

Unit 35: Systems Analysis & Design

Unit code	L/618/7451
Unit level	5
Credit value	15

Introduction

The world is constantly changing, with new and emerging digital technologies bringing many challenges to the commercial world. Organisations and the systems they use to run their businesses have to respond quickly to these transformations. Organisations can find themselves in a situation where they have to regularly upgrade old systems or develop new ones in order to continue operating successfully in the evolving competitive business environment. Before any system can be upgraded or a new system developed, the system requirements have to be analysed and the system designed, whether a database system, or a web, game or mobile application, and failure to do this adequately could lead to a costly systems failure.

Students will explore the processes of systems analysis and design using two methodologies – the traditional systems development lifecycle methodology providing a comprehensive structured framework and the agile methodology with different framework models developed with the emphasis on variations of iterative incremental modelling. To provide perspective, students will examine the models in both these methodologies. They will consider the particular strengths and weaknesses of the two methodologies and examine the suitability of the methodologies using different examples.

Topics included in this unit are examining the business case for a new system or for upgrading an existing one, looking at traditional and agile systems analysis methodologies and evaluating the merits of each, considering the implications of moving from using the traditional methods of analysis and design to agile methods on analysts, designers and developers in an organisation, and applying systems design tools and techniques. On successful completion of this unit, students will be able to produce a business case, and analyse a system and its requirements using a suitable methodology. They will be able to design a system suitable for their application. Theoretical understanding will be translated into practical skills through actual systems investigations and students will become confident in the use of particular tools and techniques relevant to the methodology chosen. Although for practical purposes it is likely that one particular methodology and related tools and techniques will be used, it is important that students understand that others are available.

Students will develop skills such as communication literacy, critical thinking, analysis, reasoning and interpretation.

Learning Outcomes

By the end of the unit students will be able to:

- LO1 Evaluate the strengths and weaknesses of the traditional and agile systems analysis methodologies
- LO2 Produce a feasibility study for a system to be developed to solve a business-related problem
- LO3 Assess systems analysis methodologies to effectively solve business-related problems
- LO4 Design a system to meet user and system requirements

Essential Content

LO1 **Evaluate the strengths and weaknesses of the traditional and agile systems analysis methodologies**

Principles of the traditional Systems Development Life Cycle (SDLC) models, including Waterfall, Prototyping and Spiral.

Principles of agile methodologies models, including Scrum, Extreme, Lean, Scaled Agile Frameworks (SAFe), Disciplined Agile Delivery (DAD), Kanban, Disciplined Agile Delivery (DAD), Agile Modelling (AM) and DevOps, among the many variations.

Strengths and weaknesses of traditional and agile methodologies.

Identify transition problems in organisations of moving from traditional to agile methodology.

Factors that need to be considered when selecting the appropriate methodology to use.

LO2 **Produce a feasibility study for a system to be developed to solve a business-related problem**

Elements of a business case to explore both business and technical feasibility options.

Desirability, viability and feasibility of systems. Investigation techniques to use.

Criteria to consider for a business case: vision and goals cost-benefit analysis, legal, economic, technical, operational, timeframes, organisational culture, security considerations.

LO3 **Assess systems analysis methodologies to effectively solve business-related problems**

Tools used to investigate the system.

Identifying user and system requirements and any constraints, including possible security issues.

Identifying the team members and their roles and responsibilities in a project team.

Identifying documentation that will be produced at the different stages and determining the sign-off conditions.

Criteria to use to determine the suitability of the methodology used to analyse the system.

LO4 Design a system to meet user and system requirements.

Determining the tools and techniques relevant for the design of systems for database applications, web applications, games, mobile applications and other software applications.

Identifying the design documentation contents for different application types, e.g. for databases, web design, games, mobile and other software applications.

Design sign-off.

Learning Outcomes and Assessment Criteria

Pass	Merit	Distinction
LO1 Evaluate the strengths and weaknesses of the traditional and agile systems analysis methodologies		D1 Critically evaluate the strengths and weaknesses of the traditional and agile methodologies and feasibility study in solving a specific business-related problem.
P1 Discuss the strengths and weaknesses of the traditional and agile systems analysis methodologies.	M1 Compare the strengths and weaknesses of the traditional and agile systems analysis methodologies with reference to a specific business-related problem.	
LO2 Produce a feasibility study for a system to be developed to solve a business-related problem		
P2 Produce a system feasibility study for a business-related problem.	M2 Evaluate the importance of the feasibility criteria in the systems investigation for the business-related problem.	
LO3 Assess systems analysis methodologies to effectively solve business-related problems		D2 Justify the choice of the methodology used in the context of the business problem.
P3 Review a system using a suitable methodology for a business-related problem.	M3 Assess the effectiveness of the methodology used in providing a solution for a given business context.	
LO4 Design a system to meet user and system requirements		
P4 Design a fully functional system to meet user and system requirements for a business-related problem.	M4 Assess the effectiveness of the system design, with reference to the methodology used and how the design meets user and system requirements.	

Recommended Resources

Textbooks

Ambler, S. and Lines, M. (2012) *Disciplined Agile Delivery (DAD): A Practitioner's Guide to Agile Software Delivery in the Enterprise*. IBM Press.

Dennis, A. and Wixom, B. (2021) *Systems Analysis and Design*. 5th Ed. International Student Version. John Wiley & Sons.

Dingsøy, T., Tore Dybå, T. and Moe, N. B. (eds) (2010) *Agile Software Development: Current Research and Future Directions*. Springer.

Hoffer, J., George, J. and Valacich, J. (2015) *Essentials of Systems Analysis and Design*. Global Edition. Pearson.

Hoffer, J., George, J. and Valacich, J. (2020) *Modern Systems Analysis and Design*. 9th Edition. Pearson Higher Ed.

Kenneth, K. and Kendall, J. (2019) *Systems Analysis and Design*. 10th Ed. Pearson.

Larman, C. (2004) *Agile and Iterative development: A Manager's Guide*. Addison-Wesley Professional.

Martin, R. C. (2013) *Agile Software Development, Principles, Patterns, and Practice*. New International Edition. Pearson.

Journals

The Computer Journal - Oxford Academic

Journal of Emerging Trends in Computing and Information Sciences - Eldis

Journal of Systems Analysis and Software Engineering - American Scientific Publishers

Web

agilemodeling.com

Agile Modelling
Agile Analysis (Article)

batimes.com

Resources for business analysts
Applying Agile Principles To Requirement Analysis (Article)

sparcedge.com

SPARC
What an Agile Design Process Looks Like (Article)

Links

This unit links to the following related units:

Unit 6: Planning a Computing Project

Unit 7: Software Development Lifecycles.