The Business Analyst - In Training

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**ABSTRACT**

Most businesses today use digital data from their database and website to assist them in making business decisions. In our Introduction to Information Systems, required of all business majors, we have incorporated a ‘real life’ case to help students learn data management and analysis skills for making business decisions. The objectives of our approach are the following:

- Introduce business analysis skills through in-class and lab exercises
- Introduce projects and exercises which require problem solving using queries of databases for decision making versus just ‘cookbook’ exercises often provided with textbooks.
- Increase integration of the hands-on lab and lecture portions of the course
- Use software tools for developing digital solutions to ‘real life’ problems
- Encourage more students to major or minor in MIS

Assessment is included. This paper presents methods for any introductory business information systems class to improve student understanding of data and business analysis.

**Keywords**

Introduction to MIS, Database, Web Development, E-Business, Analytical Skills, Business Analyst, End-user computing

**INTRODUCTION**

Most business programs have an MIS course which all business majors are required to take. Ours is called Introduction to Information Systems (MIS300). One concern of our business curriculum committee was that our business majors were not learning enough analytical skills in their course work. They were learning the Access and FrontPage tools but not how to apply them to business problems. Before fall 2005, the course was composed of 3-hours of lecture per week and 1-hour of hands-on lab. The lecture was taught by a professor and the lab was taught by a team of Graduate Assistants under the coordination of one of the lecture professors. One concern was the lab was too ‘cook-book’ oriented following step-by-step cases in the lab textbook. Plus, since the lab was not taught by the professor, it was rarely discussed in lecture nor tied to lecture topics. We felt changes needed to be made and decided the only way to accomplish this was to put the lab and lecture together under the same professor. Thus the professor is responsible for teaching the lab portion to his/her own lecture students. The course is now two-thirds lecture (2-days/week) and one-third lab (1-day/week) although the case is used in exercises for both lecture and lab.

Also, the cases used have been changed. We no longer do step-by-step cases included with each chapter in the lab text but give more problem oriented assignments that the student, using the book as a reference, determines which steps need to be done. During lab, the professor covers, with the students following along, exercises using the book examples similar to what is assigned for homework. The students then create individually a database and a web site for a company given in an introductory case study. The students create tables, forms, queries, reports and a switchboard for the database to tie it all together. They are given components to be included in each assignment and the grading criteria. From this, they determine how to design and implement based on similar activities covered in class. The case is varied each quarter from Bikes Unlimited, B & B Lawn Services, Pet Adoptions, Inc, Candle Glow …etc. The same case is integrated in both lecture and lab with the students playing the role of an employee who is trying to solve the assigned business problems or concerns.

**NEED TO APPLY IT SKILLS TO BUSINESS PROBLEMS**

The AACSB Assurance of Learning Standards states that analytical skills and use of information technology learning experiences would normally be general knowledge and skill areas in undergraduate degree programs. Furthermore, learning experiences will include ‘information technologies as they influence the structure and processes of organizations and
economies, and as they influence the roles and techniques of management.” (AASB, 2005). The program objectives for our B.S. in Business degree and related outcomes that map to the introductory MIS course are:

- Possess problem-solving and information technology skills relevant to current business practice.
  - Outcome: Students will apply spreadsheet and database skills in a business practice setting.
- Understand the principles and concepts of contemporary business practice contained in the Undergraduate Business Core.
  - Outcome: Students will be able to design and build a small-scale database application using organizational information requirements.

In addition, business graduates will be expected to help determine the informational requirements whether MIS professionals or in user departments. For those planning IT careers, business analysis skills are increasingly important. Gartner’s research on the IT professional outlook, predicts that by 2010, “six of 10 people affiliated with the IT organization will assume business-facing roles around information, process, and relationships.” (Morello, 2005). Gartner further assumed that IT and business professionals will be recruited as much for business and behavioral competencies as for technical aptitude. (Morello, 2005).

Information Technology professors have wrestled with best methods for teaching students to apply tools to solve business problems versus just technical proficiency. Bartholomew discussed employers’ expectations of graduates to apply computer expertise to solve problems, versus students’ perceptions of what constitutes computer literacy. (Bartholomew, 2004) Two key recommendations in their findings were to reinforce skills specific to functional areas with hands-on, real-world projects strategically throughout the curriculum and to conduct outcomes assessment of student confidence and employer satisfaction.

Blinkerd and Rao discussed the difficulty of making database management systems relevant to non-majors. One of the major challenges they cited was “the student’s perception of a disconnection between ‘book-learning’ and its ‘real-world’ applications.” (Blinkerd and Rao, 2005) The questions their students asked are familiar to many, “Why do I have to take this course?” and “What am I going to do with this?” The course they developed emphasizes first understanding the client’s business problem, then formulating a design. Students then can focus on the implementation with the DBMS. (Blinkerd, 2005) Barker and Monday also addressed the need for more business graduates to develop PC-based applications for their organization. Skills based computer literacy alone is insufficient to meet the business graduates needs. Some systems analysis training is necessary. Their survey of graduates found that they were building small databases, primarily with Microsoft Access. The graduates cited their need for design principles for table structure, data validation, and interface design. Accomplishing this was a challenge. They quoted an email from a student, “Just tell me what to do, how to do it, and provide me with an example.” (Barker and Monday, 2000)

The remainder of this paper describes our specific approach implemented in our Introduction to Management Information Systems course. It is designed to integrate introductory business and systems analysis skills, database design, with the technical skills of using the software.

**CASE STUDY AND EXERCISES**

The business case presents a scenario of a small company needing a database to support business decisions and a website to interface with customers for ecommerce activities. The following are examples of how the case is woven throughout the course. This approach can be used with most of the current MIS texts. We currently use *Essentials of Management Information Systems* by Laudon and Laudon for lecture and for lab, *Introductory Access 2003* by O’Leary and O’Leary and *FrontPage 2003* by Shelly, Cashman and Quasney.

**Case Introduction (Homework) (30 points)**

The first assignment is to familiarize the student with the case. A narrative about the company is handed out including products sold or services provided, the organization, some concerns they currently are having, and some financial data. Based on this narrative, the students prepare typed answers to questions regarding the company’s goals and concerns, products or services provided, the organization chart, financial status and what information systems would be most important for them. We have discussed these topics in class before this assignment is due.

**Database Creation (Lab)**

In lab we begin developing the database for the company. Each student creates their own database. The students start by creating one table in the database such as the Customer table. They create a form to input new customers and add a number
of records. In lab 2 they do some simple queries and reports on this table mainly to review the database software. The
students have had minimal exposure to Access in a pre-requisite to this course but often it has been a year since it was taken.

**Lab Checkpoint 1 Grading Criteria: (14 points)**

Each week in lab, the students have a checkpoint related to what was covered in class. The completion of the checkpoint is
due the following lab (usually a week later). The checkpoint serves as a basis for requirements and grading the completed lab
plus also to evaluate student learning of specific outcomes for assessment purposes. For example, in Checkpoint 1 the
student demonstrates his understanding of defining data and validation.

**Item**

*Create a Customer Table:*

(Included is a printout of sample maintenance form to indicate which fields must be included in the table they are
designing)
- Cust ID is Key Field and should be AutoNum with values from 1-6
- Default State to OH and have all caps
- Have Input Mask for Phone, Zip, and Date of Birth
- Validate the Gender is M or F and only shown as Upper Case
- Have Look-up table for Last year school with values of:
  - High school
  - Some college
  - College Grad
  - Advanced degree
  - Other
- Printout from Documenter under Tools to hand in (3)

*Create Customer Maintenance Form: (2)*

- Add Buttons
- Add Title, size 20
- Rearrange fields
- Box around address
- Add 6 new records using the form. Have yourself as the first Customer and include your correct birth date. ID # should be 1-6 only!!!
- Printout the datasheet view of your records to hand in (5)

**Queries and Reports (Lab)**

To review queries and designing reports, we do exercises on the table we have created in Lab 1.

**Lab Checkpoint 2 Grading Criteria: (12 points)**

**Item**

*Create 3 Queries using the Customer table from Lab 1*

- **By City:** Create a Query showing customer ID, name and contact information only (mail, phone, or email). Filter the query by City. Have a data entry so I can vary the city at run time!
- **By Education Level:** Create a Query showing Customer name, address, email and level of education. Filter the query for both some college and college grads.
- **By Birth date:** Create a query showing Customer name, zip, email, birthday and education level. Filter the query by Date of Birth. (If you are over 25, use <= 1/1/1980; if you are under 25, use >=1/1/1980; Your name should show in the results!!!)

*Create a report from each of the above Queries. Print reports to hand in:*

- **By City:** Put in your city to view the report. Sort by last name. Add a title. Add a text box showing which city you selected. .................................................................3
- **By Education Level:** Group by Education Level (results should show 2 groups. Add a title. ..............4
- **By Age:** Buyers under (or over depending on your age). Sort by Date of Birth. .........................4
- **Hand in a copy of your data by printing dataview of table (like Lab 1) so I can verify your results. ........1
Database Normalization (Lecture – in Teams of 3 or 4) (45 points)

Meanwhile in lecture, we have begun to cover databases, how they work and their benefits. We cover normalization and do some examples. During an in-class exercise, the class is divided into groups of 3 or 4 each. The teams are previously set up with a mix of majors in each team. We try to have an Accounting/IS, Marketing/Management, and Finance/Economic/HR on each team. The additional person(s) is what remains. These same teams are used for all in-class team assignments. The students determine what additional entities are needed in the case database, what attributes are needed in each, the primary and foreign keys and necessary relations for the database to work. Each team turns in a solution before they leave class to be graded and used in creating the remaining tables of the database.

Importing Tables, Relationships, Advanced Forms (Lab)

In lab, we are now ready to add additional tables and set up relationships. Due to time constraints, the other tables including data that should interface with their already created table are given to them. The students import the additional tables and establish the needed relationships. We are now ready for the advanced components in our database. The students add master/detail forms needed to add orders, services… which will require access to multiple tables.

Lab Checkpoint 3 Grading Criteria: (13 points)

**Relationships:**
- Import the additional tables with your Customer table. Set relationships.
- Print a relationship chart ................................................................. 1
- Relationships created between tables as 1 to many and correct............................................................. 3
  \[ Note: Check ‘Enforce referential integrity’\]

**Customer Order Form:**
- Customer Order with sub form (printed with your name)................................................................. 2
- Title on Form ................................................................................................................................. 1
- Rearrange fields/Address in box ........................................................................................................... 2
- Buttons............................................................................................................................................... 1
- Sub form content (correct items)......................................................................................................... 2
- Add a new order for yourself ............................................................................................................. 1

**Extra Credit: (3)**

Create a Product Maintenance form to add or change product information. Have a Title, buttons similar to your Customer Maintenance form. Show all fields. Print a copy of the Product Form showing the product you added only to hand in.

Determine Requirements, Design Options and Installation Options (Lecture- in Teams of 3 or 4) (40 points)

In lecture we are discussing application development and implementation. Based on the industry experience of many of our faculty, we try to stress how it is so important for business employees to assist those developing their Information Systems. No one knows the accountants, sales manager or other workers’ data requirements better than those who do the job. To get systems they need, they must identify their requirements. Based on this, we again use our case and discuss what type of reporting would be helpful in various departments. We have previously discussed types of applications used. We also discuss how to get software (develop, buy, prototype, outsource) and how to install the new software (pilot, phased, parallel, direct).

Again we break the class into teams and for the case company, they as a team decide:
- What reports are needed for business decisions?
- What screens or forms are needed for input?
- What calculations or processes are needed?
- What are our design options? (Develop, Buy, Prototype, Outsource)
- What options do we have for implementation? (Pilot, Phased, Parallel, Direct)
Advanced Queries and Reporting (Lab)

To cover advanced queries and reports, students are given ‘real life’ problems such as: “Your manager needs to meet with top management on Friday to give the quarterly sales results by month and also address what products are selling the best…” The students do queries plus reports to provide the manager with the needed data. Also, based on the output printed on a report, the student must type a summary analyzing the report results.

Lab Checkpoint 4 Grading Criteria: (16)

- **Product Analysis Report:** The manager in manufacturing is having a quarterly review with management next week and needs to report on the products currently being produced. He needs you to give him some supporting data for this meeting. Create a report show all sales (tip: start with orders) grouped by product. Within product, show the distributor who sold the product. Based on the price, give a total for each type of product and then a grand total. Show the detail of the orders including distributors name, date and price. Print report. (5)
  - Based on the output from the report, write a half-page typed summary of your findings for the manager to use in his meeting. (3)

- **Distributor Sales by Month:** The marketing manager is also having a quarterly meeting with management. She needs a breakdown of distributor sales (tip: go from the customer orders) grouped by month showing all detail of orders including date, buyer, city of buyer, product and price. Within the monthly grouping, sort by distributor. Have sales totals by month. Also have a grand total. Print report. (5)
  - Based on the output from the report, write a half-page typed summary of your findings (include on same page as above) for this manager to use in the meeting. (3)

Lab Checkpoint 5 Grading Criteria: Finalizing database with user interface (10)

- Mailing Labels sorted by zip (2)
- Switchboard (8)
  - Include sub-menus for Forms and Reports
  - Include menu items for previous forms and reports
  - Add a title and your name on the Main Menu

Each student then WebCTs their database file to be thoroughly tested for completion by the instructor. (40 points)

E-Commerce/E-Business (Homework) (25 points)

Back in lecture we are discussing the benefits of E-commerce and E-business. Referring back to the case, the student types answers and hands-in to be graded solutions relating to how e-commerce could benefit this company. What should be done via the web - give information only, provide service, or sell? How would a web site provide value to the company? What are some types of pages (requirements and content) that should be included on the web site? Who will Host the website and how much could that cost us per month or year (search web and print findings). From this, we begin the web site for the company in the next lab.

Creating Web Site (Lab)

In lab, the students start their web site by creating a Home page. In addition we add pages that relate to the mission of the company like product pages, photo gallery, forms for visitor input, etc. The form is related back to the database table that will hold the input.

Lab Checkpoint 6 Grading Criteria: Creating the Website (15)

Create a new Web Site. Print the following to hand in for grading.

Choose any Theme you wish. Be creative!!!.....................................................................................................................1

- Add Company Name in the Page banner of the Home page ............................................1
- Add navigation on the top or left side 1

Home Page: (index.htm)
• The home page should give some information about the company. Refer back to the case study for some ideas.
• Mission Statement and Contact Information.................................................................2
• Include a bulleted list about the products/services. .........................................................1
• Have an email to yourself as Webmaster........................................................................1
• Do the Welcome…. As a Marquee................................................................................1
• Add a link to an outside site related to our company ..................................................1

Product Pages:
  o Create a page for each product line/service. Insert a table with the models and pictures, prices and any other info you care to add. Have navigation to other pages and on home. (3 each)

Lab Checkpoint 7 Grading Criteria: Print out to hand in for grading (9)

All Products: (4)
Create a new page adding your theme, banner, and navigation. Include the following on the page:
  • Insert a Photo Gallery on this page. Use the product plus any new models you have added.
  • Add a Caption for each picture
  • Add a horizontal line at the top of the page

Specials: (5)
  • Add a page showing the product/service that is on sale this week
  • Insert an AutoShape object with Specials as text within shape. Fill in the color.
  • Include a picture of the sale item with new price.
  • Add a hyperlink to the Product page (from last week) that shows its price, description.....
  • Add a Hotspot to the on sale item from the picture on your Product page to the Specials page to show the sale price.

Hardware, Software, Networks (Lecture – in Teams of 3 or 4) (40 points)
Back in lecture we have one last in-class exercise that deals with the case. Again in teams, the students determine what hardware (servers, hubs…)/software is needed to run the application. How do we network the various groups (employees, sales offices, suppliers, distributors) that need to have access to the data? What hardware and ISP will each location need to connect?

Lab Checkpoint 8 Grading Criteria: Forms and WebCT final site (23)

Customer Form:
Add a New Web Page under the index page called Contact Us
Add a Form to this page
Include a field for every field (except Cust_ID) in your Customer table from your Access DB.
  o For City, include a drop-down box with 4 options
  o For Schooling, use Option buttons for choices, only one allowed
  o Use Check box for Attend Racing Events
  o Add Submit and Reset (you may rename them)
  • Add an additional field for Comments as text area.
  • Required Fields: Last Name, Zip, Email
WebCT final web site for grading.

Documenting Case Solution (Homework) (24 points)
The final project is for the students to combine all they have done into a manual documenting all the above. They add a table of contents with page numbers, printout of all table layouts, relationship chart, all forms and reports. Included also are printout of all web pages. The results from the in-class team exercises are included also. This is handed in the last week of
class to be graded along with a digital copy of the completed database and web site. Each lab has been graded some during the quarter but a final check of all components is done at the end.

**ASSESSMENT**

We have done assessment comparing spring 2005, fall 2005 and winter 2006 quarters. By AMCIS in August, data from spring quarter will be complete. In spring 2005 the lab was taught by a team of Graduate Students. Starting in fall 2005 the professors taught the labs using the books’ case studies with the step-by-step instructions. Most of the in-class assignments were still done but not related to the same case done in lab. The major changes were made during winter 2006 quarter when again the professors taught both lecture and lab but in addition, the same case was integrated in both.

Table 1 shows the averages for exercises related to the case study. The sample included 70 to 80 students out of approximately 130 for each quarter. All results are from the same professor. Looking at the numbers, as was anticipated, the scores for lab have gone down since the students were not given step-by-step instruction on what to do but had to refer to samples in the lab text similar to what was required on homework. What we found as a plus from better integration of the lab and lecture, was that the average on the in-class team work has gone up. We see this in fall even though the lab case was not thoroughly integrated in lecture but yet the instructor could relate with examples of what was done with the database in lab. A benefit also may be the students can understand why normalization is important when they need it to add the additional data to their database. Again, going back to one of our goal of helping the student relate the use of the tools to ‘real life’ problems, the in-class exercises helped them see the ‘whole’ picture.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Students in sample</td>
<td>81</td>
<td>73</td>
<td>74</td>
<td>76</td>
</tr>
<tr>
<td>Access DB Lab</td>
<td>94%</td>
<td>95%</td>
<td>79%</td>
<td>NA</td>
</tr>
<tr>
<td>Web Site Lab</td>
<td>90%</td>
<td>89%</td>
<td>92.5%</td>
<td>NA</td>
</tr>
<tr>
<td>DB Normalization</td>
<td>65%</td>
<td>79%</td>
<td>87%</td>
<td>94%</td>
</tr>
<tr>
<td>Design/Implementation</td>
<td>87%</td>
<td>93%</td>
<td>85%</td>
<td>93%</td>
</tr>
<tr>
<td>Network Design</td>
<td>77%</td>
<td>85%</td>
<td>83.8%</td>
<td>NA</td>
</tr>
</tbody>
</table>

Table 1. Assessment of Exercises Related to Case Study

NA=Not Available until end of quarter

A survey was given at the end of winter quarter and 70% of the students indicated the exercises related to the case helped them to better understand how a business uses a database and information system for tracking data and business decisions.

**RECRUITMENT OF MIS MAJORS AND MINORS**

More and more companies, whether they are large or small, are using database systems to manage their data. They are also sharing this data via the web with customers and suppliers. To develop the applications that interface with this data, an employee with new skills is needed. This person is the Business Analyst. One goal of this course is to begin training this business analyst. The business analyst is an End-user often with training in Accounting, Marketing, Operations Management or Human Resources, who needs additional knowledge of database, networks, E-business and systems design. The business analyst interfaces with the software developer to get the correct requirements of new systems. To do this effectively, they need to know somewhat how these Information Systems work.

To better prepare this Business Analyst, we have a minor in Management Information Systems. The program requires 20 additional hours in MIS including Systems Analysis and Design, E-Business Strategy and Design, Database Systems, Networks and Telecommunications plus one elective in programming, networking, or accounting systems. With these
additional skills plus their major courses, the student is well prepared to serve as a Business Analyst designing and assisting in the development of business applications.

In fall 2005, we began promoting the MIS minor in our MIS300 course. During winter quarter we had 6 non-MIS majors sign-up for the Systems Analysis and Design course which is the first in the sequence. In spring quarter, we hope that number will increase. It is our hope also, that some of these ‘MIS minors’ may continue their studies to become an MIS major or have a dual major in MIS in addition to their current course of study. It is also our hope that this will increase the enrollment in our MIS courses which, like many universities, has decreased in the last two years.

SUMMARY

Needless to say, the case is used as a sample throughout the course and gives the student an idea of what a company needs in a database and how this data can be used in business decisions. The student realizes the data and the network over which it is share are critical for the digital firm of today to operate effectively. The Business Analyst skills that have been introduced will better prepare them for the digital firms of today and for many years to come. Our assessment results demonstrate improvement in analysis and design skills while applying technical tools to business problem solving.

The final manual the students prepare can be used as a portfolio of course work completed while interviewing for internships or future jobs and also as a reference for other business courses.

At the August AMCIS conference, samples of the completed student projects will be available for attendee to review. We continue to ‘tweak’ the requirements based on student comments but have felt it makes the student aware of the importance of MIS applications in any business, even a small one, and how they can assist in business decisions.

REFERENCES