Industrial, Manufacturing, & Systems Engineering College of Engineering

Systems Engineering Project Practicum Summary

Project Title:	Instructional Design Team of Academic Technologies
Team members:	1. Venzor, David 2. Muro, Margarita 3. De La Rosa, Angel 4. Corral, Karla 5. Betancourt, Aleida
Semester, year:	**Spring 2016**
Type of project:	**Individual project at students work ( )** **Team project assigned by instructor (X)** **Project proposed by team ( )**

Insert Individual / team

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INTRODUCTION

The System Engineering Project Practicum provides the opportunity to apply System Engineering concepts in developing a real system and create documents that formally describe the system. Students review documents and validate them with clients and customers through formal presentations. Teams are self-managed and assign roles to control planning, quality, requirements, design, and implementation.

System Overview

Project Overview

This project consisted of documenting and standardizing the processes used by ID-AT for carrying out activities anc completing service transactions. As part of this effort:

1) A Service Level Agreement (SLA) was drafted to define the customer and provider requirements in a phasec timeline.
2) Service System components, their external interfaces, and their task allocations will be defined anc documented.
3) Service Request Management and Incident Management Sub-Systems will be introduced utilizing the existinc system components.

ID-AT processes will be abstracted into groups of activities and structured to conform to the CMMI Service Systerr Lifecycle framework. This framework combined with the above implementations will in turn introduce structure to the overall process by providing a phased guideline for the execution of activities and delivery of overall system services.

This project is a collaboration between ID-AT and the UTEP Systems Engineering program for the Spring 2016, SE Project Practicum course. The project and any documentation produced will serve as guide to ID-AT, but will not be the standard for the time being

Current Problem & Significance

An absence of structure and traceability often results in decreased customer satisfaction, increased risk, anc increased error rates.

The Instructional Design Team of Academic Technologies (ID-AT) benefit from a structured and standard process fo executing and completing service transactions with their customers. During the execution of service, a lack o prearranged communication with the customer combined with heavy workloads can lead to missed deadlines and low quality of work. Prior to execution of service, it is important to lay out a standard agreement defining customer anc provider requirements, have a well-defined model of the service system components and their external interfaces, anc maintain a uniform allocation of tasks among system components for completion of service transactions.

It is important to introduce a structured and standard process as well as adopt a well-defined understanding o requirements and timelines that both customer and provider should adhere to for completing service transactions This will provide schedule and task traceability as well as an avenue for correcting deficiencies in a timely manner This will ultimately promote the assurance of service attributes that meet customer needs and increase overal customer satisfaction.

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System Description

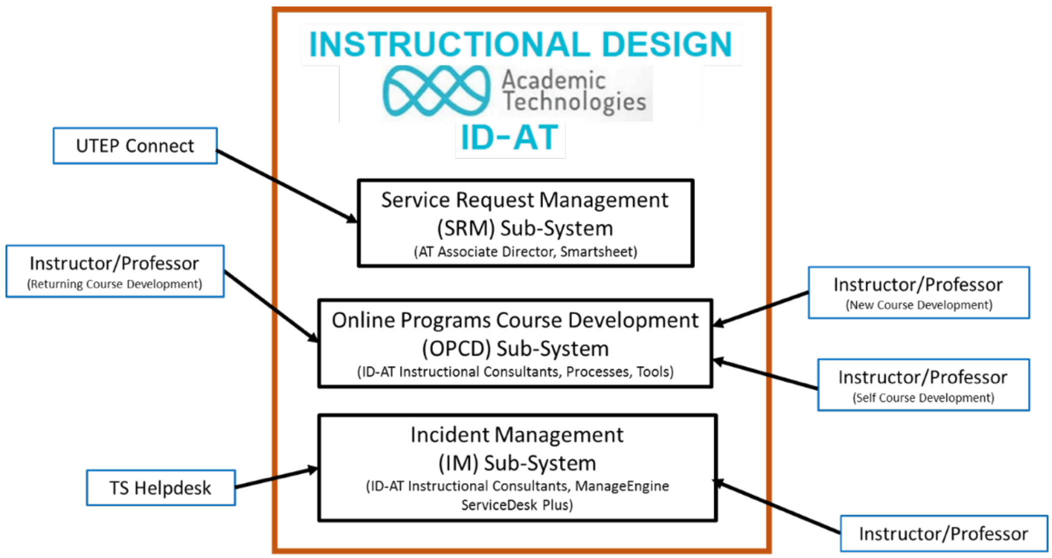

Figure 1.0 – External System Entities Diagram

The figure 1.0 shows a high level depiction of the three ID-AT Service System Sub-Systems and their external interactions.

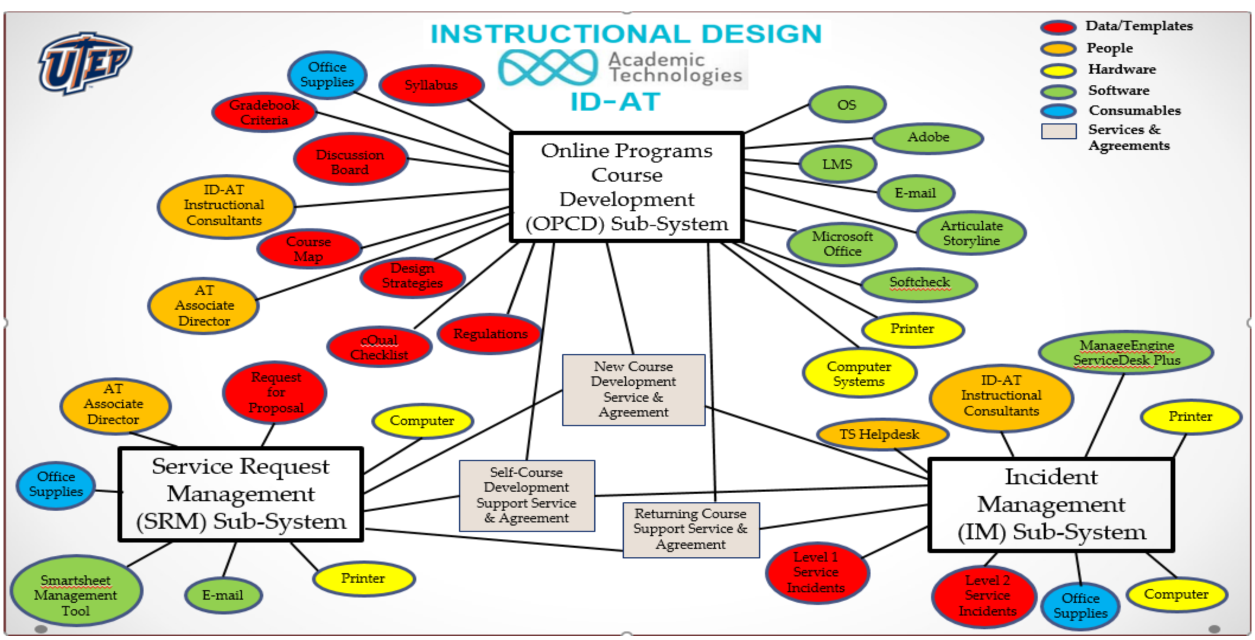

Figure 1.1 Service System Diagram

The figure 1.1 shows a general depiction of how the ID-AT Service System fits as a sub-system of the overall Academic Technologies organization. It consists of tools, people, and processes working together to provide online course development services for UTEP's academic departments.

Figure 2.0 Use Case Diagram

The diagram represents the user interaction with the system that show the relationship between the user and the use case in which the user is involved.

List of Actors

1) Instructor/Professor – User of the ID-AT Service System
2) ID-AT Instructional Consultant – ID-AT personnel who perform consultations, instructional design, and course development.
3) TS Helpdesk – Provides online interface for users to report incidents for support and/or maintenance.

List of Scenarios

1) New Course Development
2) Returning Course Development
3) Self-Course Development
    i. New Course
    ii. Returning Course

4) IM
   i. Level-2 incident

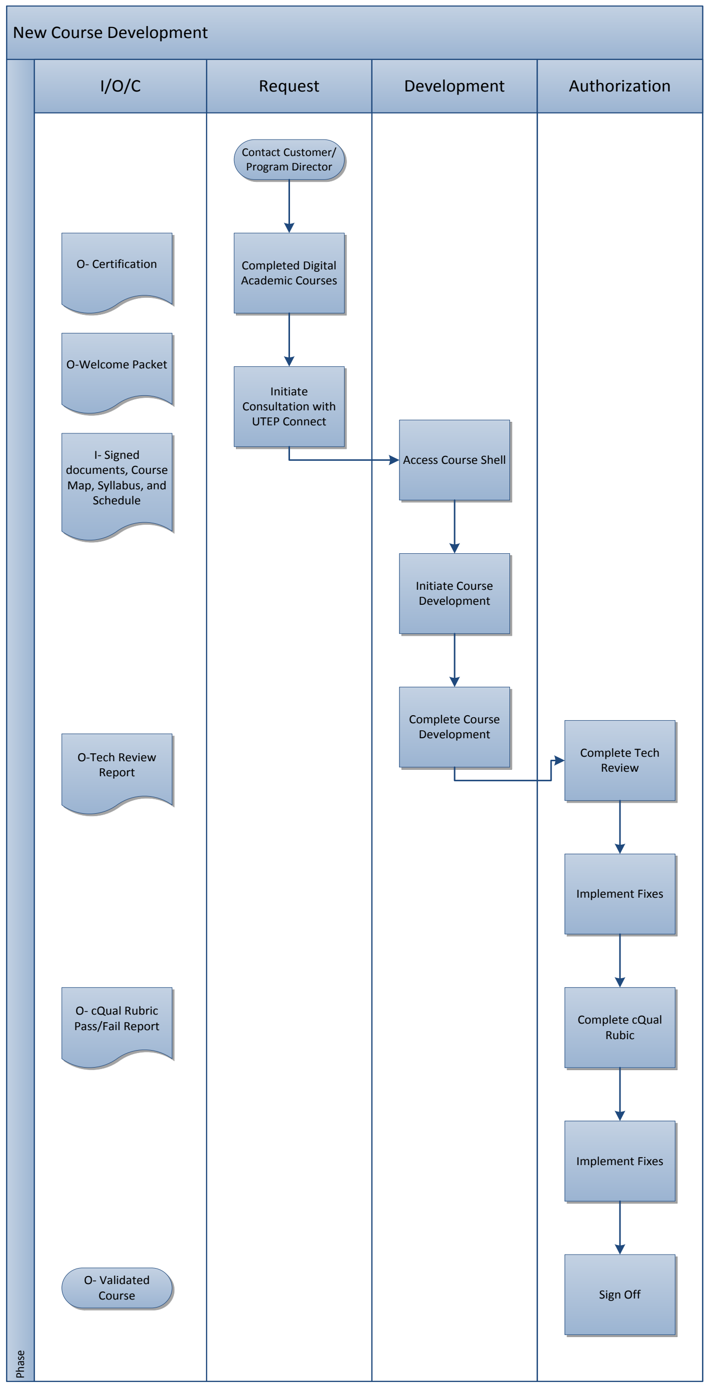

Figure 2.1- Activity Diagram: New Course Development

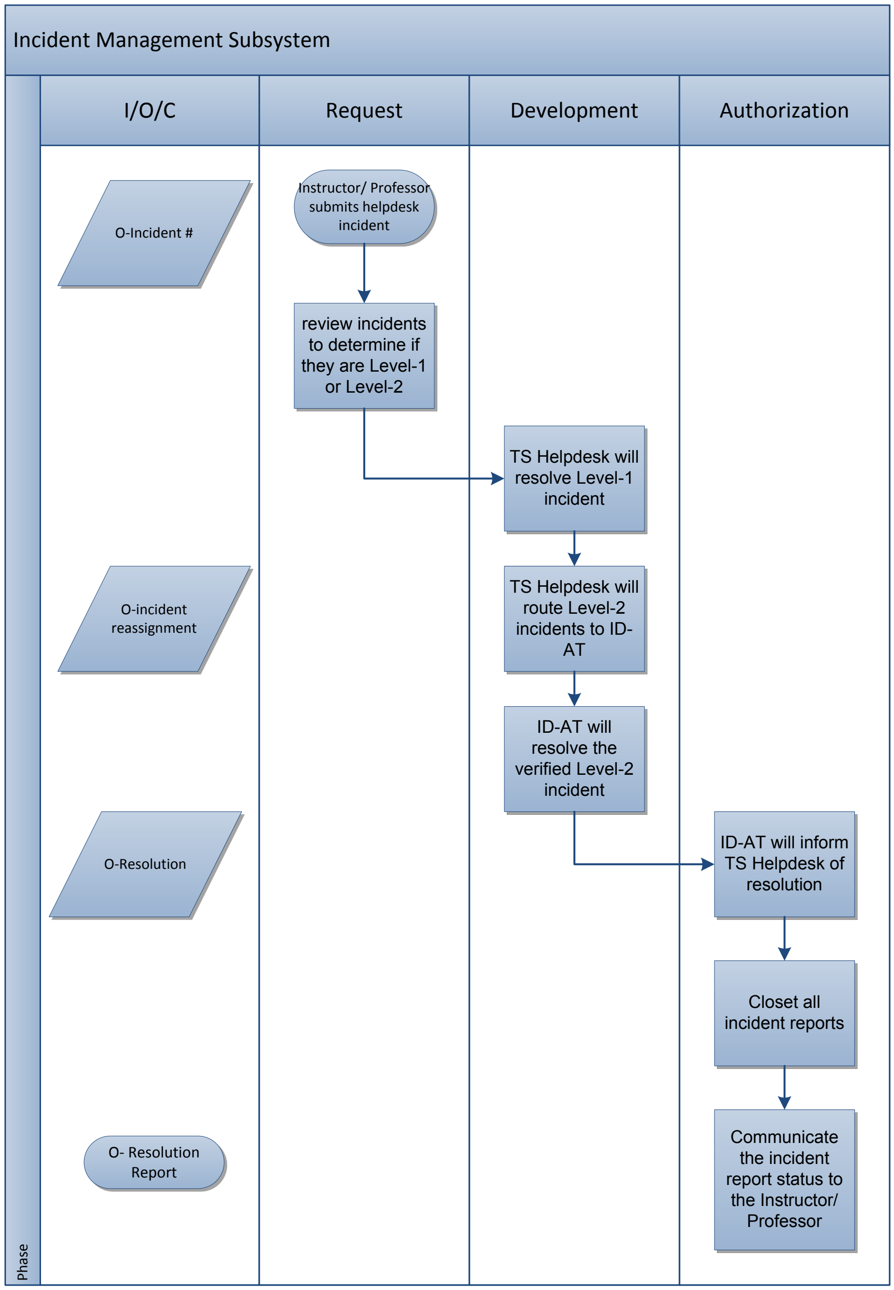

Figure 2.2- Activity Diagram: Incident Management Sub-System

Activity diagrams depict the flow of steps (actions) and input, output,& control points (I/O/C) within a component, subsystem and system. An activity specifies transformation of inputs to outputs through a controlled sequence of actions. Figure 2.1 illustrates the activity flow of the new course development process. Figure 2.2 illustrates Incident Management Sub-System process.

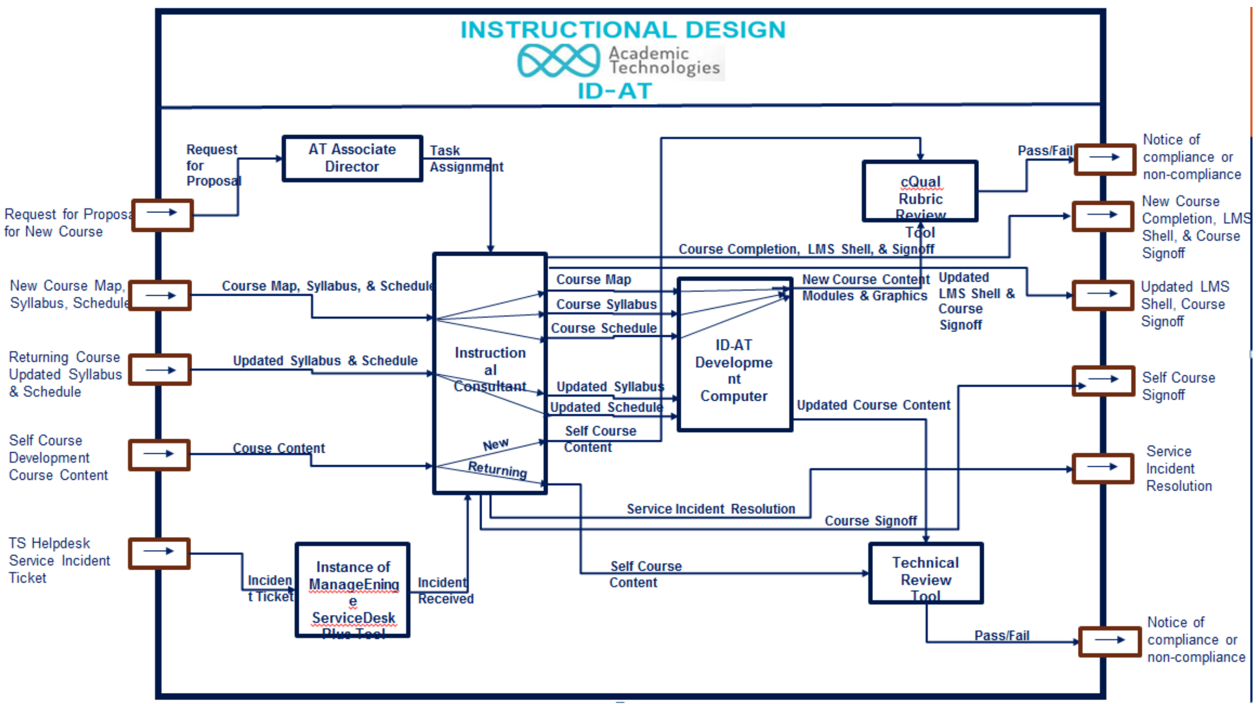

Figure 2.3 Internal Block Diagram

Internal Block Diagram (IBD) describes the internal structure of a block in terms of its properties and connectors. IBD specifies interconnection of parts.

PROJECT OUTCOMES

Our diagrams facilitated ID-AT's comprehension of the system engineering processes employed. As ID-AT restructures their organization, they will utilize our work products as reference for developing their processes and improving overall service delivery.

As the project developed our appreciation of the project's true needs, scope, and functionality also developed. We were able to take appropriate corrective actions and realign to provide a verifiable product to ID-AT. The fluidity associated with firming up the project's purpose and scope resulted in many changes that often trickled down through multiple work products. Performing document reviews through the use of Checklists and defect logs was a cornerstone to maintaining uniformity and consistency throughout the multiple work products. The quality analysis is an invaluable metric to ensure that the project is being controlled. It is important to have numbers to substantiate project progression and quality to provide to the team, customer, and stakeholders. It is also essential to use it as a benchmark for continuous improvement. In order to improve you have to recognize how you are performing initially. Our recommendation would be to always have communication with your customers, stakeholders, and team. All viewpoints must be considered and aligned in the interest of a successful project. Verification should be done at all decision gates in order to avoid wasted work effort, time, and resources.

		Conceptual Phase	Conceptual Review	System Requirements Phase	System Requirements Review	SEM Plan Phase	SEM Plan Review	Prototype Phase	Prototype Review	Design Phase	Design Review	Implementation Phase	Implementation Review	Unit Testing Phase	Integration Testing Phase	System Testing Phase	Total Lifecycle
	Time (hr)	63.5	17.7	47.2	43.5	19.5	5.5	13.9	5.7	21.5	14.6	134.7	53.8	21.5	32.3	32.3	527.2
B	Time (%)	12.0%	3.4%	9.0%	8.3%	3.7%	1.0%	2.6%	1.1%	4.1%	2.8%	25.6%	10.2%	4.1%	6.1%	6.1%	100%
C	# Defect Injected	133		114		17		8		63		142					477
D	% Defect Injected	27.9%		23.9%		3.6%		1.7%		13.2%		29.8%					100%
E	Injection Rate (defect/hr)	2.1		2.4		0.9		0.6		2.9		1.1					
F	# Defects Removed		42		116		17		8		152		81	28	19	14	477
G	% Defect Removed		8.8%		24.3%		3.6%		1.7%		31.9%		17.0%	5.9%	4.0%	2.9%	100%
H	Removal Rate (defect/hr)		2.4		2.7		3.1		1.4		10.4		1.5	1.3	0.6	0.4	
I	Defect Removal Leverage (DRL)		1.8		2.0		2.4		1.1		8.0		1.2				
J	Yield (%)		31.6%		56.6%		16.0%		8.2%		100.0%		57.0%	45.9%	57.6%	100.0%	
K	Step Size	11		259		8		23		96		80		16	9	6	508
L	Defect Density		3.82		0.45		2.13		0.35		1.58		1.01	1.75	2.11	2.33	

Our team members brought different personalities, skills, and experiences to the project. All served a purpose and was the foundation for our soft skills improvement. Time constraints were the catalyst for refining our verbal communication, writing, humor, listening, interviewing, strategic planning, delegating, conflict resolution, time management, decision making, and negotiating.

What did you learn by doing this project?
Understanding our customer in order to interact and elicit cooperation from them was a critical takeaway. We learned the significance of RACI matrix, N2 diagrams, Service Level Agreements, and Activity diagrams with swim lanes to include Inputs, Outputs and Control points. Applying these to our deliverables aided in acquiring validation from our customer.

What impact had this class in our job?
The team members who are working professionals implemented use of the Block Definition Diagram, the Internal Block Definition Diagram, the RACI matrix, and requirements elicitation and realization to their business activities.