

ISM 4117: DECISION SUPPORT SYSTEMS

Spring 2009 • Tuesdays and Thursdays • RBA 208 • 11 AM - 12:15 PM

INSTRUCTOR

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Office Hours: T/R 12:30 – 1:30 PM, and by appointment

Decision Support Systems, ISM 4117, is the capstone class for MIS majors. A component of this course is the group project which will focus on measuring your ability to analyze, design, and implement a decision support system.

The primary objectives of the group project are for the students to:

- Develop an understanding of business strategy concepts
- Develop an understanding of how information technology (IT) can be integrated into organizations to create and sustain competitive advantage.
- Develop an understanding of the role of computers in direct support of managerial decision-making.
- Integrate and reinforce knowledge gained from prerequisite classes in systems analysis and design, database, programming, and project management.
- Apply this understanding to the design of typical systems for managerial decision support.

The group project gives you hands-on experience designing and building a decision support system for an organization. The project provides a unique opportunity to gain experience with the types of issues and challenges you will have to deal with once you graduate and join the ranks of IT professionals. ***There will be absolutely no instruction on software used to develop the DSS project. It is expected that you have an inventory of development tools that you can draw upon to organize and implement these projects.*** Further, it is specifically expected that you know how to learn a new programming language or how to research and use new features for languages with which you have some familiarity.

Deliverables are due on the dates listed, at the beginning of your assigned class period.¹ To assure that there are no last minute problems, you are expected to manage your time to allow for any possible glitches. Technology related reasons (busy computer labs, corruption of files without backups, computer/printer/network failures, etc.) and time management issues (work-related conflicts, work in other courses, locked doors, etc.) are not acceptable justifications for late submissions. Extensions will be granted for documented medical or family emergencies only. In such cases, please notify me as soon as possible.

¹ Deliverables are due on or before the **beginning** of your class session. After that, your deliverable will be subject to a 20% penalty for each 24 hours it is late. Note that this penalty will not be pro-rated (i.e., a deliverable submitted 15 minutes late will receive the 20% penalty just as a deliverable submitted 23 hours late).

THIS IS NOT A TRIVIAL PROJECT. IT IS ABSOLUTELY ESSENTIAL THAT YOU BEGIN WORK AS SOON AS YOUR GROUPS ARE ASSIGNED AND YOU HAVE RECEIVED THIS HANDOUT.

All written materials will be turned in with 12 point Times New Roman font, single-spaced, 1 inch margins, with page numbers in the lower right.

Keys to Success: The Decision Support Systems (DSS) project requires that you design a system and then build it based on a strategic value discipline. This is an important difference from programming assignments you may have had in prior classes. Typically, programming assignments require you to implement programs that accomplish given stated requirements. In this class, the project requires that you develop those requirements.

There are several characteristics and behaviors that differentiate successful students from those who struggle with the class. In general, successful students:

- Make coordination with the instructor a regular part of their study process and their project implementation. This corresponds to the habit of staying in touch with your manager or your customer in a business environment.
- Get their project underway early and stay on top of the project. Successful students recognize that programming always involves unknowns and problems no matter how competent they are, and they allow time for resolving the problems. They also pay attention to project documentation.
- *Successful students do not wait for things to happen or to be explained or delivered to them. They initiate and try to take control of their studies, their projects, and their lives.*

Book Recommendation

[Data Mining with SQL Server 2005](#) by ZhaoHui Tang and Jamie MacLennan (ISBN 0471462616)

KEY DATES

| | |
|---------------------------|---|
| Deliverable One | Thursday, January 29 th |
| Deliverable Two | Tuesday, February 24 th |
| Deliverable Three | Thursday, March 26 th |
| Deliverable Four | Tuesday, April 21 st |
| DSS Project Presentations | Tuesday & Thursday, April 21 st and 23 rd |

PROJECT REQUIREMENTS, POLICIES, AND GRADING

Your grade will be determined according to the following percentages:

| Deliverables | Weight |
|---------------------|---------------|
| Deliverable One | 10 % |
| Deliverable Two | 20 % |
| Deliverable Three | 30 % |
| Deliverable Four | 40 % |

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Be aware that all deliverables will be graded for both content and presentation. Double-check your work to assure that it is "polished" and does not contain typos or grammatical errors. Poorly written work will be graded significantly below what it would receive if graded on content alone.

PROJECT BACKGROUND

It is by riding a bicycle that you learn the contours of a country best, since you have to sweat up the hills and coast down them. Thus you remember them as they actually are, while in a motor car only a high hill impresses you, and you have no such accurate remembrance of country you have driven through as you gain by riding a bicycle.

~Ernest Hemingway~

Adventure Works is a successful global bicycle manufacturing company located in the Tallahassee community. While successful, Adventure Works developed its technology infrastructure sporadically throughout its history leading to multiple systems containing redundant data. Recently, the CEO of Adventure Works, Arthur Cob, read an article about data warehousing and the use of decision support systems to identify unknown business opportunities and develop new business strategies.

Adventure Works feels that in order to maintain its business success it is time for a strategic overhaul and realignment of the overall business strategy and value proposition. Management also wants to enhance its revenue and profit stream by identifying new opportunities that will appeal to an increasingly savvy consumer. Based on your vast knowledge and experience with DSS and business strategy, your team of expert consultants was hired by "**Adventure Works**" to review the current practices of the company, and to make strategic recommendations based on a primary and secondary value discipline.

Value Discipline

The following site will provide additional background on each of the three value disciplines. In addition, the executive summary assignment provides a detail description of each of these value disciplines (www.businessplans.org/market.html).

- ***Operational excellence and transaction efficiency*** – “based on the concept that you can produce and market a good quality product or service at a lower cost than your competitors. These low costs should translate to profit margins that are higher than the industry average. Some of the conditions that should exist to support [an operational excellence strategy] include an on-going availability of operating capital, good process engineering skills, close management of labor, products designed for ease of manufacturing and low cost distribution.”

- ***Product leadership*** – “... creating a product or service that is perceived as being unique ‘throughout the industry’. The emphasis can be on brand image, proprietary technology, special features, superior service, a strong distributor network or other aspects that might be specific to your industry. This uniqueness should also translate to profit margins that are higher than the industry average. In addition, some of the conditions that should exist to support a [product

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leadership] strategy include strong marketing abilities, effective product engineering, creative personnel, the ability to perform basic research and a good reputation.”

- **Customer intimacy** – “may be the most sophisticated of the generic strategies, in that it is a more ‘intense’ form of either the [operational excellence or product leadership] strategy. It is designed to address a ‘focused’ segment of the marketplace, product form or cost management process and is usually employed when it isn’t appropriate to attempt an ‘across the board’ application of [operational excellence or product leadership]. It is based on the concept of serving a particular target in such an exceptional manner, that others cannot compete. Usually this means addressing a substantially smaller market segment than others in the industry, but because of minimal competition, profit margins can be very high.”

In order to review current practices and assess the organization’s state of affairs, you will design a DSS to help you develop your strategic recommendations. The DSS that you design will also become integrated into the organization and serve to assist in future managerial decision-making. The company technology staff has created a data warehouse containing transaction data of its recent sales orders information that contains basic information about each bicycle sold, either via the internet or local reseller, including its quantity, unit price, and discount rate. Adventure Works has held several promotions of the years in various countries which required a minimum or maximum purchase quantity and a pre-specified discount percentage. Manufacturing data such as days to manufacture, unit weight, and unit size are also included to provide additional information to the Adventure Works management. While recent sales orders contain the traditional sales information, Adventure Works paid particular attention to getting to know its customers.

Over the years, Adventure Works collected customer demographics data such as: names, birthdates, gender, marital status, yearly income, occupation, and education level. Furthermore, Adventure Works collects regional sales data by territory and information about the employee that aided in the sale of the bicycles such as their pay rates, and personal information such as their name, start date, department name and vacation or sick leave hours.

Also, the technology staff has created a Star Schema Diagram for you to see the links between the various tables available in the data warehouse. This document is located in the Project folder on Blackboard.

PROJECT GUIDELINES

With respect to the project reports:

- No fluff. Address the information described above in a concise manner. Use bullet lists where appropriate.
- Grammar and spelling matter. This is a group project, project members are expected to proof read the deliverable before submission.

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- Document should look professional but not flashy. Don't spend lots of money on big, heavy, cumbersome 3-ring binders, color graphics, or those annoying plastic sheet holders (that make it difficult for me to make notes on the pages). Make sure that I can still read everything in your report when it's bound. Use tabs to mark the beginning of each report section.
- Include each group member's name, phone number, and e-mail address in all deliverables.

DELIVERABLE REQUIREMENTS

Deliverable One - Thursday, January 29th before class

Good planning and strategic thinking about the environment in which your decision support system will operate in is vital to a successful project. This deliverable focuses on ensuring that your team has examined the bicycle industry, understands its assigned value discipline, and is making initial preparations for effectively managing the DSS project.

Required sections:

1. Executive Summary (1 page) – What are the main points from this deliverable? Write a short summary of the deliverable for the executive of Adventure Works. The executive summary should be clear and present specific information that your group presents within the deliverable pages.
2. Industry Analysis (2 pages) – Using Porter's 5 forces, perform an analysis of the bicycle industry. From this analysis, what are the major opportunities in this market?
3. Value Discipline (2 pages) – Provide a detailed description of your primary and secondary value disciplines assigned to your project group. Be sure to include the following at a minimum:
 - Definition of value discipline
 - Description of its potential use in the bicycle industry
 - Examples of the value discipline in related industries
 - Preliminary strategy for its use based on the DSS project background information.
4. Project Plan (3 pages) – Using Microsoft Project (version 2003 or higher) make a preliminary outline of your project plan. Your work breakdown structure should provide a three-level deep description of the work your group plans to carry out for a successful DSS project.
5. Time log. Include the names of each group member, the tasks performed by each member, date the task was performed and how much time was spent (in half-hour increments). Compute total hours worked by each member as well as total hours worked by the group on the deliverable.

Deliverable Two – Tuesday, February 24th before class

Before you design your prototype, you must think long and hard about the kinds of analyses that “Adventure Works” management will need in order to take advantage of opportunities in the marketplace and achieve the value discipline that you recommend. You must design a system that accurately assesses historic operations, and then helps management make decisions about: 1) profitability, 2) supply chain management, 3) inventory management, 4) customer relations, and 5) a unique strategic analysis based on the value discipline you end up recommending.

Given your vast experience working with project teams, you have realized that establishing clear expectations among team members is the key to success. Therefore, in addition to brainstorming ideas about managing the business, you will also come up with a detailed plan for internal project management.

Required sections:

1. Executive Summary (1 page) – What are the main points from this deliverable? Write a short summary of the deliverable for the executive of Adventure Works. The executive summary should be clear and present specific information that your group presents within the deliverable pages.
2. Industry Analysis Revised (4 pages) – Using Porter’s 5 forces, perform an analysis of the bicycle industry. From this analysis, what are the major opportunities in this market?
3. Initial Characterization of Database and Decision Support (2-3 pages) – Run 3-5 preliminary queries on the database that will give you a “feel” for the data and the insights they may provide to your team. Provide sufficient information in tabular form to demonstrate that you have conducted an initial exploration of the data. Identify specific relationships across attributes that may be especially interesting to pursue. This should be a high-level form of pseudo code for the queries and analyses that you will conduct for the second and third deliverables.
4. Decision Support (6 pages) – What does the top management team of “Adventure Works” need to know? Brainstorm the critical analyses that you could perform to investigate the following issues, taking into account each of the value disciplines Explain what the output from the queries done for item 3 might tell you (e.g., how you could interpret the findings and apply them to your strategic recommendations).
 - Profitability
 - Supply Chain Management
 - Inventory Management
 - Customer Relations
5. Project Group Analysis (1 page) –
 - List your personality types
 - Create a vision for your project team
 - What is the team’s overall goal for this project?
 - How will you organize tasks to achieve this goal?

- How will you provide each other with feedback on individual performance?
6. Group Performance Plan (2 pages) - How you plan to provide each other with feedback about each project member's performance to date. Include how you plan to motivate members that may have not performed satisfactorily to date.
 7. Project Plan Revised (4 pages) – Provide an updated version of your project plan. Be sure to update tasks that have already been accomplished and tasks that have been added to reflect a new understanding of your DSS project. Include the main tasks that will be conducted by the group to accomplish deliverable three along with time estimates and assigned project member.
 8. Time log. Include the names of each group member, the tasks performed by each member, date the task was performed and how much time was spent (in half-hour increments). Compute total hours worked by each member as well as total hours worked by the group on the deliverable.
 9. Deliverable #1
 10. Peer evaluations (submitted individually via email). All evaluations must be received prior to deliverable submission at the beginning of class or individual grades will be lowered 5% per day until an evaluation is received. I want peer evaluations done individually and confidentially!

Deliverable Three - Thursday, March 26th before class

Your next task is to design the DSS that helps you implement the analyses from deliverable 1 and that answer the key management decisions listed above. In addition, you should use a variety of methods for reporting information, not just forms. Thus, your DSS should generate at least 2 reports, one of which must include a non-tabular representation of the data (i.e. at least 1 graphic representation). Focus your efforts on supporting the decision-making issues, not on creating lists that summarize data. The goal of this project is to focus on the decision support aspects of the business and not the TPS portions. For example, do not simply provide a list of customers; rather perform some type of analysis that examines the characteristics of those customers. Representations of data that illustrate comparisons across categories of data will be especially helpful to those who will use your DSS.

Projects that 1) demonstrate the functionality for analyzing profitability, supply chain management, inventory management and customer relations 2) have an effective and easy to use user interface, and 3) develop a well-developed and supported strategic plan will receive a “B” (grade range 82-89). In order to receive an “A” on this project, you need to build additional substantial functionality that examines a strategic analysis that supports the value discipline that you recommend as part of your strategic plan. Be creative – there is lots of room for you to develop an exciting DSS to support this decision-making situation.

You must use the tables and data provided for you and available through the MIS Department's server.

Required sections:

1. Executive Summary (1 page) – What are the main points from this deliverable? Write a short summary of the deliverable for the executive of Adventure Works. The executive summary should be clear and present specific information that your group presents within the deliverable pages.
2. Preliminary Strategic Recommendations (6 pages) – What value discipline will you recommend? Support your recommendation with data from your preliminary analyses.
3. Screen designs, created in ColdFusion. Include the userID and password for the account. Note - You do not need to have the additional functionality/strategic analysis screen for this deliverable. This will be hard to develop until you have completely analyzed the organization's data.
4. Functional navigation between the screens.
5. Logic (e.g. pseudo code) to describe all DSS components of the system. (1 page for each query) NOTE – between the screen designs and pseudo code I should be able to determine exactly how you will perform the DSS analyses. This is what you will be graded on!!
6. Assumptions that you made that affect your design. These include system and user assumptions. (1 page)
7. Project Plan Revised (5 pages) – Provide an updated version of your project plan. Be sure to update tasks that have already been accomplished and tasks that have been added to reflect a new understanding of your DSS project. Include the main tasks that will be conducted by the group to accomplish deliverable four along with time estimates and assigned project member.
8. Time log. See prior deliverable for details.
9. Deliverables #1 and #2.
10. Peer evaluations (submitted individually via email). All evaluations must be received prior to deliverable submission at the beginning of class or individual grades will be lowered 5% per day until an evaluation is received. I want peer evaluations done individually and confidentially!

Deliverable Four - Tuesday, April 21st before class

In addition to a functional DSS, you have been hired to develop a long-term strategic plan for “Adventure Works”, which includes giving the organization a new name that captures the “essence” of your strategic plan. Strategic plans should assess the strengths, weaknesses, opportunities and threats that “Adventure Works” faces and that will guide all future business decisions. The SWOT analysis must be grounded in historical data captured from the store's

data warehouse. Recommendations should be supported with analyses enabled by your DSS. Describe your proposed new business model for “Adventure Works”. State your recommendations for its value discipline, identifying its core competencies and target market, and articulate how you expect to create a competitive advantage.

Clearly articulate the strategic goals that you are trying to achieve with the DSS, and how these align with your recommended value discipline. Your DSS will essentially embody and reflect the “spirit” of “Adventure Works”, as well as demonstrate key functionalities that will enable the company to gain and sustain a competitive advantage in this market.

Required sections:

1. Executive Summary (2 pages) – What are the main points from this deliverable? Write a short summary of the deliverable for the executive of Adventure Works. The executive summary should be clear and present specific information that your group presents within the deliverable pages.
2. Functional DSS that includes an analysis of profitability, supply chain management, inventory management and customer relations (for a “B”). DSS should include an additional substantial analysis that complements your strategic recommendations in order to receive an “A” on this aspect of the project.
3. Strategic Plan (5-7 pages) – highlights the key recommendations you make to management to ensure “Adventure Works” future success. You should note the organization’s major SWOTs, core competencies and match this with a recommended value discipline. Your strategic plan should be supported by the data analyses performed with your DSS.
4. User’s manual. Explain the DSS start-up and operation, reports, and queries. Be sure to provide the appropriate team userID and password since this is the only way we can fully access your application. Include screen shots. You may find it helpful to document design assumptions for the end-user so that he/she has an understanding of how the system is intended to be used. (Of course, users frequently do not use systems as the developers intended!). REMEMBER – your system must include at least 2 reports, and at least one of those reports should show a graphic representation of the data.
5. DSS design documentation. Use whatever combination of design diagrams (e.g., data flow diagram, flow chart, entity-relationship diagram etc.) you feel is necessary to communicate the design of your system. I’m not looking to see how many different diagrams you’ve learned to use but want to evaluate the quality of your design.
6. Code documentation. All of your code should be documented (I’ll check!). Print and submit the code and documentation for the all decision support aspects of your system. I want to clearly see the logic you used to create this functionality. **CLEAR COMMENTS THROUGHOUT DOCUMENTATION ARE EXPECTED!**

7. System evaluation (2 pages). Evaluate your own project by telling me what you see as the strengths and weaknesses of the system design and/or implementation. This is not a place for you to overstate your accomplishments or to complain about the queues in the computer lab. What parts of the project are you particularly proud of, feel you learned lots about, did well, etc.? What areas do you know are weak, that you would improve if you had more time? What mistakes did you make on this project that you'll be able to avoid or minimize in the future? Did your team management planning help in coordinating efforts?
8. Project Plan Completed (5 pages) – Provide an updated version of your project plan. Be sure to update tasks that have already been accomplished and tasks that have been added to reflect a new understanding of your DSS project. Include the main tasks that will be conducted by the group to accomplish deliverable four along with time estimates and assigned project member.
9. Time log. See earlier deliverables for details.
10. Deliverables #1, #2, and #3.
11. Peer evaluations (submitted individually via email). All evaluations must be received prior to deliverable submission at the beginning of class or individual grades will be lowered 5% per day until an evaluation is received. I want peer evaluations done individually and confidentially!

ADDITIONAL INFORMATION

I will keep all project deliverables in my files and no materials will be returned to your team. Make personal copies of the deliverables if you want them for your records.

In addition to the project deliverables which account for 25 % of your overall grade, there are two additional DSS project-related activities. The first is a group participation grade which is assessed using peer evaluations. These evaluations are assessed at three times – deliverable #2, #3, and #4. These evaluations will account for 5 % of your overall grade.

Finally, each consultant team will make a presentation to management, including outsider evaluators, that highlights their recommendations for managing “Adventure Works” based on analyses enabled by the DSS. The key to a successful project is writing queries that allow you to uncover the meaningful relationships in the data, which company executives can then use as the basis for decision-making. The project presentation will account for 5 % of your overall grade. Additional information on the content of the presentations will be made available later on in the semester.

During the project presentations, there are two separate evaluation forms – one is used to assess the project presentation and the other is used by the department to assess departmental learning goals for accreditation purposes.