Competency Assessment Parameters for System Analyst Using System Development Life Cycle

A Sugiandi* and Y Kerlooza

Department Of Magister Information System, Universitas Komputer Indonesia
Jl. Dipatiukur No. 112-116 Bandung, Jawa Barat, Indonesia

*ade@mkitech.co.id

Abstract. The purpose of this research is to know the parameters of the competencies required by the systems analyst in a software development project. Software development methods used is Software Development Life Cycle (SDLC). The use of SDLC development software project consists of several stages that must be passed, each of these stages require a competence technical qualifications to suit the needs of the project one needs system analyst. In the development of a software project system analyst must be able to adjust the required competencies to the needs of every software development. By using the methods of the SDLC can identify the competencies needed by a system analyst in developing software projects.

1. Introduction

Software Development Life Cycle (SDLC) is the traditional system development methods used most by organizations today, is a framework that provides a structured sequential processes in the development of information systems [1]. The stages of the SDLC begin with planning, requirement analysis, designing, programming / coding, testing and maintenance. Each stage of the SDLC involves a number of personnel who have special competencies such as in the stage of requirement analysis and design required Systems Analyst personnel, designing stages required programmer and so on.

Expert Systems Analysts have an important role in the development of Information Systems, providing ideas and suggestions to support and improve business processes, help design new business processes supported by Information Technology, design new information systems and ensure that all information systems maintenance can be done [2].

David Graf and Mark Misic say an analysts work individually but very closely related to the team members and users, system analyst activities are performed to analysis existing system, determining the scope and purpose of the system, determining requirement of the new system, and interviewing users [3-5].

Sayani’s (1997) predicted that systems analysts should concentrate stronger on the front-end and development of information system life cycles, in addition to the role of systems analysts is required in verification [6].

To determine the requirements of information systems needs to be determined technical competencies that must be owned by a system analyst in handle a software development project. Therefore, from these problems this study aims to determine the parameters needed by a system analyst in doing software development, with Software Development Life Cycle (SDLC) [7-11].
2. Research methodology
In the software development process using System Development Life Cycle (SDLC) method there are several stages: requirement analysis, design, implementation, testing, deployment and maintenance [8] (figure 1).

![SDLC cycle](image)

Figure 1. SDLC cycle.

Figure 1 shows the SDLC process in building a software. Here is an explanation of each step in the SDLC:

2.1. Planning and requirement analysis
In the initial process of planning and requirement is a step to identifying and ensuring problems, determine and identify the scope of the system, system feasibility analysis, system proposals, and monitoring mechanisms built from the beginning. It also analyzes each user's requirements, types of systems used, system criteria, system security, systems backup, integration rules and initial system design. This stage is a discussion of the requirements for software development, the goal is to take all the details of the project including the requirements and scope of work [8].

2.2. Design
The design stage is the stages of identification alternative systems, configuration evaluation, preparing data diagrams, data dictionaries, structure diagrams, rational models, and class specifications. The design stage decides how the system operates in a hardware, software, and network infrastructure [2].

2.3. Implementation
Implementation stage is the step of translating each design both requirements and design into program, fulfill hardware resource, software, prepare database, and implementation proposal.

2.4. Testing
Testing is part of the system-testing scenario, monitoring system in the testing stages, and records any findings obtained in the testing phase and reports the documentation to follow-up.

2.5. Maintenance
The last stage is the stage of maintenance that is technical assistance during the application run, the database backup process, and fix any errors or bugs found during the application run.

Competence is anything that is associated with the skills, knowledge, and attitudes that serve as a guide in doing the job responsibilities by experts [3].
In working on any software development project besides understanding the SDLC method a system analyst must have the necessary competencies in software development.

3. Results and discussion
In software development using the SDLC method consists of several stages and each stage has a responsible person in the completion of such stages as described in table 1:

**Table 1.** Step of SDLC and personal in charge [2].

| No. | The Step Of SDLC       | Personal In Charge          | Type   |
|-----|------------------------|-----------------------------|--------|
| 1.  | Planning               | Project Manager             | Main   |
|     |                        | System Analyst              |        |
|     |                        |                              | Support|
| 2.  | Requirement Analysis   | System Analyst              | Main   |
|     |                        | Technical Writer            |        |
|     |                        |                              | Support|
| 3.  | System Design          | System Analyst              | Main   |
|     |                        | Technical Writer            |        |
|     |                        |                              | Support|
| 4.  | Implementation         | Programmer                  | Main   |
|     |                        | Database Engineer           |        |
|     |                        | UI/UX Engineer              |        |
|     |                        |                              | Support|
| 5.  | Integration & Testing  | Quality Assurance           | Main   |
|     |                        | Quality Control             |        |
|     |                        | System Analyst              |        |
|     |                        |                              | Support|
| 6.  | Maintenance            | Technical Support           | Main   |

In table 1 describes about role distribution in team are involved in each stages of software development process, divided into two roles that is the main role and supporting role.

3.1. Team involvement in the planning stage
In the planning process involved two parties namely project manager with system analyst. In this case, project manager has a major role in completing the planning stage while the system analyst only acts as a supporter in that stage.

3.2. Team involvement in the requirement stages of analysis
In the requirement stage, system analyst with technical writer determine the system requirements to be built. In this case the system analyst has a major role in determining each system requirements accompanied by a technical writer.

3.3. Team involvement in the system design stage
In design system, system analyst and technical writer play a role. The main role is held by the system analyst to ensure each design is built in accordance with the requirements defined.

3.4. Team involvement in implementation
The implementation stage is the stage of programming that is implemented from the previous stages and major role in this process is a programmer with database engineer who implements every design into the program to be created.

3.5. Team involvement in integration and testing
In the testing process there are several personnel involved are quality assurance, quality control, and system analyst. In this process system analyst play as supporting role to monitor any program testing.
3.6. Team involvement in maintenance
In the maintenance process only technical support that play a role to ensures every running application is monitored and recorded in case of bugs or errors in the application.

In the competence which is needed in development software, system analyst is categorized into two competencies as the main competence and as a support competence. In order for the software development process to run properly, a system analyst must have the required competencies in the stages of requirements analysis and design system (table 2).

Here are the main competencies that a system analyst must possess:

| Table 2. Competency of system analyst. |
|------------------------------|---------------------------------|-----------------|
| **Phase / Tahapan** | **Step / Tahapan Rinci** | **Teknik / Metode** |
| Requirement Analysis | Develop analysis Strategy | Business Process Automation |
| | | Business process improvement |
| | | Business process reengineering |
| Main Output: | Create Use Cases | Use Case Analysis |
| Software Requirement Specification | Model Processes | Data Flow Diagram |
| | Model Data | Entity relationship modeling |
| | | Normalization |
| System Design | Design architecture | Architecture design |
| Main Output: | | Hardware & software selection |
| System Design Specification | Design interface | Use scenario |
| | | Interface structure |
| | | Interface standards |
| | | Interface prototype |
| | | Interface evaluation |
| Design programs | Data flow diagram | |
| | Program structure chart | |
| | Program specification | |
| Design databases and files | Data format selection | |
| | Entity relationship modeling | |
| | Denormalization | |
| | Performance tuning | |
| | Size estimation | |

In table 2 shows every competence that must be owned by a system analyst in doing software development. In requirement analysis stage a system analyst must be able to pass through and understand about the stages of develop analysis strategy, use case, process model, and data model. To support these stages, a system analyst must master in business process automation technique, process improvement, reengineering, use case analysis, DFD, ERD, and data normalization.

Meanwhile, at the stage of system design the stages must be mastered by system analyst are architecture design, interface, program and database. To support the process a system analyst must master the design architecture, interface, DFD, ERD, normalization and denormalization. Output generated by a system analyst in software development of each process is Software Requirement Specification (SRS) and System Design Specification.
4. Conclusion

Systems analyst must have the competence to support each process on software development to run well. Systems analyst almost involved in every process of software development that is planning process, requirements, system design, and testing program. The main competencies that must have by system analyst are develop analysis strategy, use case, process model and data, architecture design, interface, program and database.

Acknowledgements

Thanks to PT. Mediatama Kreasi Informatika (MKI) are willing to be a place for the research.

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