Author: **Gjestson, Amy C.**

Title: ***Summer Contracts***

The accompanying research report is submitted to the **University of Wisconsin-Stout**, **Graduate School** in partial completion of the requirements for the

Graduate Degree/ Major: MS Operations and Supply Chain Management

Research Advisor: James Keyes, Ph.D.

Submission Term/Year: Spring 2019

Number of Pages: 48

Style Manual Used: American Psychological Association, 6th edition

☒ **I have adhered to the Graduate School Research Guide and have proofread my work.**

☒ **I understand that this research report must be officially approved by the Graduate School.**

Additionally, by signing and submitting this form, I (the author(s) or copyright owner) grant the University of Wisconsin-Stout the non-exclusive right to reproduce, translate, and/or distribute this submission (including abstract) worldwide in print and electronic format and in any medium, including but not limited to audio or video. If my research includes proprietary information, an agreement has been made between myself, the company, and the University to submit a thesis that meets course-specific learning outcomes and CAN be published. There will be no exceptions to this permission.

☒ **I attest that the research report is my original work (that any copyrightable materials have been used with the permission of the original authors), and as such, it is automatically protected by the laws, rules, and regulations of the U.S. Copyright Office.**

☒ **My research advisor has approved the content and quality of this paper.**

STUDENT:

NAME: Amy Gjestson **DATE: 04/11/2019**

ADVISOR: (Committee Chair if MS Plan A or EdS Thesis or Field Project/Problem):

NAME: Dr. James Keyes **DATE: 04/11/2019**

This section for MS Plan A Thesis or EdS Thesis/Field Project papers only

Committee members (other than your advisor who is listed in the section above)

1. **CMTE MEMBER'S NAME:** **DATE:**
2. **CMTE MEMBER'S NAME:** **DATE:**
3. **CMTE MEMBER'S NAME:** **DATE:**

This section to be completed by the Graduate School

This final research report has been approved by the Graduate School.

Director, Office of Graduate Studies: **DATE:**

Gjestson, Amy C. ***Summer Contracts***

Abstract

The UW-Stout was challenged with delivering more value effectively, with fewer resources, increased scrutiny of expenditures, and re-engage a workforce fatigued from ongoing funding cuts. This study evaluated the summer session contracting process using lean principles to identify nonvalue activities, potential problems areas, and to develop a framework for a more efficient process.

Acknowledgments

I would like to take this opportunity to thank my husband, family, and friends for their support, patience, and understanding as I pursued my graduate degree. A special thank you to my supervisors, Kim Schulte-Shoberg for starting me on this journey and Dr. Maria Alm for inspiring me to grow. I wish to extend additional thanks to my professors and classmates for encouraging and challenging me to look outside my personal experiences to search, see, and understand the broader impact we can have. Finally, I would like to thank my coworkers for their continued support throughout this process.

Table of Contents

List of Tables

List of Figures

Chapter I: Introduction

The University of Wisconsin System is one of the largest assemblages of higher public education in the country. It serves approximately 170,000 students each year, on 26 campuses with more than 39,000 staff and faculty statewide. The University of Wisconsin System is governed by the 18-member Board of Regents, of which, 16 members are appointed by the governor and two are state school officials. The University of Wisconsin Stout (UW-Stout) is one of 11 four year campuses offering undergraduate and master's degree programs. UW-Stout enrolls over 9,500 students offering 47 undergraduate majors and 21 graduate majors. As of fall 2017, UW-Stout employed over 1300 faculty and staff.

History

The school was originally found in 1891 by Senator James Stout as a manual training school. In an effort to distinguish between public school and the schools supported by Senator Stout, the Stout Institute was formed in 1908. The ownership of the institute was transferred to the State of Wisconsin following Stout's death in 1910. In 1955 the school was placed under the control of the Board of Regents of the State Colleges and The Stout Institute officially changed its name to Stout State College. The Wisconsin State Universities and the University of Wisconsin campuses then merged to form the University of Wisconsin System in 1971.

Leadership

Over the last four years, the leadership within UW-Stout has undergone significant change. Most notable was the retirement of the longest serving leader in UW-Stout's history Chancellor Charles Sorenson. Further change occurred with UW Stout's leadership with the appointment of a new Provost and Vice Chancellor.

Financial

UW- Stout's revenue comes from two primary sources, the state and the students. Over the last 20 years, in the state of WI, financial plans included budget reductions and budget lapses. Initially, to offset the lost revenue and fill the void created by the loss of state funds, institutions raised tuition. The result was an outcry regarding the affordability of higher education and increased scrutiny of expenditures.

The 2013-2015 biennial budget cuts were dramatic and an additional $250 million was cut from the system. The universities state support reached the lowest level in more than 40 years. At the same time, former Governor Walker implemented a two-year undergraduate tuition freeze. The freeze was extended through the 2015-2019 budgets. System summaries of the cut's effect included: layoffs, administrative consolidations, reduced advisement and fewer course offerings. Newly elected Governor Evers indicated that he intended to keep the tuition freeze in place.

In 2018 UW Stout faced a trifecta of problems of budget pressures, demographic changes and declining enrollment. Staff recruitment, and retention issues existed due to the inability to offer competitive salary rates. With an annual budget in 2017 of $212 million, the ongoing tuition freeze along with reduced state funding, and declining enrollment, continued to challenge the university. The challenge included staff delivering more value effectively and with fewer resources, and increased scrutiny of expenditures.

Contracts

In 2017, UW-Stout employed approximately 250 faculty and instructional staff and 220 adjunct staff during the academic year which consisted of two semesters. Special session contracts were issued for all instructional and noninstructional duties outside of the academic

year. Separate contracts were issued for instructional duties and noninstructional duties which resulted in multiple contracts for many employees. An Access database created 20 years ago as a temporary solution for the generation of special session contracts was utilized. During the summer of 2018, a total of 862 special session contracts were created for faculty and adjuncts.

The academic departments at UW Stout were divided into three district colleges. Each of these colleges had an academic accountant who was responsible for the generation of special session contracts. On average, each academic accountant spent over 100 hours manually generating contracts in May and June of 2018. Standard work instructions were in place for the generation of these contracts however no check was in place to ensure contracts adhered to the guidelines.

The timeframe for contract generation coincided with the fiscal year-end when the academic accountant workload is heaviest. Additionally, the universities hypersensitive financial situation had placed additional pressure on the academic accountant role to reconcile accounts in a multitude of ways. These pressures included completing reconciliations in a well-timed manner, detailed reviews to ensure financial accuracy, in depth financial forecasting, and dissemination of financial information to a variety of users for economic decisions.

Statement of the Problem

UW-Stout's special session contract process was a manual process with minimal change since inception. In order to meet the new demands of delivering more value effectively and with fewer resources, increased scrutiny of expenditures and reengage a workforce fatigued from ongoing funding shortfalls, UW-Stout sought means to increase efficiencies and improve a labor intense process.

Purpose of the Study

The purpose of this study was to improve the overall efficiency of the special session contracts at UW-Stout. Value stream mapping flowcharts were generated to recognize the current state, and aid in the detection and analysis of waste. A future state value stream map was generated to demonstrate the reduction opportunities and highlight the benefits of the suggested process improvements.

Assumptions of the Study

This study made several assumptions related to the possible success or failure of the study. It was assumed that process owners answered candidly and honestly about the process they were using at UW-Stout. Next it assumed that process owners have some knowledge of lean management and that management would support the recommended lean initiatives. The study assumed the application of standard governmental rules and regulations and that legislation would remain constant in its contract process during the next year. Lastly it was assumed that the results of the study and suggestions made were only for UW-Stout.

Definition of Terms

The following terms were defined for use in this paper to provide clarity.

Academic year. The annual period of sessions of an educational intuition usually beginning in September and ending in June (A. Alm, personal communication. February 15, 2019).

Adjunct. Non-tenure track faculty or part-time instructors (A. Alm, personal communication. February 15, 2019).

Autonomation. Applying technology to a feature of a machine the enable the machine to work with their operator, automating task that operators find repetitive, boring, or unsafe but retaining human monitoring (Feld, 2000).

Budget lapse. Withdrawal by an authority of the unspent portion of an organization's budget allowance at the time the budget period expires.

Current state (CS). All steps that are performed to complete the work as it is operating in today's environment (this is often differs from how a written procedure states it should be done) as well as the issues and performance (metrics) of the process (Martin,2012).

Faculty. Person who holds the rank of professor, associate professor, assistant professor, or instruction or in an academic department (A. Alm. personal communication. February 15, 2019).

Future state. A plan for how a process is projected to be running at a defined point in time. Serves as the primary input for the development of an implementation plan (Martin, 2012).

Kaizen. A Japanese word for continuous improvement that encompasses the idea of employee participation and promotes a process orientated culture (Ortiz, 2006).

Lean. Continuous elimination of unnecessary, non-value-added steps within a process.

Non value-added work. It is best known as waste and it includes non-essential activities that add time, effort, and cost, but no value to the project. Examples include excessive inventory, unnecessary transportation, waiting, excessive processing, waste of motion and defects (Chen & Meng, 2010).

Provost. The chief academic officer responsible for overseeing the Division of Academic Affairs including all academic programs, career services, enrollment and retention services and university library at UW-Stout (Alm, 2019).

Special session. Work done outside of the academic year Fall and Spring semesters.

Value-added work. Refers to those activities essential to the operation and that will enhance a project in a way the customer is willing to pay for (Chen & Meng, 2010).

Value stream. The series of steps required to bring a product or service to a customer (Dennis, 2007).

Value stream map (VSM). A lean tool that employs a flow diagram to document the movement of information, material, and actions documenting in a process (Rother & Shook, 2009).

Waste. Activity that takes time, resources, or space but does not add value to the product.

Limitations of the Study

The results of this study are limited to University of Wisconsin Stout. Changes and implementation were limited due to resources, time, and policy and procedures. This paper was focused on the overall process and big picture associated with special session contracts.

Methodology

This study employed user feedback, value stream mapping methodology, and lean principles. The study utilized firsthand knowledge of the academic accountant who was responsible for the generation of special session contracts along with and focus group meetings with the process owners of special session contracts to understand the current the current state. The data was then used to generate a value stream map of the special session process.

Once the process was clarified and charted, process owners were asked to review the current state to identify waste, opportunities and nonvalue activities present in the creation of summer contracts. Problem areas were identified, analyzed and appropriate lean principles were

then explored to detect waste and non-value activities. Lean principles were then explored to determine possible process improvement and potential benefits.

A brainstorming session, of the process owners, focused was on ways to reduce non-value added task and examined prospective areas for improvement. A future value stream map was created to demonstrate potential process improvement and illustrate the advantages gained through implementation of lean principles. Improved processes would potentially enable UW-Stout to deliver summer contracts more efficiently and with fewer resources.

Summary

UW-Stout was facing significant challenges to enhance efficiencies, reduce waste, streamline processes, and re-engage a workforce fatigued from ongoing funding shortfalls. This chapter provided the framework for the study that included the problem statement, assumptions, and definitions necessary to understand the subject of the paper. The literature reviewed in Chapter II provides background information to lean basics, the history of lean and offers insight into the value stream mapping process.

Chapter II: Literature Review

UW-Stout was facing significant challenges to enhance efficiencies, reduce waste, streamline processes, and re-engage a workforce fatigued from ongoing funding shortfalls. The special session contract process was a manual process with minimal change since inception. To remain successful, UW-Stout sought means to increase efficiencies and improve a labor intense process.

This chapter gives an overview of the lean concept and provides a brief history of the evolution of lean. The literature includes an explanation of the some of the basic principles and tools used in the lean process as well as a background of lean activities including value stream mapping. Information provided in this chapter, is meant assist the reader in understanding the details of the study in later chapters.

The Basics of Lean and Continuous Improvement

Lean is a process improvement methodology. Dalal (2009) refers to lean as a powerful common-sense tool used to eliminate waste from organizations, processes and systems. It is a method that focuses on creating more value for customers and eliminating nonvalue-added activities. The core philosophy surrounding lean is to minimize or eliminate waste and continuously simplifying process (Tatikonda, 2007). Conway (2008) suggests that people often need leadership to help them see waste because they are too close to it to see it themselves. Learning to see waste is an important step however the lean process is more than a scavenger hunt for waste (Dennis, 2007). It includes building a culture that encourages and empowers all employees to pursue opportunities to improve their work and share ideas for continuous improvement. Lean is a cultural change that does not happen overnight (Oracle, 2003).

Continuous improvement is the on-going effort to improve products, services, and processes. Bhuiyan & Baghel (2005) define continuous improvement as a culture of sustained improvement to eliminate waste in an organizations systems and processes. It can be achieved through the use of a number of methods and techniques and is a never-ending strive for perfection.

Continuous improvement can occur through incremental improvements or breakthrough improvements (Bhuiyan & Baghel, 2005). Incremental improvements is about fine tuning a process, method, or practice as problems are identified. It is based on the belief that the sum of the small changes will add up to a major change over time. These changes are usually small, are easily done and therefore carry little risk. Breakthrough improvements involve major enhancements to crucial business areas. These improvements tend to cost more in money and time than incremental improvement but results in bigger revisions and is sometimes necessary for processes which need to significantly change to remain relevant and accurate.

All continuous improvement methods have strengths and weakness and it is important that the selected method be applied to processes appropriately and be supported by planning, training and monitoring (Lodgaard, E., Ingvaldsen, J., Aschehoug, S., & Gamme, 2016). However, according to Conway (2008), despite continuous improvement being critical, most organizations do not really understand it. Additionally, Conway (2008) indicates that continuous improvement includes improvements made at low and middle level of the organization but more importantly fundamental and major changes that only top management can lead.

Originally lean philosophies were applied to large manufacturing which used two traditional methods to set the cost for their products or services, cost-based pricing and competitor-based pricing. Cost-based pricing involves setting the cost of a product or service by

calculating the cost associated with the product or service and adding a profit margin (Dennis, 2007). Competitor-based pricing sets the price for a product or service using a competitor's price for a similar product or service as a benchmark. Unfortunately, in today's competitive market, there is often a competitor who can make the product faster, better, or at a lower price. In this type of environment, pricing is often customer-driven, and management is often under pressure to lower cost, reduce lead times, and maintain high quality in an effort to remain profitable (Tapping, Luyster, & Shuker, 2002). It also explains why minimizing or eliminating waste is so important. Lean has expanded beyond manufacturing and is used in various industries from healthcare to education. To better understand the opportunities lean offers, it is important to understand a little about the history of lean.

History of Lean

Some argue that the story of lean can be traced back to the Venice Arsenal of the 1450s and the Lancashire cotton mills of the 18th and 19th century. It is fair to say that the roots of lean go back many years and that lean philosophy has been evolving for centuries. The appropriate time to start a history of lean manufacturing would be the industrial revolution and the beginning of mass production in the 1800's. Usually there are three main accounts that are connected with the history of lean manufacturing, Henry Ford and factory production, Kiichiro Yoyoda and Taciichi Ohno in the 1930s, and Womack and Jones publication Lean Thinking from 1996 and *The Machine that Changed the World*. Some of the biggest contributors and pioneers of lean and their concepts and contributions are summarized in Table1.

Table 1

History of Lean Time Line

Period	Person	Concept/Study/Focus	Contribution
1880's	Eli Whitney	Interchangeable parts	Allowed inexperienced workers to assemble and repair weapons
1909	Frank Gilbreth	Focused on the elimination of non-value work	Process charts and motion study
1911	Frederick Taylor	Studied efficiencies of the individual workers and work methods	Standardized work, and a method to analyze and measure the process
1913	Henry Ford	Arranged people, machines, tooling, and products in a continuous system	Assembly and flow lines
1924	Sakichi Toyoda	Automatic loom with	Allowed a single person to monitor multiple machines
1943	Eiji Toyoda Taiichi Ohno	Smaller batches, less inventory	Just-in-time (JIT) or Toyoda Production System (TPS)
1982	Edward Deming	Sampling and statistical process control	Structured batch sampling Statistical Process Control (SPC)
1990	James P. Womack, Daniel Roos, Daniel T. Jones	wrote The Machine that Changed the World	Coined the term "Lean"

Note: Lean Institute (n.d.)

Principles and Techniques of Lean

The five principles that Womack and Jones (1990) defined in their book are: defining value – asking the customer what they want and value, value stream – mapping value added, and non-value added activities, creating flow – work in a smooth method, using a pull system – produce what customers want, when they ask for it and pursuing perfection – keep improving.

The principles encourage fashioning better workflow in processes and developing a continuously refining culture. A company can remain competitive, increase the value brought to the customers, decrease the cost of doing business, and increase their profitability by exercising all five principles. Nave (2002) states that in addition to removing waste and improving flow, lean has some secondary effects one of which is improved quality. According to Nave (2002) "the product spends less time in process, reducing the chances of damage or obsolesces" (p. 75). Although the lean principles started in manufacturing, they can be applied universally across simple to complex organizations. The lean principles that will be explained include kaizen, 5S, value stream mapping, and value stream management.

Kaizen

The Japanese word kaizen means continuous improvement (Ortiz, 2006). The lean methodology is a strategy of continuous improvement and is a philosophy of building a culture which engages employees, of all levels, in suggesting and implementing company improvements. Kat , I., & Smalley, Art (2011) suggest that Kaizen is a journey of learning by studying a process and figuring out way to improve it. "Kaizen is intended to be integrated into the normal day-to-day activities with the focus on eliminating waste, creating standards, and having a clean organized workplace" (Ortiz, 2006, p. 7). Ortiz (2006) also stated, "The success of Kaizen comes from its people and their actions, not from new pieces of equipment and machinery" (p. 7).

Robinson and Schroeder (2004) build the argument for Kaizen without calling it Kaizen when the they examined what's in an idea. They proposed that an employee performing the work, sees inefficiencies and opportunities for improvement and that the employee's idea are engine of progress. These employees have knowledge of the problem, of potential solutions, and

that a company's continued success lies in making the most of on these ideas (Robinson & Schroder, 2004).

A kaizen event centers on the power of employee ideas. Many companies conduct kaizen events that allows companies to focus on a project and quickly implement improvements (Alukal & Manos, 2006). Graban (2014), compares Kaizen events to a suggestion box only better for the kaizen items are likely to be acted on. These events involve a small group of employees in a company coming together to address a specific area within the company. Ortiz (2006), recommends that the kaizen program should have a Kaizen Champion dedicated 100%, to the program and a governing committee. Kaizen events should be tailored to fit the needs of an organization but usually involve three phases.

Planning and Preparation are included in phase one and this includes collecting background information, selecting a problem or target area and scheduling the event, and selecting team members. In phase two, implementation, the team works to develop an understanding of the targeted process or problem, brain storms for improvement ideas and uses analytical techniques to test and pilot ideas. Ortiz (2006) states that for a kaizen event to successful, a long-term strategy needs to be in place management must provide the team with the necessary tools. Phase three is follow-up and refers to determining whether the action improved the problem. It may include tracking key performance measurement, analyzing results, documenting, and presenting results. Oritz (2006) recommends that each team member be assigned an action item and suggest that the kaizen event is not complete all action items are complete. This phase also covers follow-up and perfecting, by identifying modifications that may be necessary to sustain the improvement or skills and concepts in need of reinforcement.

5S System

The 5S is the foundation of all improvements and represents a way of installing order in the workplace. Dennis (2007) describes the 5S work environment as self-explanatory, self-ordering, and self-improving. It is an environment where the out of order is apparent. The system is simple and encompasses the process of sort, set in order, shine, standardize, and sustain Dennis, 2007). Ortiz (2006) describes the 5S elements as follow: Sort involves removing all unnecessary items from the workplace. Straighten or set in order means creating a specific place for everything. Shine comprises keeping the work area clean and maintenance of tools and equipment. Standardize encompasses finding a best practice for a process, kaizen aims to find improvement for those process. 5S can become less effective due to complacency so sustain tracks progress and includes communication and the training needed to maintain the culture. Tapping, Luster and Shuker (2002), mention that the positive results from 5S will be reflected in shorter changeover times, reduction in total lead time, and in the elimination of accidents.

Standardization

Standardization refers to a detailed documentation and visualization in a system (Whitmore, 2008). It describes the current best way for employees to complete their work. Standard work is the best, safest and easiest way, to achieve and maintain a defined quality level (Ortiz, 2006). Standards can help an organization reduce effort, time and money. Standardization, involves the people who do the work, determining the optimal way to complete a process. It includes listing the resources needed and providing step by step directions to a process. Standardization facilities the collection and implementation of the best practices known and means everyone is using or performing a process in a consistent manner. Whitmore (2008)

considers standardization the secret weapon in becoming lean by ensuring improvements and preventing relapse.

Pascal Dennis (2002) identified seven benefits of standardized work and the first benefit was process stability: providing repeatability to meet targets. The second benefits is a clear start and stopping point for all processes which allows for one to determine if work is ahead or behind schedule. The third benefit is organizational learning: standardization preserves the knowledge which is not lost when experienced employees leave. The fourth benefit of standardization involves audit and problem solving: standardization helps in evaluating the production, tracking processes steps, investigating whether job elements are performed smoothly or not, and defining problems to solve them. The fifth benefit is employee involvement: employees contribute in developing standardized work, and also in identifying possibilities for simple error-proofing devices. Kaizen is the sixth benefit: once the work is standardized the act of eliminating waste start with the process of continuous improvement. The seventh benefit identified by Dennis is training: standardized work creates the foundation for the worker`s training process.

Standard work does not mean permanent, restrictive or eliminating the need for judgement, but it should establish a base. Ortiz (2006) stated “Once standard work is implemented, the process can be revised over and over again to make it more efficient” (p. 39). Dennis (2007) suggest that one should take notes and date changes on standards for the standard’s evolution is as important as it current from. It should enable and facilities team training and the creation of meaningful job descriptions.

Value Stream Mapping

Every business is an assemblage of processes, and in every process, there is value-added steps and there is waste (Dennis, 2007). VSM is a lean management method that provides a

visual map to demonstrate information process and production flow from start to finish and how elements affect each other within an organization (Rother & Shook, 2009). A VSM should reflect a process as it currently exists, not how it was designed to work. The purpose of VSM is to identify waste by breaking down the system to its basic components challenging each step as to whether it creates value. VSM demands a thorough understanding of processes and organization (Weiss, 2013).

Value stream mapping is a powerful tool that helps one understand their current situation and identifies opportunities for improvement.

> VSM, which allows you to take a high-level view of your process or value stream — then diagnose problems and implement changes — is the best way to identify the right areas for improvement so you can get lean and maximize your productivity. (Wisconsin Manufacturing Extension Partnership [WMEP], 2018, para.4)

VSM is a multiple step process which begins by identifying the value stream or process to map. The next step is to create a current state map which shows the current flow of materials and information needed to make a product. Diagnosing problems, suggesting changes and making a future state map are included in the final step (WMEP, 2018). VSM should be continuous and not a onetime event (Rother & Shook, 2009) describe value-stream mapping as a communication tool, a business planning tool and a tool to manage change. According to Rother and Shook (2009) the summarized process of creating a value stream map involves a four step process. Step one, identify the product family, product or service. The family should be clearly identified along with how much and when the customer wants it (Rother & Shook, 2009). Step two, draw a map of the current state. Generate a map that reflects the current situation with information gather during a walk through. Step three, draw a future state map value stream map (FSVSM). The

ideas for the future state map are generated when you are creating the current state map (Rother and Shook, 2009). Step four, includes implementing a work plan. This step involves breaking the implementation into steps (Rother and Shook, 2009). Checks should be put in to support the process and monitor results.

Summary

UW-Stout was facing significant challenges to enhance efficiencies, reduce waste, streamline processes, and re-engage a workforce fatigued from ongoing funding shortfalls. To remain successful UW-Stout will need to become more effective in what they do. This chapter introduced lean and how it developed over time. It presented details regarding the importance of lean and explored different lean tools such as 5S, standardization, Kaizen, and value stream mapping that have been effective in an array of industries. Chapter III discusses methodologies for data collection, procedures and analysis used in this project.

Chapter III: Methodology

UW-Stout was challenged with delivering more value effectively, with fewer resources, increased scrutiny of expenditures, and re-engage a workforce fatigued from ongoing funding cuts. The purpose of this study was to evaluate the summer session contracting process using lean principles to identify nonvalue activities, potential problems areas, and to develop a framework for a more efficient process. This chapter includes data selection and description of the project, the collection of data, and the analysis method applied.

Subject Selection and Description

In 2017, UW-Stout employed approximately 250 faculty and instructional staff and 220 adjunct staff during the academic year which consisted of two semesters. Summer session contracts were issued for all instructional and noninstructional duties outside of the academic year. Separate contracts were issued for instructional duties and noninstructional duties which resulted in multiple contracts for many employees. During the summer of 2018, a total of 1,141 summer session contracts were created for faculty and adjuncts. The combined sum of these contract was in excess of 2.7 million dollars. An access database, created 20 years ago as a temporary solution to using carbon paper contracts, was utilized to compile the data needed to generate the contracts. The responsibility to generate the contracts was assigned to the universities three academic accountants.

The special session contract process was a manual process that has been minimally changed since inception. Improved processes would potentially enable UW-Stout to deliver summer contracts more efficiently and with fewer resources. This study utilized data gathered from the process owners of the special session contracts in the academic departments at the UW-Stout and solely incorporates the process within the institution.

Flow Chart

A flowchart is a picture of the separate steps of a process in sequential order. Flow diagrams was be used to show the relationship between a small part to a large part and to develop an understanding of how a process is completed. They can also be used to communicate this process to others.

The information needed to produce summer contracts comes from all corners of the campus, UW system, UW extension and state statue. Payroll dates and pay rates are just some of the numerous components needed to generate these contracts. A summer contracts capture all activities outside the academic year. These contracts includes not only summer instruction but could include grants, research, camps, mentorships, independent studies, internships and study abroad. Additionally, work related to the roles of program director and department chairs are also incorporated into these contracts. The creation of the flow chart was critical to capture these intricacies and ensured accurate communication between people involved in the same process. This flow chart aided process owners who learned through seeing, to comprehend the total process being studied for improvement.

The construction of this flow chart began by identifying the rules, regulations, and deadlines relating to the contracts. Next, potential contract components and their source were identified along with a timeframe in which the information is available. Contract authorization and approval steps were identified, and the exception process noted. After arranging the activities in proper sequence, the flow chart was created to illustrate the flow of information used to generate the summer session contracts. A review of the flow chart with process owners ensured that it was accurately drawn. The process ensured that all process owners understood the current state of the special session contracts. and served as a stepping stone for evaluating the

generation of summer session contracts. To better picture and understand flow charting, Figure 1 provides an example of the different symbols utilized to generate a flow chart.

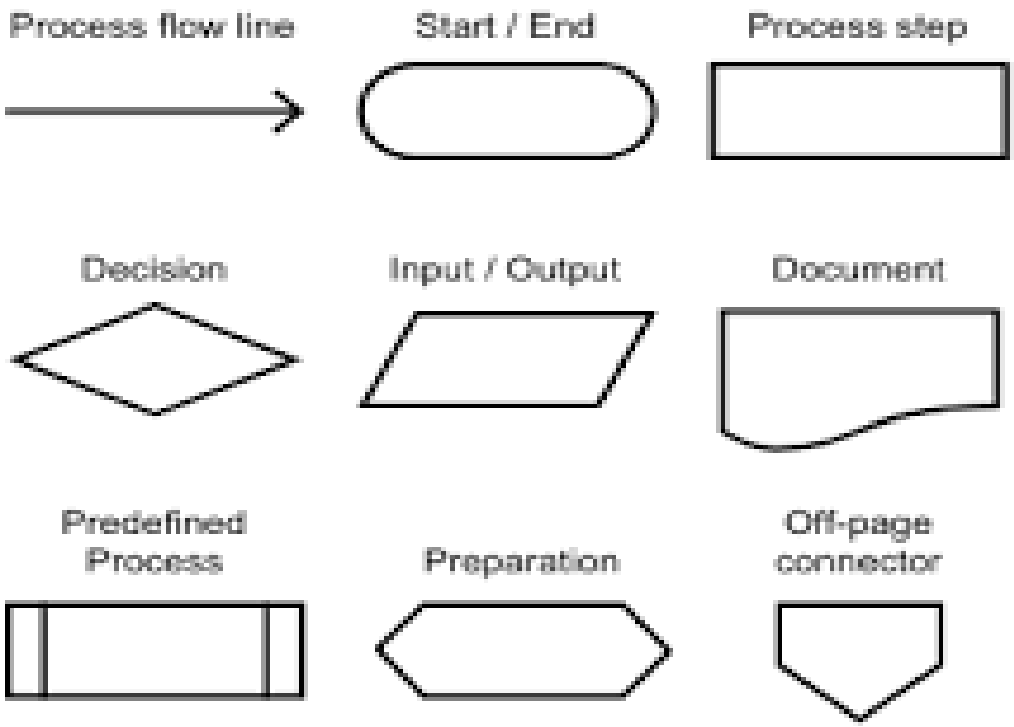

Figure 1. Standard flow chart symbols.

Create a Current State Map

A current state map describes the process that currently exists and serves as a visual aid to understand how the process is actually working. It is a map that reflects all of the steps in a process, who is responsible for each step, and the time it takes to complete each step.

The current state map of the summer session contracts was constructed by gathering individuals directly involved in the process. The first step involved clarifying the steps and methods used by each member and noting exceptions. Next, the team of key contributors sketched an outline of the complete process. Process owners were then asked to review the map

and determine if anything was missing. Modifications were made to the current map until all contributors agreed that the current state map reflected the current process. This current state map established a baseline that would be used to identifying nonvalue activities, potential problems areas, and to develop a framework for a more efficient process. Bright ideas where captured during the current state mapping and served a channel for future improvements. To better visualize and understand value stream mapping, Figure 2 provides an example of a current state map which utilizing common current mapping symbols.

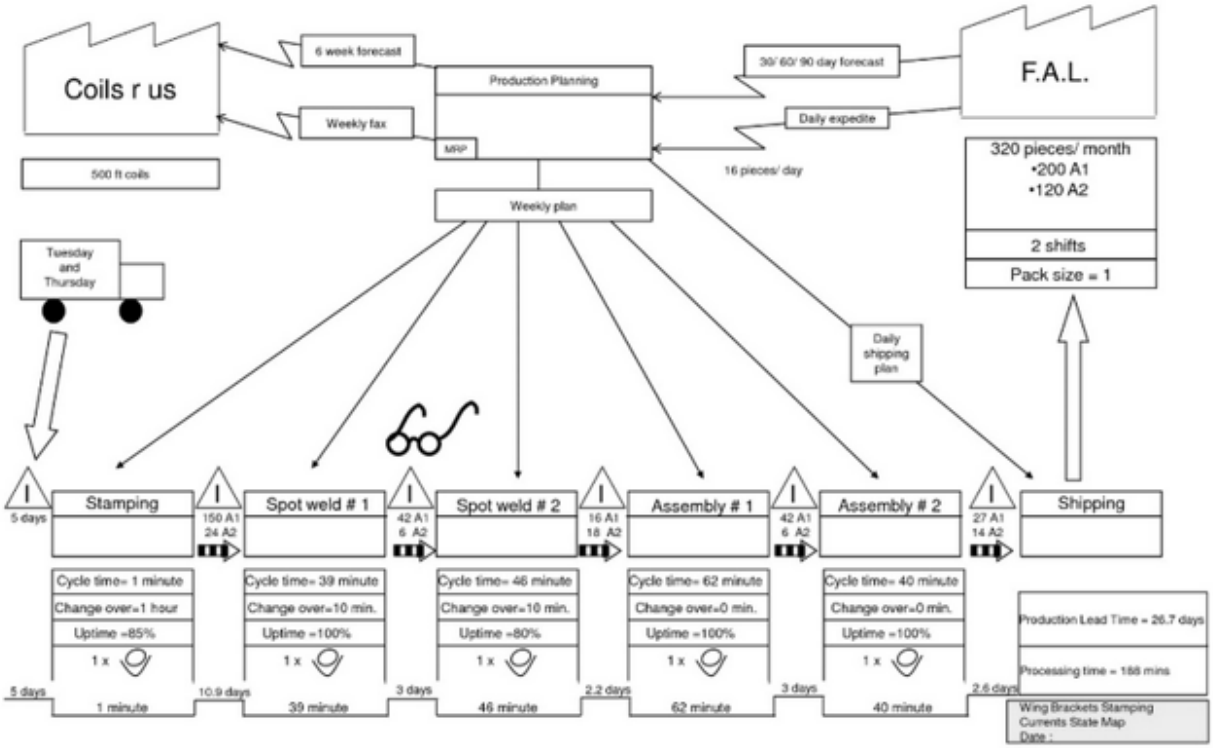

Figure 2. Current state map.

Develop a Future State Map

A future state map represents a shared vision of the future, a concept. The goal of a future state map is to design a process that better serves the customers, reduces non-value added activities and motivates employees. Subsequently, a proposed future state value stream map demonstrates opportunities to utilize lean principles and where to use them.

A brainstorming session, of the process owners, focused on ways to reduce non-value added task and examined prospective areas for improvement. This session began with process owners reviewing the current state map. The bright ideas, recorded while generating the current state map, were explored to determine possible process improvement and potential benefits. Next process owners were asked to identify areas of concern, delays and obstacles. For each item identified, process owners were asked a series of questions. Can a task be eliminated or combined? Do tasks take too long? If so, why? Should task be performed by someone else? How would the process look in a perfect world? How would stakeholders benefit from changes? Utilizing information acquired in this session, a future value stream map was created by the process owners. This map incorporated potential process improvements and illustrated the advantages gained through implementation of lean principles. These improved processes would potentially enable UW-Stout to deliver summer contracts more efficiently and with fewer human resources. To better envision and appreciate the different methods to develop a future state map Figure 3 illustrates a future state map generated using sticky notes.

Data Analysis

Data analysis began by reviewing the information needed to generate summer contracts and converting the data in to flow chart. The flow chart data along with data gathered from process owners was then transformed to a current state map. Value stream mapping was the primary tool used to map the current state of the summer session contracts to determine possible improvements that would lead to delivering summer contract more efficiently. Once waste was identified and reviewed, possible actions were explored and developed into possible actions.

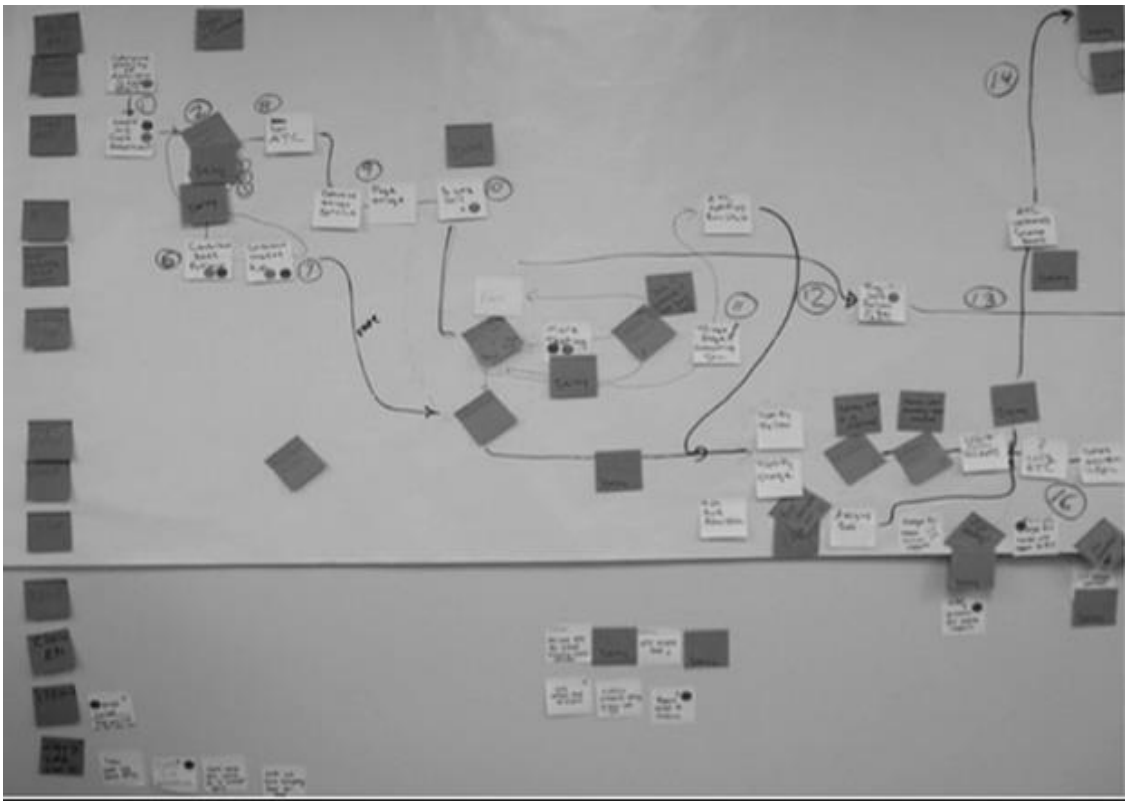

Figure 3. Future state map.

The data was analyzed to identify wastes and to account for reductions in cost and time. The final version of the current and future state value stream maps were recreated via a computer for better readability.

Limitations

The study focused solely on the generation of summer session contracts at UW-Stout. Research results in this study were limited to the opinions and the answers provided by the process owners. Subsequently, the outcomes for this study was derived from the analysis of information offered by the interested parties. Consequently, the quality of the results is contingent on the quality and quantity of the participant's responses. Similarly, process owners may or may not have competencies in the area of lean management.

Summary

This chapter presented an overview of methodology adapted for the summer session contract process and procedures used to collect data from process owners. Improved processes would potentially enable UW-Stout to deliver summer contracts more efficiently and with fewer resources. Data gathered from process owners generated a flow chart to demonstrate the movement of information used to generate special session contract. Next a current state map of the special session contracts was constructed by gathering the individuals directly involved in the process. This current state map provided a visual aid of current process and serves as a reference point. A brainstorming session, of the process owners, focused was on ways to reduce non-value added task and examined prospective areas for improvement. A future value stream map was created to demonstrate potential process improvement and illustrate the advantages gained through implementation of lean principles. Improved processes would potentially enable UW-Stout to deliver summer contracts more efficiently and with fewer human resources. Findings of the data collected in this chapter will be reported in Chapter IV.

Chapter IV: Results

This study was designed to evaluate the summer session contracting process at UW-Stout. The first step in this study was to understand the current process of generating summer contracts. The process included a full over view of the process from the flow of information needed to generate the contracts, the approval process of the contracts, the generation of the contracts and the signature process. As contract components and their source were identified a flow charts was constructed to illustrate the flow of information used to generate the contracts. A second flow chart captured the contract generation and approval process. Using the flow charts as starting point, a current state map was constructed to reflect the contract generation process from information to document. The current state map was used by the researcher to identify areas for improvement and complete and assessment of the current state of operations. My next step was to develop a future state map to demonstrate potential process improvements and illustrate the possible advantages gained through implementation of the recommendations.

Flow Chart

The University of Wisconsin-Stout is divided into three distinct units, referred to as colleges along with a separate unit for on-line courses. Each unit is responsible for generating its own summer session contracts under the supervision of the Provost. Within each unit, the responsibility the process of producing summer contract is assigned to the academic accountant. Respectively, each academic unit created an excel spreadsheet to accumulate and house the unit's employees activities and corresponding monetary information. The excel spreadsheet was used to compile and organize the data, apply mathematical formulas, and perform analysis. A meeting with process owners was used to complete and correct the process. Figure 4 depicts the

final flowchart of the special session contracts, approved by process owners in the academic departments, at UW-Stout.

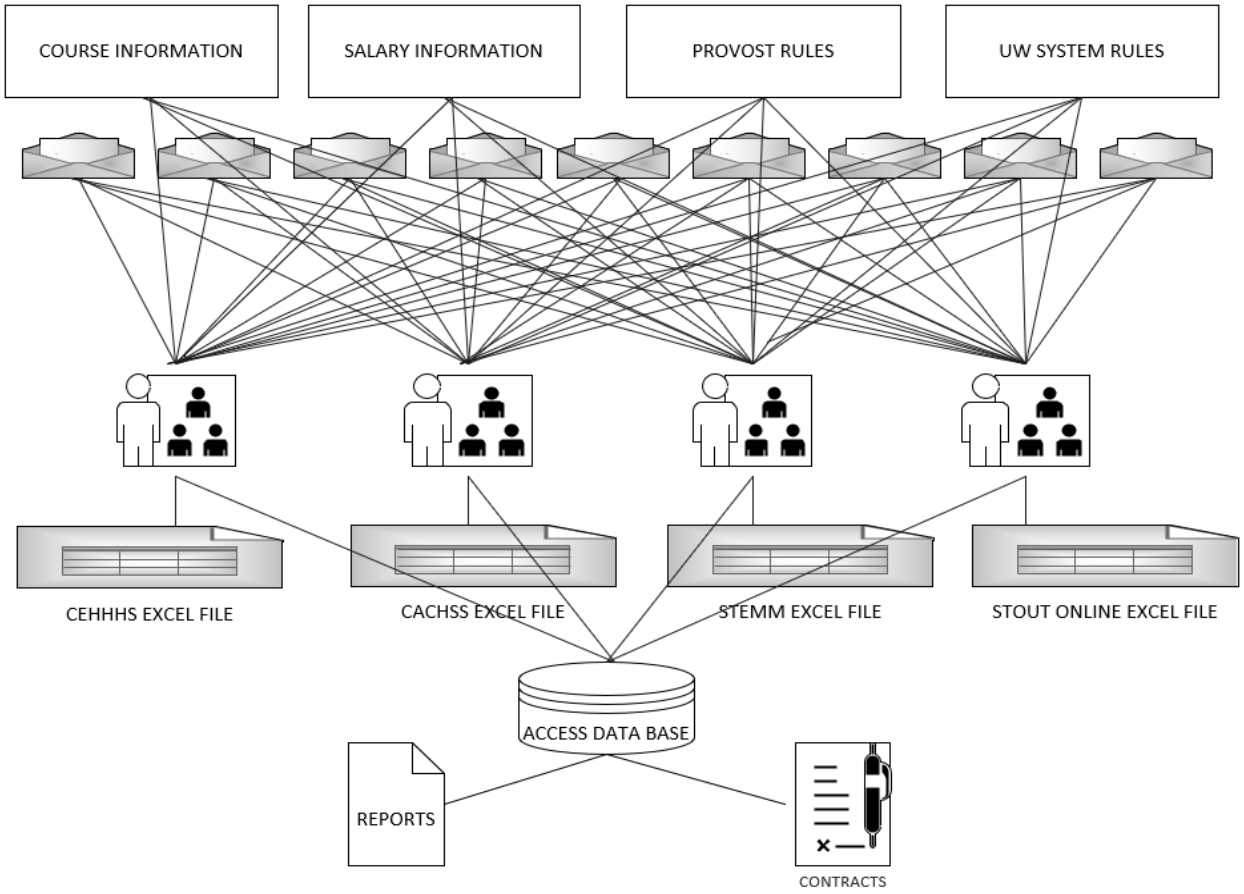

Figure 4. Flow chart of information used in summer contracts.

The generation of summer contract began by gathering the rules, regulations and deadlines established by UW System. In the second step, the current salary information along with job titles were extracted from the payroll system and loaded into excel and access. The third step included administering the pay instructions outlined in administrative procedures established by the UW-Stout Provost. Loading the course offering, including co-ops, independent studies, study abroad programs along with correspond instructor, and student enrollment information gathered from registration and records was the fourth step. In step five, non-instructional activities and their corresponding funding source were recorded in the excel spreadsheets. These

activities were then submitted to the academic accountants via email from various departments on campus and included but were not limited to, research, grant, camps, McNair mentorships, co-op site development, course design, and Wisconsin Teaching Fellow and Scholar programs. After the initial data pull, both the access data base and excel spreadsheets required manual updates for course changes, enrollment updates, salary and title changes. Once the academic accountant determined that an employee's information was complete, the data was keyed into the access data base.

Finally, using the access data base, the employees activities and corresponding financial were printed on a portable document format (PDF) contract form and captured within UW Stout's document imaging and management system, Perspective Content. Using this system, the document was then routed for approval. Figure 5 illustrates the contract approval process for the College of Arts, Communications, Humanities and Social Science (CACHSS).

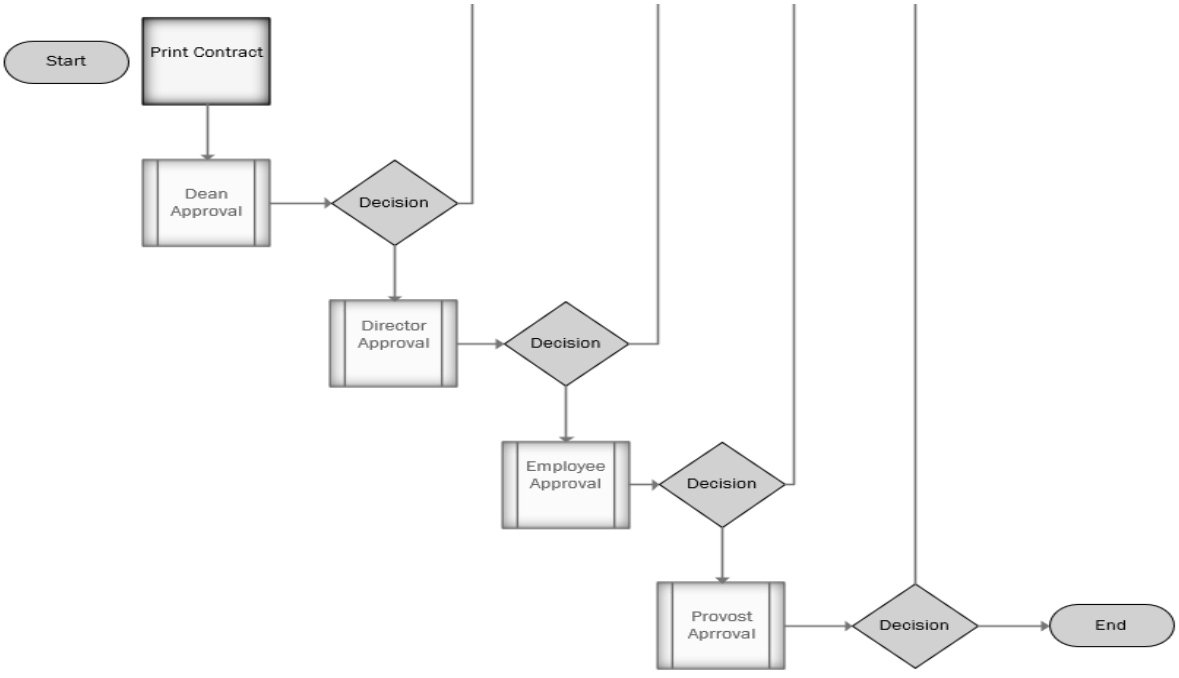

Figure 5. Flow chart of summer contract approval process for CACHSS.

Although approval sequencing may slight vary by unit, UW-Stout policy required all units to obtain two approvals per funding source. A contract often contained multiple funding sources, resulting in multiple approvals. The process began with Dean approval, followed by Chair approval, employee approval and finally Provost approval. If, at any point in this process the contract was not approved, it was sent back to the academic accountant for rework and the approval process was started over. Table 2 indicate the volume of active captured on the summer contracts and the corresponding value of summer contracts generated for the past three years.

Table 2

Summary of Summer Contracts Generated

Year	Number of Contract Items	Value of Contracts Issued
2018-19	1141	$ 2,757,340
2017-18	1132	$ 2,656,946
2016-17	1129	$ 2,653,059

Current State Map

The following information in figure 6 was was obtained by inquiring process owners about the time time it takes to complete each process step and whether an activities contain waste. Problem areas are indicated with so-called Kaizen burst and are numbred. The process begins when the accademic accountants receive email from across campus notifying them of summer activity. In 2018, the academic accountants then assembled 1,141 contract items. It was noted by process owners that information trickled in from departments over the course of several weeks and that emails often lacked vital information such as funding source and dates of service. Once information is received, verifying and correcting informations takes aproximatedly 5 days.

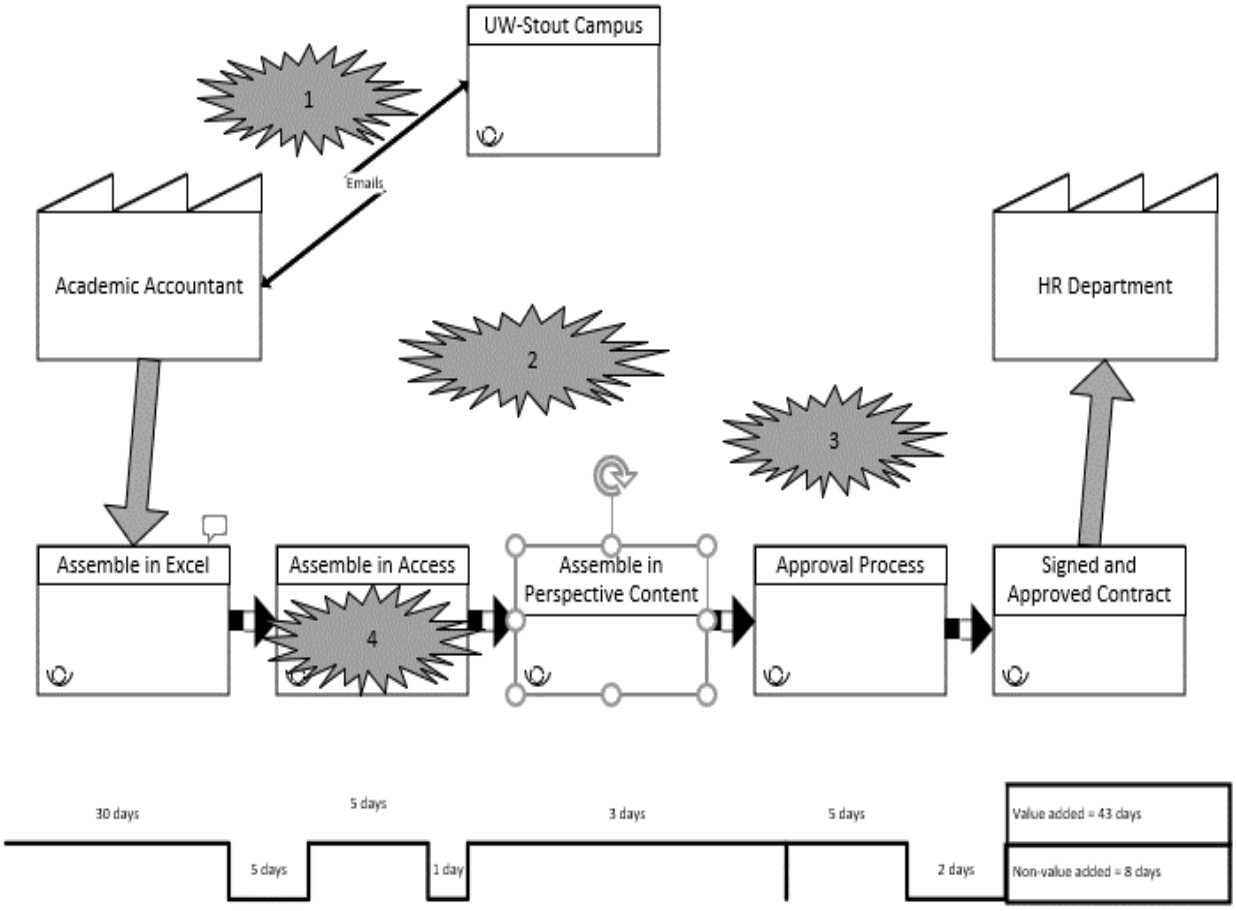

Figure 6. Current state map of the summer contracts.

Next payroll information and course information gathered from across campus were entered into the excel spreadsheets and payment were calculated. Contracts were calculated using a consist campus-wide rate structure established by the Provost office. The scale varied based on instructor classification and title. The pay scales is outlined in Table 3. Of the contracts issued, 73 or 6.3% were prorated contracts and required an additional steps to calculate the contract. An additional 4.7% of the contracts contained payment for independent study course, internships and field experiences which required yet another set of steps to process.

Table 3

Summer Contracts Pay Structure

Instructor Classification	Title	Per Credit
Faculty	Full Professor	$1850
Faculty	Associate Professor	$1650
Faculty	Assistant Professor	$1400
Instructional Academic Staff	Senior Lecturer	$1650
Instructional Academic Staff	Lecturer	$1400
Instructional Academic Staff	Associate Lecturer	$1200

Next the data was entered into the Access data base by contract type. UW-Stout's fiscal year ended July 1st, during the summer session contract period complicating the situation. Non-instructional assignments paid in the current fiscal year were written using a FY18 Summer Service contract. Next fiscal year, non-instructional assignments were paid using a FY19 Summer Service contract. If non-instructional work period crossed year-end separate contracts were issued for work done in each year. Each contract type contained a different pay date and different payroll deadline. The composition of these contract items was outlined in Table 4.

Table 4

Composition of Summer Contracts Generated

Assignment Type	Fiscal Year - Contract Type	Number of Contract
Non-instructional	FY18 Summer Service Items	243
Non-instructional	FY19 Summer Service Items	334
Instructional	FY19 Summer Session Items	555

After retrieving the individual employee's record, all 1,141 items were manually keyed by the Academic accountants into the access data base. For item entered, nine additional fields including: faculty/staff type, contract type, funding string, contract date, amount of contract, assignment, credits, initials of the person entering information, date of information entered, funding type source were filled in. Process owners indicated that each item required a minimum of three minutes to enter and was completed over five days. Process owners that due to the large amount of data entry, an additional day is needed to reconcile the entered data.

Once an employee's data was completed in the Access data base, the employees contract or contracts were captured and indexed in UW Stout's document imaging and management system Perspective Content. This process was manually done by the Academic accountants and required seven fields to be completed, they were: printer, employee name, year, employee dept, employee HR department, employee payroll id number and contract type. In 2018-19, 649 contracts were completed over the course of three days. Figure 7 illustrated the summer contract index requirements.

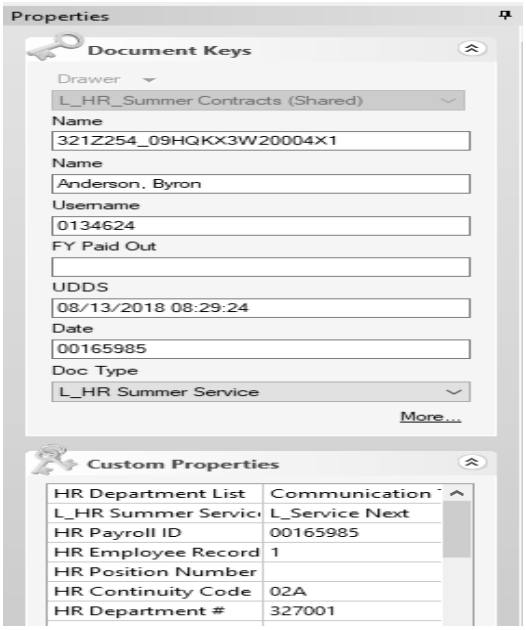

Figure 7. Summer contract index requirements.

The final process displayed on the current state map is Contract approval. All contracts needed to be issued and approved prior to the start date of the work. This process required the Academic accountants to route the contract to two authorized signers, for each funding source displayed on the contract. A sampling of contracts indicated that an average contract contained six signatures per contract. If a contract was sent back for rework, the process started over at the Excel process. The number of reworked contracts was not available however process owners indicated that 60% of all contracts required rework of some nature. Process own indicate that the signature process averages five days and often requires follow up emails to instructor's located off campus.

The first kaizen burst included establish a form for submitting summer activities, creating and publishing a procedure for submitting summer activities and establishing firm submission deadlines.

The second kaizen burst was directed toward rework. Process owners suggested the creation of a review process that would allow for error identification and corrections before data was moved to the next phase. The idea was expanded to suggest a central reviewer to hold everyone accountable to consistent standards and to drive conformance within and across the process. Additionally, the review process would create the opportunity for reporting and analytics to identify patterns and opportunities for improvement.

The third kaizen burst addressed the approval process. Process owners suggested that the extensive approval process was excessive, extended cycle, and added no value. Clarification of this step would be needed to determine the number of approvals and the level of approval needed. Approval clarification would eliminate unnecessary approvals and decrease cycle time.

The fourth kaizen burst was to combine service and session contracts. Based on the fact that the majority of employees receive multiple contracts, this combination would result in a in contracts assembled in perspective content and routed for approval.

Proposed Future State Map

A proposed future state map was designed and discussed with process owners. This discussion prompted additional suggestions. The first suggest was to scrap the individual excel spreadsheets and emails and take advantage of a collaborative work environment. The second idea was to eliminate the data duplication that exist in the access database and utilize the functionality that exist within excel to generate reports and contracts. The final suggestion was to implement technology and systems to eliminate manual entry to Perceptive Content. Figure 8 captures proposed future improvements and additional suggestions.

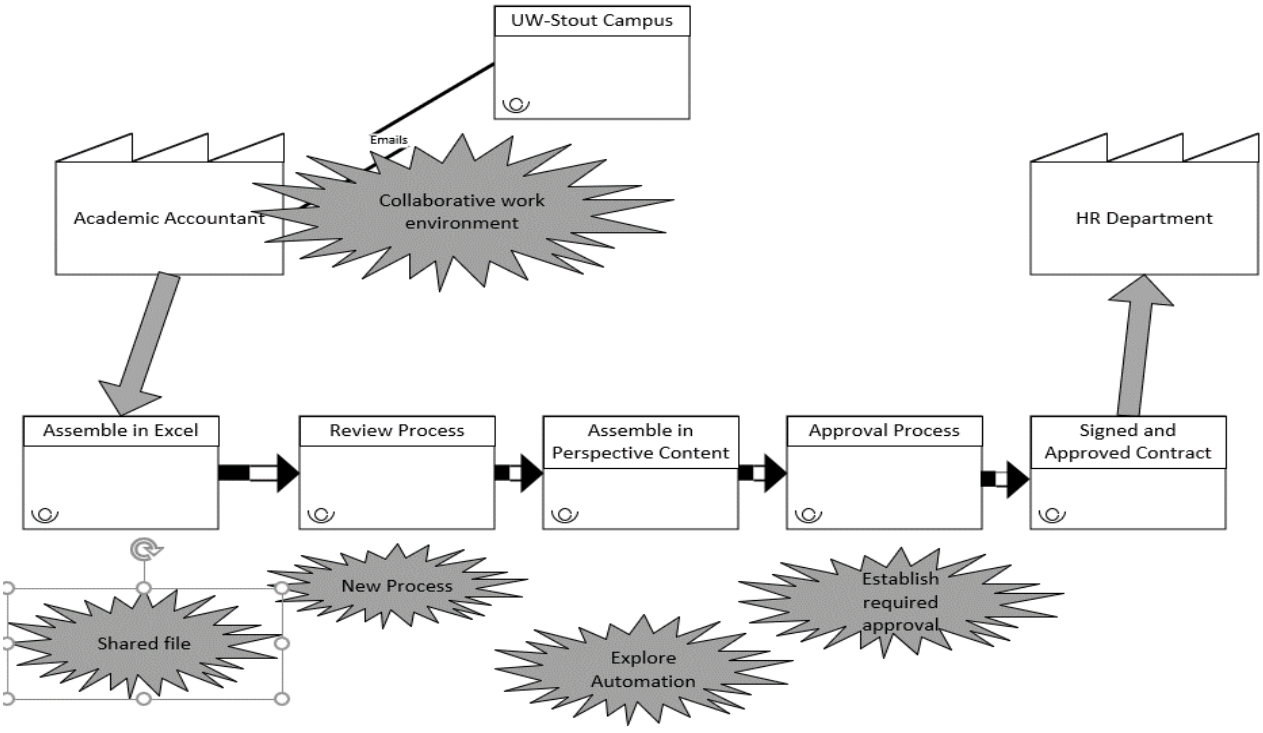

Figure 8. Proposed future state map and additional suggestions.

Summary

UW-Stout was challenged with delivering more value effectively, with fewer resources, increased scrutiny of expenditures, and re-engage a workforce fatigued from ongoing funding cuts. This study evaluated the summer session contracting process using lean principles to identify nonvalue activities, potential problems areas, and to develop a framework for a more efficient process. The development of a process flow allowed team members to visualize the process see the opportunities for improvement in the process. The data analysis showed the potential of the project. Chapter V will discuss the culmination of the project.

Chapter V: Discussion, Conclusion and Recommendation

This study analyzed the existing state of summer session contracts at UW-Stout. The special session contract process was a manual process with minimal change since inception. To remain successful, UW-Stout sought means to increase efficiencies and improve a labor intense process. The process was mapped, and value stream mapping tools were used to identify and analyze waste within the current process. A current state value stream map was created which reflects problem areas and possible solutions. All recommendations and suggests were then incorporated into a proposed future state value stream map.

Chapter I provided a concise overview of University of Wisconsin System and a brief history of UW-Stout. Additionally, the chapter outlined the university's financial structure, introduced the background of the current state of the summer contract process at UW Stout, and defined the problem. Furthermore, this chapter addressed the study's assumptions and limitations of the study.

Chapter II consisted of the literature review, presenting an overview of the lean concept and furnishing a brief history of the evolution of lean. The literature review included an explanation of the some of the basic principles and tools used in the lean process as well as a background of lean activities including value stream mapping.

Chapter III outlined the process used to complete the project. The chapter discussed the methods used for this study and how those methods were used. This endeavor was completed by mapping the current process, generating a current state map and generating a future state map. These maps captured the steps and methods within the process and were vital in identifying nonvalue activities, potential problems areas, and developing a framework for a more efficient process.

Chapter IV focused on process mapping which allowed process owners to visually illustrate and convey the essential details of the process. The process of generating a current state map demonstrated how the process was currently operating and enabled process owners to think about how the process could be improved. The proposed future state map demonstrated opportunities to utilize lean principles and where to use them. The results of the process map, current state, and proposed future state maps were presented in Chapter IV.

Limitations

The findings from this research were encouraging but not without limitations. The summer session contract process under the scope of this project was limited to the generation and approval of the contracts within UW-Stout. Research results in this study were limited to the opinions and the answers provided by the individuals involved in the generation of the summer contracts referred to as process owners. Subsequently, the outcomes for this study were derived from the analysis of information offered by the interested parties. Consequently, the quality of the results were contingent on the quality and quantity of the participant's responses. Similarly, process owners may or may not have competencies in the area of lean management. The main limitation of this study is that the proposed changes to reduce waste could not yet be implemented.

Discussion and Conclusion

If not properly managed, business process can become inefficient and ineffective overtime. In most cases process owners are responsible for the management of processes within an organization, has the authority to determine how a process operates, and the responsibility to make sure it meets the customer and business needs of today. At the start of this research, the question was posed, who owns this process? Who is responsible for this process, who

understands this process from start to finish and who has the ability to make change to this process? Despite multiple answers being put forth, the answer was never the same and true ownership was not apparent. At present, the individuals responsible for this process indicate that the that processes was inherited and that despite being cumbersome and antiquated, that they do not have the ability to change it.

Throughout this project, the application of lean principles has allowed for a better understanding of the summer contract process. Many people involved with the generation of summer contract process knew the basics of lean thinking, which meant that many of the lean techniques were understood without formal training. The visual representation of the process was useful when working in a group because of the overview and structure it provided. The process of generating a current state map helped to see more than waste, it displayed the linkage between information flow and helped identify the sources of waste. A proposed future state map was generated by exploring suggestions generated by process owners. Review of lean principles and discussion of the proposed future state map with process owners yielded additional potential enhancements and the map was revised to reflect those suggestions. Although the suggestions for improvement were not yet implemented, it can be said that there was design acceptance, from those present, of the proposed future state map.

The responsibility of generating summer contracts is assigned to four people at a time when academic accountants are the busiest, year-end. The current method of producing contracts requires hundreds of hours spread across four people, contributing to workforce fatigue, burnout and diverts the academic accountants away from the crucial duties of year end. Fatigue results in slower reaction time, more errors and decreased cognitive skills and it affects

everyone regardless of skill, knowledge, or training. Further research is needed to measure fatigue, its effects, and to quantify the financial impact of opportunity lost.

Recommendations

The proposed future state map highlights significant potential opportunities for improving the summer session contract process at UW- Stout. The first recommendation for the summer contract process is to clarify ownership; determine who has the ability to change the process. The next recommendation is to develop and communicate both a process and timeline for submission of noninstructional summer work. In an effort to decrease manual steps, the ensuing recommendation is to eliminate the use of the Access database by leveraging new technology and systems. The subsequent recommendation includes establishing a review process, prior to the generation of contracts, to reduce rework. An additional recommendation is to seek managements support to minimize the pay structures and simplify payment calculations.

The university should further this study by evaluating the summer contract process throughout the organization to further identify areas of process improvement. It is recommended that university offer training to expand knowledge in the identification of waste at the university. Additional tutelage is also recommended to encourage employees to speak up when an inefficiency is present within a process.

References

Alukal, G., & Manos, A. (2006). *Lean kaizen: A simplified approach to process improvements*. Milwaukee, WI: ASQ Quality Press.

Bhuiyan, N., & Baghel, A. (2005). An overview of continuous improvement: From the past to the present. *Management Decision, 43*(5), 761-771. doi:10.1108/00251740510597761

Chen, L., & Meng, B. (2010). The application of value stream mapping based lean production system. *International Journal of Business and Management, 5*(6), 203-209. Retrieved from http://dx.doi.org/10.5539/ijbm.v5n6p203

Conway, W. E. (2008). *Winning the war on waste: Changing the way we work.* Nashua, NH: Conway Management Company.

Dalal, A. (2009). Go lean, save green. *ASQ Six Sigma Forum Magazine, 8*(3), 33–35.

Dennis, P. (2007). *Lean production simplified: A plain-language guide to the world's most powerful production system* (2nd ed.). New York, NY: Productivity Press.

Feld, W. (2000). *Lean manufacturing: Tools, techniques, and how to use them.* Boca Raton, FL: St. Lucie Press.

Graban, M. (2014). GOOD CHANGE. *Industrial Engineer, 46*(2), 30-35.

Kat , I., & Smalley, Art. (2011). Toyota kaizen methods: Six steps to improvement. Boca Raton, FL: CRC Press.

Lean Institute (n.d.). *Learn about history of lean thinking*. (n.d.). Retrieved from http://www.leaninstitute.in/what-is-lean/history-of-lean

Lodgaard, E., Ingvaldsen, J., Aschehoug, S., & Gamme, I. (2016). *Barriers to continuous improvement: Perceptions of top managers, middle managers and workers*. *Procedia CIRP., 41*, 1119-1124. Retrieved from https://core.ac.uk/download/pdf/81998073.pdf

Martin, K. (2012). *Lean terminology*. Retrieved from http://www.ksmartin.com/resources/terminology.html

Nave, D. (2002, March). How to compare Six Sigma, Lean and the Theory of Constraints. (choosing the best improvement methodology). *Quality Progress*, *35*(3),73 -78.

Oracle. (2003). *Value of lean principles (JD Edwards EnterpriseOne White Paper)*. Retrieved from http://expobadge.com/dldev/dc/file/JDE%20E1%20WP-1032%20Value%20of%20Lean%20Principles.pdf

Ortiz, C.A. (2006) *Kaizen assembly designing, constructing, and managing a lean assembly line*. Boca Raton, FL: CRC Taylor & Francis.

Robinson, A. G., & Schroeder, D. M. (2004*). Ideas are free: How the idea revolution is liberating people and transforming organizations.* Retrieved from https://ebookcentral.proquest.com

Rother, M., & Shook, J. (2009). *Learning to see.* Cambridge, MA: Lean Enterprise Institute.

Tapping, D., Luyster, T., & Shuker, T. (2002), *Value stream management.* New York, NY: Productivity Press.

Tatikonda, L. (2007), Applying lean principles to design teach, and assess courses. *Management Accounting Quarterly*, *8*(3), 27 - 38.

Weiss, S. (2013). *Product and system development: A value approach.* Retrieved from https://ebookcentral.proquest.com/lib/uws-ebooks/detail.action?docID=1180373

Whitmore, T. (2008). Standardized WORK. *Manufacturing Engineering, 140*(5), 171-172,174-179.

WMEP (n.d.). *Value stream mapping*. Retrieved from www.WMEP.org.

Womack, J. P., Jones, D. T., Roos, D., & Massachusetts Institute of Technology. (1990). *The machine that changed the world: Based on the Massachusetts Institute of Technology 5-million dollar 5-year study on the future of the automobile*. New York, NY: Rawson Associates.

Womack, J. P., & Jones, D. T. (1996). *Lean thinking*. New York, NY: Simon and Schuster.