Systems Development Life Cycle Course Project

IS315 – Computer Systems Analysis and Design I

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Abstract

System development requires an extensive and specific process to meet the client’s goals and vision. The Systems Development Life Cycle (SDLC) evolved from this concept and was later broken down into four phases: planning, analysis, design, and implementation. With this process, IS professionals can more effectively gather information and requirements to create a plan of action suitable to the client’s needs, analyze such information to make sure it maintains focus on the client’s goal, design it as it should be expected, and lastly, build it with the intent to release and eventually deploy the newly developed system. Depending on the complexity of the needed system and the methodological approach being used, the SDLC can last from a few weeks to months and years at end. Having this in mind, Scenario 2 calls for a new system to be developed for the South Dakota Department of Labor. The labor office requires a digital system (web-based) from their traditional paper system where they can look up injury claims, case numbers, medical reports, and any associated personal information to expedite turnarounds, maximize productivity, and ease the workload of any clerk working in the office. This paper will focus on the planning and analysis phase in conjunction with Scenario 2 to develop the much-needed system.

*Keywords: Phase, Planning, Analysis, SDLC, Scenario 2, South Dakota Department of Labor.*

Systems Development Life Cycle Course Project

Currently, any South Dakota Department of Labor clerk must manually look up files and case numbers stored in filing cabinets. If a person or company calls to see the status of an injury claim, more times than none, the clerk must put them on hold or call them back, due to the excessive amount of paper the clerk must check. The as-is system calls for a spiral notebook filled with a running log of injury claims with dates, numbers, and personal information for the file to be physically retrieved by the clerk. The goal or to-be system will simplify the process by providing a web-based digital system where a clerk can look up injury claims, case numbers, medical reports, or even by a person’s name and access the information in a matter of seconds. To achieve this goal, the process starts with the planning phase.

**System Planning**

The purpose of the planning phase is to “understand why an Information System (IS) should be built and determine how the project team should go about building it” (Dennis et al., 2018, p. 10). During project initiation within the planning phase, the proposed system, in this case, the new system for the South Dakota Department of Labor goes through a committee for evaluation and review. Roles are defined and participants (IS professionals, executives, and clients) are included. As the project progresses to become approved, a system request and feasibility analysis are presented as deliverables. *Figure 1* and *Figure 2* below represent a system request and feasibility analysis for the South Dakota Department of Labor’s new suggested system.

**Figure 1: System Request**

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| --- |
| **System Request – South Dakota Department of Labor**  **Project Sponsor:** Luis Hurtado, Project Manager, South Dakota Department of Labor  **Business Need:** This new project system initiation is to create and design a new integrational system (web-based) to aid daily operations in the South Dakota Department of Labor, Workers’ Compensation Division, by providing access to digital information from paper filing, increasing work-flow productivity, and decreasing clerk buffering time within the office.  **Business Requirements:** Using a digital system, clerks will be able to access injury claims, case numbers, medical reports, and any associated personal information as it concerns the Workers’ compensation Division in a timely manner. Users should be able to upload medical reports instantly (web-based).  **Business Value:** The South Dakota Department of Labor, Workers’ Compensation Division’s new system will expedite turnarounds, maximize office clerk productivity, while accessing digital information more effectively, saving valuable time and money.  **Special Issues or Constraints:** Currently, clerks spent a lot of time physically looking for files that should be digitalized. Due to the disconnection between clerk, person, and ease of information, this project is necessary for the productivity and daily operations, as it solves the paper filing issue in the South Dakota Department of Labor, Worker’s Compensation Division. |

**Figure 2: Feasibility Analysis**

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| --- |
| **South Dakota Department of Labor Feasibility Analysis**  Luis Hurtado, Project Manager, created the following feasibility Analysis for the South Dakota Department of Labor, Worker’s Compensation Division. Included, are the technical, economic, and organizational feasibility, and are detailed as follows:  **Technical Feasibility**  *Familiarity with the application:* This project for the South Dakota Department of Labor is feasible, with overall moderate to high risk.   * Since the as-is system is paper filing, a system will be developed from the ground up to maintain the labor’s office vision and goal. There is no previous digital system in place. * It is crucial to involve the Division office to address procedural changes.   *Familiarity with technology: The risk* of familiarity with technology is high.   * Since the as-is system is paper filing, a system will be developed from the ground up to maintain the labor’s office vision and goal. The technology proposed will be completely different. * The IT department does not know current technology as it is a paper filing process.   *Project Size:* The project size for this IS system is medium.   * The project scope has been limited to submitting documents electronically through a website and the clerks querying that information. * The system will be created from scratch and will consist of at least a website (for the people and the clerks) and a database. * The project team will consist of at least five people.   *Compatibility:*  The compatibility of the to-be IS system with the as-is system is low.   * The as-is system is paper filing, and the to-be system is digital. * The to-be system will be based on new technology.   **Economic Feasibility**  The economic feasibility is adjusted based on South Dakota’s Occupational Employment and Wage Statistics found in the U.S. Bureau of Labor Statistics combined with cost-benefit analysis (*see References section*). Labor is composed of at least five IS professionals including a project manager, BSA, team lead, and two programmers (front and back-end). There is no current benefit revenue from contracts or sales. This IS system will improve productivity in the Workers’ Compensation Division.  *Development Costs (estimated for the initial year)*  Labor 451,610  Office Space/equip. 15,000  Software 50,000  Hardware 80,000  *Total Costs* **$596,610**  *Intangible Costs and Benefits:* Since the budget for the South Dakota Department of Labor is assigned based on yearly funds by the state and their offices receive no revenue (by contracts or sales), is hard to quantify ROIs and NPVs. Additionally, the amount of money (budget) the department will save accounts for production output. Again, it’s hard to quantify the exact amount with limited information as to how many clerks the department has.  **Organizational Feasibility**  From an organizational perspective, this IS system has a moderate risk.   * *Top management support:* The Director of the Workers’ Compensation Division strongly supports the project. * *Project champion:* Luis Hurtado is a respected project manager. * *Organization management:* Overall, managers in the division support the project. However, few oppose the change as they are used to the as-is system and are not familiar with new technologies. * *People calling:* People will be delighted to have an easier way to submit paperwork on a website. Some people are not used to technology and will not want to use a website to upload documents on. The user interface will have to be as simple and straight forward as possible for people to use. * *Clerks:* Overall, clerks support the project as it will reduce the time to find documents significantly. However, few oppose the change as they are used to the as-is system and are not familiar with new technologies. The system must be as simple and straightforward as possible for clerks to use. |

**Project Plan**

Creating a project plan is the next step once the system request and feasibility analysis deliverables are approved by a committee. A methodological approach needs to be selected that best fits the system in development. In this case, with the South Dakota Department of Labor, the methodological approach best suited is throwaway prototyping. Throwaway prototyping “includes the development of prototypes, primarily to explore design alternatives rather than as the actual new system…where it has a fairly thorough analysis phase that is used to gather requirements and to develop ideas for the system concept” (Dennis et al., 2018, p. 47). Since the technical feasibility provided states there is a high risk of familiarity with technology, overall it has a moderate to high risk in the other areas, and the system will be developed from scratch, throwaway prototyping covers all the boxes. Furthermore, the project plan follows certain criteria including a work plan that follows a recorded schedule and keeps track of tasks and accomplishments over the duration of the project. Additionally, it contains a staffing plan to determine the amount of IS professionals needed, a standards list to ensure vision and goal, and lastly, a risk assessment that tracks down potential risks and impacts on the system project. *Figure 3*, *Figure 4*, *Figure 5*, and *Figure 6* below represent a work plan, staffing plan, standards list, and risk assessment for the South Dakota Department of Labor’s new suggested system initial year.

**Figure 3: Work Plan**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Task ID** | **Task Name** | **Assigned To** | **Duration (days)** | **Dependency** | **Status** |
| 1 | Planning |  | 60 |  | Complete |
| 1.1 | Project Initiation | Project Manager | 10 |  | Complete |
| 1.1.1 | Create System Request | Project Manager/BSA | 3 |  | Complete |
| 1.1.2 | Create Feasibility Analysis | Project Manager/BSA | 5 |  | Complete |
| 1.1.3 | Present to Approval Committee | Project Manager/BSA | 2 | 1.1.1, 1.1.2 | Complete |
| 1.2 | Project Plan | Project Manager | 50 |  | Complete |
| 1.2.1 | Work Plan | Project Manager/BSA | 20 |  | Complete |
| 1.2.2 | Staffing Plan | Project Manager | 10 |  | Complete |
| 1.2.3 | Standards List | Project Manager | 10 |  | Complete |
| 1.2.4 | Risk Analysis | Project Manager | 10 |  | Complete |

**Figure 4: Staffing Plan**

The staffing plan for this new digital IS system is simple. As mentioned previously in the technical feasibility analysis, the requirements called for at least five IS professionals for the South Dakota Department of Labor’s system development. *Figure 4* belowshows, from top to bottom, the hierarchy of participants and their roles during the project.

|  |  |
| --- | --- |
| **Role** | **Description** |
| Project Manager | Responsible for ensuring project progression and completion within budget and promptly, maintaining focus on project vision and goal. |
| Business System Analyst (BSA) | Responsible for gathering and analyzing the business side of the project. Highly involved during the planning phase. |
| Team Lead | Responsible for coding and managing an IS team, coordinating closely with the project manager and BSA to ensure all tasks and objectives are reached in a timely manner. |
| Developer (front-end) | Responsible for coding and creating the front-end applications. In this case, a website. |
| Developer (back-end) | Responsible for coding and creating the back-end applications. In this case, databases, architectural design, and servers. |

**Figure 5: Standards List**

|  |  |
| --- | --- |
| **Types of Standards** | **Description** |
| Documentation Standards | Documents will be composed in the traditional APA 7th edition style.  Every document page should include a header aligned left with the name of the project and a serialized number of pages. For example, 1/30 refers to page 1 out of 30.  All IS team members should have a copy of all deliverables to be used as a reference to ensure the system’s vision and goal. |
| Coding Standards | Proper coding guidelines to be used (camel case).  Variable names should be meaningful to the action.  Proper documentation in the form of comments should be used to describe complex code.  Cutting up code into “regions” is highly encouraged.  The first few lines of code should include the developers name, project name, and date, especially when changes occur. |
| Procedural Standards | There will be a white board with the tentative project plan. Every time a task is completed, the assigned individual to such task will report progress to the project manager and will cross out the finished task.  Every day at 8 A.M., there will be a 15-minute meeting to address any issues, concerns, and the state of the task assigned.  All changes will require prior approval from the project manager with a written MEMO. |

**Figure 6: Risk Analysis**

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| --- |
| **Risk Analysis**  **Risk #1:**  The development of this new system for the South Dakota Department of Labor will be slow, considering a digital system needs to be developed from the ground up.  **Likelihood of risk:** There is a high probability of risk.  **Potential impact on the project:** Since the likelihood of risk is high, the time frame for this project might be pushed to the right.  **Ways to address this risk:** Using the methodology approach chosen, throwaway prototyping, will allow the IS team to experiment with prototypes and design. This can allow the IS team to figure out the best way to develop the system in the early stages of the design phase, allowing leeway time.  **Risk #2:**  Considering the extensiveness of the project and the familiarity with the application being moderate to high risk in the technical feasibility analysis, team member adjustments and/or knowledge of programming language might be an issue.  **Likelihood of risk:** There is a high probability of risk.  **Potential impact on the project:** The project design phase can be slowed down until everyone is on the same page.  **Ways to address this risk:** Depending on the programming language used, in this case, Java and JavaScript, IS team candidates will be selected or hired with prior experience in the chosen programming language. |

**System Analysis: The As-Is and To-Be System**

As previously mentioned, the as-is system is based on filing paper claims. If a person (claimant) calls to see the status of an injury claim, the clerk would have to take a message, get the paper file, review the status, and call the person back. This process is cumbersome, inefficient, and time-consuming. There are even some other factors that negatively impact this process. The proposed, or to-be system is a digital solution where reports could be submitted online, and clerks could query a database while on a call and get to the information faster. The requirements for the new system should improve the current process by making it digital, faster, and more efficient.

With this being said, during the analysis phase, IS professional teams will “investigate any current system(s), identify improvement opportunities, and develop concepts for the new system” (Dennis et al., 2018, p. 10). This phase takes all deliverables from the previous planning phase (i.e., system request, feasibility analysis), and analyzes them in depth to understand who the user will be, what the to-be system will do, the system’s potential, and when, where, and how it will be used. The first step within this phase focuses on developing and creating an analysis strategy. This means that a plan of action will be structured to aid IS professionals accomplish the to-be system while keeping, in this case, the South Dakota Department of Labor system’s vision and goal. Second, an extensive period to gather requirements needs to happen in conjunction with interviews, questionnaires, site surveys, etc., to eventually develop analysis models that will showcase a visual and technical representation of information of the to-be system, based on user and system interaction. Lastly, a system proposal, a deliverable from the analysis phase, will be constructed from all data gathered and presented once again to a committee for final approval.

**Gathering Requirement Techniques**

Various information-gathering techniques can be used while developing an analysis strategy to determine business requirements, such as interviews, questionnaires, observation, document analysis, and JAD. The interview is the most common technique and questions are usually performed one on one. Questionnaires are a list of questions for intended users and are regularly meant to gather information from people outside of the company. Observation is observing the as-is system to understand it. Document analysis involves analyzing documentation of the as-is system to better understand it. Lastly, JAD stands for Joint Application Development. It was invented by IBM, and it is a “technique that allows the project team, users, and management to work together to identify requirements for the system…as identifying improvements is most commonly done through JAD sessions because these sessions enable the analysts, users, and other key stakeholders to work together and create a shared understanding of the possibilities for the to‐be system” (Dennis et al., 2018, p. 94). Therefore, this seems like the most appropriate technique advised for the South Dakota Department of Labor, Workers’ Compensation Division.

The proposed JAD Session format is as follows. Ten experienced clerks will be selected from the division to be part of the session. A third-party consultant familiar with customer relationship management processes will be hired as the facilitator and will be brought up to speed on the as-is, and the to-be system. The facilitator's only job will be to facilitate by guiding the discussion, but they will not provide any sort of opinion or idea. The facilitator will have an agenda to follow during the session. Some of the questions that will be included in the agenda will be: what do you think about the process, how do you think we can improve the current process, and what the biggest problem is with the current process. The initial JAD session will be run for a full work week for two hours each day. This can be extended if more information is needed. The session will take place in a conference room away from desks and will be arranged in a U-shape so that everyone can see each other. The goal is for every one of the clerks to give their thoughts and opinions of the as-is system and the to-be system.

A questionnaire is proposed for the division to gather information from the users (claimants). The questionnaire should be sent through email preferably or mailed. Data should be collected from a sampled audience big enough to get better answers. I would suggest at least 100 people conduct the questionnaire. The purpose of the questions should be to understand users' willingness to adopt a digital system and to get feedback on the current system. Some questions to include are: how likely are you to use a digital system, how likely are you to upload documents online, and how satisfied are you with the current system.

**System Analysis: Requirements**

Within developing and creating an analysis strategy, requirements must be addressed. Requirements refer to “statements of what the system must do or what characteristics it needs to have” (Dennis et al., 2018, p. 88). These requirements are further broken into five categories, which include *functional*, *nonfunctional*, *business*, *system*, and *user* requirements. Functional requirements describe “end user specifically demands as basic facilities that the system should offer”(GeeksforGeeks, 2020). For the South Dakota Department of Labor, Workers’ Compensation Division, the user should be able to upload their medical files. The new system should be able to store the user’s uploads. Clerks should be able to query the system users’ claims by using the user’s personal information or claim number. Users should be able to create an account to log in and upload documents. Finally, clerks should be able to create an account to log in and access users’ files.

The next requirement is nonfunctional. Nonfunctional requirements describe “quality constraints that the system must satisfy according to the project contract” (GeeksforGeeks, 2020). For the South Dakota Department of Labor, Workers’ Compensation Division, users, and clerks should log in through a two-step verification process. The system should use a database (like MySQL) to store files. Files should be named by year and case number. The system should be written in a well-known programming language like Java. Lastly, but not limited to this, the processing of each query should take no more than ten seconds.

Moreover, business requirements describe “what the business needs” (Dennis et al., 2018, p. 89). For the South Dakota Department of Labor, Workers’ Compensation Division, paper filing user claims is inefficient and requires a digital solution to improve service and increase productivity. Clerks and users have complained that the current method takes too long, and a faster digital method is required. The only place where the new system is required is at the South Dakota Department of Labor, Worker’s Compensations Division offices. The system should allow users to upload documents and the clerks to query those documents. The goal of the project is to improve and speed up the current process, significantly.

System requirements are also included. System requirements describe “how the system should be built” (Dennis et al., 2018, p. 89). For the South Dakota Department of Labor, Workers’ Compensation Division, the operating system should be Windows 10 and newer. The system only supports PCs. The RAM should be 1 GB for 32-bit computers, and 2 GB for 64-bit computers. The hard drive space should be 128 GB. The minimum processor speed should be 1 GHz. The graphics card should be DirectX9 or later. At last, the display should be at least 800 x 600 pixels.

The last category is user requirements. User requirements describe “what the user needs to do” (Dennis et al., 2018, p. 89). For the South Dakota Department of Labor, Workers’ Compensation Division, the system should present a website to the user with a login tab. The login tab should present an option for clerks and users. When the user or clerk clicks on “users” or “clerks”, they should be taken to a login screen. Both login screens should have an option to create an account. The user or clerk should click on create an account, to create an account using their personal information. When the user uses their information and clicks login, an option will be given to upload documents. When the clerk logs in, the clerk is shown a search box to query claims.

**System Analysis: Use Cases**

Use cases are a “written description of how users will perform tasks on” a system (Assistant Secretary for Public Affairs, n.d.). They can be seen as the user’s workflow in a system, along with other elements. Use cases can also be beneficial tools to use while developing a new system since they provide a way for IS professionals to ensure nothing gets overlooked, especially requirements. From use cases, more specific requirements can be derived. Furthermore, they can assist in the development and testing of the system in later phases.

Several elements make up a use case. These include name, ID, priority, actor, description, trigger, type, preconditions, normal course, information for steps, postconditions, exceptions, inputs, source, outputs, and destinations. The name refers to the name of the use case. ID refers to a unique number to identify the use case. Priority refers to the urgency of the use case. The actor is the user of the use case, in other words, who is causing the actions. The description is a short explanation of the use case and what the actor is doing. The trigger is what caused the actor to produce the use case. The preconditions are the conditions that must be true, involving the actor or system, for the use case to take place. The normal course is the steps of the use case and the back and forth between the actor and the system. The information for steps describes how the information is moving in each step between the actor and the system. The postcondition is the state of the system and/or actor after the normal course is complete. The exceptions are errors that might arise for any reason, such as the actor entering invalid data and how these are handled. The inputs are the information given to the system by the source, such as the actor. Lastly, the output is the information or feedback given to a destination, such as the actor, by the system.

The mentioned elements can be observed in the next use cases. These use cases belong to the South Dakota Department of Labor, Workers’ Compensation Division.

**Use Case ID: 1**

**Table

Description automatically generated**

**Use Case ID: 2**

**Graphical user interface, text

Description automatically generated**

**Use Case ID: 3**

Graphical user interface, text, application, table

Description automatically generated

**Use Case ID: 4**

Graphical user interface, text, application, email

Description automatically generated

**Use Case ID: 5**

**Graphical user interface, text, application, email

Description automatically generated**

As mentioned before, use cases not only help with the later phases, like development and testing, but they can also help to avoid overlooking requirements. While creating the use cases above, an overlooked functional requirement became evident. The user case with ID: 3 shows this requirement: users should be able to log in. This illustrates how important use cases are to the whole development cycle of a new system. Finally, use cases are the primary output of the entire case analysis. We have arrived at these use cases through different requirement-gathering techniques, such as JAD and questionnaires.

**System Analysis: Data Flow Diagrams**

Data flow diagrams (DFDs) represent a graphical and logical illustration of how a business system should operate. The following DFDs were composed, and are based on the use cases for the South Dakota Department of Labor, Workers’ Compensation Division. DFDs are a logical representation, meaning they should show logical processes only. Therefore, the DFDs shown below might not explicitly show all the inputs and outputs in the use cases shown above. However, there is an explanation for each DFD on how it relates to their respective inputs and outputs. Please refer to the following DFDs below:

Starting with use case ID: 1, the user/caller creates an account, data flow atop represents the initial user (external entity) interaction. This interaction is needed for this process to start, as it marks the user’s initiation to create a web-based account by inquiry. Since this initiation is not solely logical, it does not fit in as part of the logical processes, but it is mentioned to better understand the flow of the system. Focusing on the user and the first set of data flow, one can see input and output reaching the process “Process User Data.” Here, the user provides a bundle of data (personal information for account creation) to process 1.1 as input, as requested by the process. Once the process acquires this information, it moves to verification and creates the user’s account, as seen in process 1.2, “Verify and Create Account.” From here, the account information gets stored in a data store (D1). Each data store has a response. For this instance, the account-creating response will return a value that will tell whether the account creation is successful. Process 1.2 will send back to the user a notification message, letting the user know whether the creation of the account was a success or failure.

Diagram

Description automatically generated

Use case ID: 2, clerk creates an account, is similar to use case ID: 1, where the data flow atop represents the initial clerk (external entity) interaction. Again, since this initiation is not solely logical, it does not fit in as part of the logical processes, but it is mentioned to better understand the flow of the system. The same will be for all DFDs. Two arrows from process 2.1 (Process Clerk Data) are shown to represent the interaction between the clerk (external entity) and process 2.1. The clerk provides a bundle of data in the form of personal information for account creation, as requested by the process. Once the process acquires this information, it moves to verification and creates the clerk’s account, as seen in process 2.2, “Verify and Create Account.” From here, the account information gets stored in a data store (D1). Each data store has a response. For this instance, the account-creating response will return a value that will tell whether the account creation is successful. Process 2.2 will send back to the clerk a notification message, letting the user know whether the creation of the account was a success or failure.

Diagram

Description automatically generated

In use case ID: 3, the user logs in, and data flow shows the interaction between process 3.1, “Process User Data,” and the external entity, the user. In this case, process 3.1 will request the user’s name and password, while the user inputs such data. The system will show a welcome screen with a login tab, where the user will click to log in. The user’s information (name and password) will then move to process 3.2, “User Authorization,” where the system will determine whether the user has permission to access the actual system. The system will verify that the information entered is correct by accessing the data store (D1), and the data store will return a validation response to process 3.2, with a grant access response back to the user. The system will take the user to an account home page.

Diagram

Description automatically generated

Use case ID: 4, user uploads medical files, data flow shows the interaction between process 4.1, “Process User File,” and the external entity, the user. In this DFD, the system will show an upload document dialog box. As input, the user will click on the upload dialog box, process 4.1 will show the user's file explorer (request user file), and the user will select the desired files to be uploaded. Once uploaded, process 4.2, “Store File,” will store the file and send it to D1, “Workers Compensation” data store. The data store will then return a notification response to the user through process 4.2, with a notification message of a successful upload.

Diagram

Description automatically generated

Use case ID: 5, clerk queries a database for claims, data flow shows the interaction between user, clerk, and clerk database query. In this DFD, a user calls the South Dakota Department of Labor, Workers’ Compensation Division to inquire about the claim status. Through process 5.1, “Process User Claim Info,” the user provides a claim ID (case number), a clerk receives the claim ID, and processes it through process 5.2, “Retrieve Claim Info,” where the system will show a query box to input such information. Through the same process, the system will search and retrieve claim records based on the search criteria from data store D1, “Workers Compensation.” From here, the data store will return the queried claim record with the requested claim ID back to the clerk through process 5.2.

Diagram

Description automatically generated

**System Analysis: Entity Relationship Diagram**

The following diagram is the entity relationship diagram (ERD) for the South Dakota Department of Labor, Workers’ Compensation Division to-be system. An ERD is a type of “flowchart that illustrates how entities such as people, objects, or concepts relate to each other within a system” (What Is an Entity Relationship Diagram (ERD)?, n.d.). Each box represents a data entity. These entities are the User, Clerk, Account, Medical File, and Claim. Each of these entities contains attributes that describe the properties of entities. For instance, a User entity has a first and last name. The asterisk next to an attribute indicates that that attribute is used to identify the entity. Furthermore, the entities are related to one another, and this relationship is shown by the lines among the entities. Each relationship also has cardinality and modality, and it is portrayed by the symbols at the ends of each relationship line. For example, the User has a relationship to Medical File. A User can have 0 to many Medical Files. This is known as cardinality. Since it is 0, this means that the modality is “optional”, User can exist without a Medical File. Looking at it the other way around, a medical file can have one and only one User (cardinality). The modality for this one is required. For a file to exist, it must be related to one and only one user. Lastly, the text on the lines labels the relationship.

By analyzing the ERD further, it becomes evident that a User submits a Medical File. It is submitted by only one User as seen by the two-line symbol in the relationship line. Users can submit none or many Medical Files as seen by the circle and crow’s foot symbol. Medical Files are included in Claims. Each Medical File is included in one and only one Claim. A claim can include none or many Medical Files. Claims are included in Accounts and are searched for by Clerks. Many Clerks can search many accounts and many accounts can be searched by many Clerks as shown by the crow’s foot symbol. Clerks and Users both create accounts. The remaining symbols are the same as those explained. Having this in mind, the following image represents an ERD for the South Dakota Department of Labor, Workers’ Compensation Division.

Diagram, schematic

Description automatically generated

**System Analysis: Data Dictionary**

A data dictionary is “a collection of names, definitions, and attributes about data elements that are being used or captured in a database information system, or part of a research project” (What Is a Data Dictionary? | UC Merced Library, n.d.). They are meant to describe data elements' purposes and meanings, as it pertains to the overall system project while providing some type of guidance on interpretation. Data dictionaries are useful tools, as they provide “assist in avoiding data inconsistencies, help define conventions that are to be used across a project, make data easier to analyze, and enforce the use of data standards” (What Is a Data Dictionary? | UC Merced Library, n.d.). The following data dictionary was composed using the South Dakota Department of Labor, Workers’ Compensation Division DFDs.

Table

Description automatically generated

**System Analysis: Deliverables**

In the outcome of the analysis phase, after gathering requirements, collaborating in the JAD session, and defining all current known requirements, a system proposal arises as the deliverable, to be presented for final approval. The system proposal provides “a detailed list of requirements, serves as the input into the design phase, and finalizes or marks the end of the analysis phase” (Coursera, n.d.). The system proposal will also include use cases, processes, data models, and any other diagram related to or constructed during both, the planning and analysis phase. Once the system proposal is presented to a committee for final review, a walk-through is conducted. During a walk-through, the proposed system is presented and clearly explained to both parties involved, IS professionals creating the to-be system, and key members from the client’s organization. In this case, the system proposal is presented to the key members of the South Dakota Department of Labor, Workers’ Compensation Division, who can authorize or deny the development of the to-be system.

**Conclusion**

To conclude, this course project analyzed the first two phases of the Systems Development Life Cycle (SDLC): the planning and analysis phase. The intent was to provide an analytical and descriptive analysis taking into consideration a chosen scenario to demonstrate concepts and methodology learned during this course, IS 315, and found within the IS sector. With this in mind, Scenario 2 called for a new system to be developed for the South Dakota Department of Labor, Workers’ Compensation Division. Their as-is system was based on filing paper claims. If a person (claimant) called to see the status of an injury claim, the clerk would have to take a message, get the paper file, review the status, and call the person back. This process was cumbersome, inefficient, and time-consuming. The proposed to-be system alleviated this issue using a digital solution where reports could be submitted online, and clerks could query a database while on a call, and get to the information faster.

Planning the new to-be system for the South Dakota Department of Labor, Workers’ Compensation Division started with the planning phase. The planning phase involved several moving pieces as the project progressed. From this, a system request and a feasibility analysis were produced as deliverables and eventually presented to an approval committee. The system request provided compiled information concerning the project sponsor, business needs, business requirements, what value the to-be system will bring, and special issues or constraints. Furthermore, the feasibility analysis summarized key components and benefits of the to-be system, broken down into three sub-categories: technical, economic, and organizational feasibility. Technical feasibility provided an evaluation of the technical complexity of the new system, including familiarity with the application, familiarity with the technology, the size of the project, and project compatibility. Additionally, economic feasibility provided the cost-effectiveness scope of the project. It included a cost-benefit analysis, as well as a cash flow analysis to determine the financial worthiness of the project. Lastly, the feasibility analysis provided organizational feasibility to determine assets, management, and other resources needed to bring the to-be system forward.

Along with the system request and feasibility analysis, a project plan was created that included a methodological approach for the new system, a work plan that followed a recorded schedule and kept track of tasks and accomplishments over the duration of the project, a staffing plan that determined the amount of IS professionals needed, a standards list that ensured the initial vision and goal from the stakeholders was upheld, and lastly, a risk assessment that tracked down potential risks and impacts on the system project. This marked the end of the planning phase for the South Dakota Department of Labor, Workers’ Compensation Division.

As with the Analysis phase of the project, all deliverables from the planning phase were used and analyzed in depth to understand who the user was, what the to-be system did, the system’s potential, and when, where, and how it was used. This process was composed around an analysis strategy, where a plan of action was structured with extensive periods to gather requirements in conjunction with interviews, questionnaires, site surveys, etc., analysis models were developed, and a system proposal was constructed as the result of the analysis phase, to once again be presented to a review committee for final approval.

Information-gathering techniques were used while developing an analysis strategy to determine and gather requirements. Business requirements for the South Dakota Department of Labor, Workers’ Compensation Division included the need for a digitalized solutions instead of a paper filing user claim system, effectiveness, efficiency, increase productivity, a system able to upload documents, and clerks being able to query such documents. System requirements included the need for the to-be system to operate using Windows 10 or newer, PC-only supported system, and RAM to be 1 GB for 32-bit computers, among others. User requirements included a digitalized solution in the form of a website with a login tab presenting options for clerks and users to use, a way to create an account using personal information, a way for users to upload claim documentation, and a way for clerks to query such information. Additionally, functional and non-functional requirements were presented. Functional requirements included the user being able to upload medical files, the to-be system being able to store data, clerks being able to query the system users’ claims by personal information or claim number, and the creation of an account to log in, upload documents, and have clerks able to access such users’ files. Lastly, nonfunctional requirements included a two-step verification process to log in, the system should use a database such as MySQL to store files, files to be named after year and case number, and the processing of each query should take no more than ten seconds.

Depicting system processes, and still part of the analysis phase, analysis models, use cases, data flow diagrams (DFD), entity relationship diagrams (ERD), and a data dictionary were created. Use cases provided a visual representation concerning five main processes needed for the to-be system to function. These processes were a user creating an account, a clerk creating an account, a user logging in, a user uploading medical file claims, and a clerk querying a data store to retrieve claims. Moreover, data flow diagrams provided a graphical and logical illustration of how the South Dakota Department of Labor, Workers’ Compensation Division should operate, showing all processes involved from the use cases, data flows as inputs and outputs, external entities involved within the process of the system, and data stores where information is stored and retrieved. Additionally, entity relationship diagrams showed the relationship among the different data entities to help analysts examine information in systems and how they are “organized and related to each other” (Dennis et al., 2018, p. 187). Lastly, the data dictionary defined each entity, the entity description, relationships of the entity, all its attributes, and attributes characteristics to further help the analyst look up information when needed.

In the outcome of the analysis phase, after gathering requirements, collaborating in the JAD session, and defining all current known requirements, a system proposal arises as the deliverable, to be presented for final approval. Once the system proposal is presented to a committee for final review, a walk-through is conducted. During a walk-through, the proposed system is presented and clearly explained to both parties involved, IS professionals creating the to-be system, and key members from the client’s organization. In this case, the system proposal is presented to the key members of the South Dakota Department of Labor, Workers’ Compensation Division, who can authorize or deny the development of the to-be system. This marks the end of the analysis phase and the conclusion of both, the planning and analysis phase.

**References**

Assistant Secretary for Public Affairs. (n.d.). *Use Cases | Usability.gov*. Retrieved September 25, 2022, from https://www.usability.gov/how-to-and-tools/methods/use-cases.html

Coursera. (n.d.). *2.1-1 Analysis Phase to System Proposal*. Retrieved September 25, 2022, from https://www.coursera.org/lecture/analysis-for-business-systems/2-1-1-analysis-phase-to-system-proposal-MUaME

Dennis, A., Wixom, B., & Roth, R. M. (2018). *Systems Analysis and Design* (7th ed.) [E-book]. Wiley.

GeeksforGeeks. (2020, April 29). *Functional vs Non-Functional Requirements*. Retrieved October 3, 2022, from https://www.geeksforgeeks.org/functional-vs-non-functional-requirements/

*South Dakota - May 2021 OEWS State Occupational Employment and Wage Estimates*. (2022, March 31). U.S Bureau of Labor Statistics. Retrieved September 5, 2022, from https://www.bls.gov/oes/current/oes\_sd.htm

*What Is a Data Dictionary? | UC Merced Library*. (n.d.). Retrieved October 3, 2022, from https://library.ucmerced.edu/data-dictionaries#:%7E:text=A%20Data%20Dictionary%20Definition,part%20of%20a%20research%20project.

*What is an Entity Relationship Diagram (ERD)?* (n.d.). Lucidchart. Retrieved October 3, 2022, from https://www.lucidchart.com/pages/er-diagrams