetc. You could go to where materials found, buy all the materials and build it yourself, the building you made completed with week walls insufficiently strong to hold the roof, drains are insufficient etc.... , You failed to plan what you were going to do.

Instead you could have requested a builder to build your house. He knows how to build the walls with the correct strength, lay the drains, and install electricity. Do his ideas of size and shape match with your building requirements?

To build your own home you must define your exact requirements in such a way that you and the builder are happy

that you understand what you want is going to be built, and that nothing has been overlooked or misinterpreted. You would hire an architect to draw a plan (pictures, diagrams) of your exact requirements, and superimpose on them all the rules and regulations for building houses. The builder would take his plan and produce a house to these specifications.

The same is like establishing (building) factories, Farms, Malls, etc., we can also compare it with the Stakeholders' needs to benefit from their enterprises, therefore there should be a feasibility study; is the system feasible or not therefore we have to consider the feasibility by studying and evaluating the economy study, the operational study and organizational study.

This simple example illustrates the need to specify the exact requirements of the house before construction begins. This example applies to computer systems.

If the architect is replaced by the systems analyst and the builder by the system builder (Programmer) the analogy is appropriate. The systems analyst discusses with the user his requirements to identify what is needed from the new system and produces a required system specification. After consultation with the user the analyst, together with the system designer

produces several solutions for the user to choose from. Once the choice has been made the system can be built.

1.2 Problem Definition

If we need to build a software system we can use one of the methodologies; either Object Oriented Analysis and Design or Structured Systems Analysis and Design.

Software systems are complex to create. They perform many functions; they are built to achieve many different and often conflicting objectives.

To conquer complexity Object Oriented techniques are used, in this way we discuss, describe use and compare it with traditional techniques.

1.3 Research Objectives

The objectives of the thesis are:

1. To be aware of the common methods of development methods.
2. To Compare between Structured Systems Analysis and Design (SSAD) and Object oriented Analysis and Design (OOAD) development methods.

3. To focus on Structured Systems Analysis and Design (SSAD) and Object Oriented Analysis and Design methods and their advantages, disadvantages, risks vs. traditional methods.

4. To acquire a practical experiences on system development using Object Oriented Analysis and Design methods

1.4 Research Questions

1. What do we mean by Systems Analysis and Design?
2. What are the stages of Systems Analysis and Design?
3. What is the different between SSAD & OOAD?
4. How to choose a certain methodology?
5. When you choose a certain methodology?
6. What are the troubles faces any methodology?

1.5 Research Methodology

In this thesis we use both descriptive and experimental methods, to describe the steps of building Information Systems and tools used in SSAD & OOAD, the differences and similarities in implementing, advantages and disadvantages of each of them the benefits of using OOAD, the risk of using OOAD.

The tools used in this thesis are: Text books, Internet, Journals, previous researches etc

1.6 Thesis Structure

The structure of the thesis would come in those chapters:

Chapter One: Introduction.

Chapter Two explains what methodology is? What SSAD is?

And what OOAD is?

Chapter Three discusses the tools that are used in each methodology.

Chapter Four is an empirical Analysis and Design for A suggested system using SSAD and OOAD.

Chapter Five illustrates the advantages and disadvantages of each methodology the benefits and of OOAD and recommendation of the thesis.