ASU

ARIZONA STATE UNIVERSITY
GENERAL STUDIES COURSE PROPOSAL COVER FORM

Course information:

Copy and paste current course information from Class Search/Course Catalog.

Academic Unit __W. P. Carey School of Business__ Department __Information Systems__

Subject __CIS__ Number __236__ Title __Honors Introduction to Information Systems__ Units: __3__

Is this a cross-listed course? No
If yes, please identify course(s)

Is this a shared course? No If so, list all academic units offering this course
Course description:

Requested designation: Mathematical Studies–CS
Note- a separate proposal is required for each designation requested
Eligibility:
Permanent numbered courses must have completed the university's review and approval process.
For the rules governing approval of omnibus courses, contact the General Studies Program Office at (480) 965–0739.

Area(s) proposed course will serve:
A single course may be proposed for more than one core or awareness area. A course may satisfy a core area requirement and more than one awareness area requirements concurrently, but may not satisfy requirements in two core areas simultaneously, even if approved for those areas. With departmental consent, an approved General Studies course may be counted toward both the General Studies requirement and the major program of study.

Checklists for general studies designations:
Complete and attach the appropriate checklist
- Literacy and Critical Inquiry core courses (L)
- Mathematics core courses (MA)
- Computer/statistics/quantitative applications core courses (CS)
- Humanities, Fine Arts and Design core courses (HU)
- Social and Behavioral Sciences core courses (SB)
- Natural Sciences core courses (SQ/SG)
- Global Awareness courses (G)
- Historical Awareness courses (H)
- Cultural Diversity in the United States courses (C)

A complete proposal should include:
- ☒ Signed General Studies Program Course Proposal Cover Form
- ☒ Criteria Checklist for the area
- ☒ Course Syllabus
- ☒ Table of Contents from the textbook and list of required readings/books

Contact information:

Name __Angelina Saric__ Phone __5-4974__

Mail code __4606__ E-mail: __angelina.saric@asu.edu__

Department Chair/Director approval: *(Required)*

Chair/Director name (Typed): __Michael Goul__ Date: __11/07/2014__

Chair/Director (Signature): *Michael Goul*

MATHEMATICAL STUDIES [CS]

Rationale and Objectives

The **Mathematical Studies** requirement is intended to ensure that students have skill in basic mathematics, can use mathematical analysis in their chosen fields, and can understand how computers can make mathematical analysis more powerful and efficient. The **Mathematical Studies** requirement is completed by satisfying both the **Mathematics [MA]** requirement and the **Computer/Statistics/Quantitative Applications [CS]** requirement explained below.

The **Mathematics [MA]** requirement, which ensures the acquisition of essential skill in basic mathematics, requires the student to complete a course in College Mathematics, College Algebra, or Precalculus, or demonstrate a higher level of skill by completing a mathematics course for which any of the first three courses in a prerequisite.

The **Computer/Statistics/Quantitative Applications [CS]** requirement, which ensures skill in real world problem solving and analysis, requires the student to complete a course that uses some combination of computers, statistics, and mathematics.

Approved: Feb. 2000

Proposer: Please complete the following section and attach appropriate documentation.

<table>
<tr>
<td colspan="4" align="center">**ASU--[CS] CRITERIA**</td>
</tr>
<tr>
<td colspan="4" align="center">**A COMPUTER/STATISTICS/QUANTITATIVE APPLICATIONS [CS] COURSE MUST SATISFY ONE OF THE FOLLOWING CRITERIA: 1, 2, OR 3**</td>
</tr>
<tr>
<td>**YES**</td>
<td>**NO**</td>
<td></td>
<td>**Identify Documentation Submitted**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>**1. Computer applications***: courses must satisfy both **a** and **b**:</td>
<td></td>
</tr>
<tr>
<td>☒</td>
<td>☐</td>
<td>**a.** Course involves the use of computer programming languages or software programs for quantitative analysis, modeling, simulation, animation, or statistics.</td>
<td>Course syllabus and table of contents for MIS book; Appendix A Overview and Assignment Summaries documents</td>
</tr>
<tr>
<td></td>
<td></td>
<td>**b.** Course requires students to analyze and implement procedures that are applicable to at least one of the following problem domains (**check those applicable**):</td>
<td></td>
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<tr>
<td>☒</td>
<td>☐</td>
<td>**i.** Spreadsheet analysis, systems analysis and design, and decision support systems.</td>
<td>Course syllabus and table of contents for MIS book; Appendix A Overview and Assignment Summaries documents</td>
</tr>
<tr>
<td>☐</td>
<td>☐</td>
<td>**ii.** Graphic/artistic design using computers.</td>
<td></td>
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<td>☐</td>
<td>☐</td>
<td>**iii.** Music design using computer software.</td>
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<td>**iv.** Modeling, making extensive use of computer simulation.</td>
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<td>☐</td>
<td>☐</td>
<td>**v.** Statistics studies stressing the use of computer software.</td>
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<tr>
<td colspan="4">*The **computer applications** requirement **cannot** be satisfied by a course, the content of which is restricted primarily to word processing or report preparation skills; learning a computer language or a computer software package; or the study of the social impact of computers. Courses that emphasize the use of a computer software package or the learning of a computer programming language are acceptable, provided that students are required to understand, at an appropriate level, **the theoretical principles embodied in the operation of the software and are required to construct, test, and implement procedures that use the software to accomplish tasks in the applicable problem domains.**</td>
</tr>
<tr>
<td colspan="3">**2. Statistical applications:** courses must satisfy both **a** and **b**.</td>
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</table>

ASU--[CS] CRITERIA			
☐	☐	**a.** Course has a minimum mathematical prerequisite of College Mathematics, College Algebra, or Precalculus**,** or a course already approved as satisfying the MA requirement.	
☐	☐	**b.** The course must be focused principally on developing knowledge in statistical inference and include coverage of all of the following:	
YES	**NO**		**Identify Documentation Submitted**
☐	☐	**i.** Design of a statistical study.	
☐	☐	**ii.** Summarization and interpretation of data.	
☐	☐	**iii.** Methods of sampling.	
☐	☐	**iv.** Standard probability models.	
☐	☐	**v.** Statistical estimation	
☐	☐	**vi.** Hypothesis testing.	
☐	☐	**vii.** Regression or correlation analysis.	
		3. Quantitative applications: courses must satisfy both **a** and **b**.	
☐	☐	**a.** Course has a minimum mathematical prerequisite of College Mathematics, College Algebra, or Precalculus**,** or a course already approved as satisfying the MA requirement.	
		b. The course must be focused principally on the use of mathematical models in quantitative analysis and design making. Examples of such models are:	
☐	☐	**i.** Linear programming.	

ASU--[CS] CRITERIA			
☐	☐	**ii.** Goal programming.	
☐	☐	**iii.** Integer programming.	
YES	**NO**		**Identify Documentation Submitted**
☐	☐	**iv.** Inventory models.	
☐	☐	**v.** Decision theory.	
☐	☐	**vi.** Simulation and Monte Carlo methods.	
☐	☐	**vii.** Other (explanation must be attached)	

Course Prefix	Number	Title	Designation
CIS	236	Honors Introduction to Information Systems	CS

Explain in detail which student activities correspond to the specific designation criteria. Please use the following organizer to explain how the criteria are being met.

Criteria (from checksheet)	How course meets spirit (contextualize specific examples in next column)	Please provide detailed evidence of how course meets criteria (i.e., where in syllabus)
Course involves the use of computer programming languages or software programs for quantitative analysis, modeling, simulation, animation, or statistics	- Develop the ability to value information systems and supporting concepts such as, business processes, business applications, software concepts, security concepts, and overall business systems.	- Corresponds to item 1 and 2 in the Course Description and Objectives Section of the Syllabus. Also see Harrah's Case Study in Appendix A Overview and Assignment Summary documents
	- Illustrate the use of spreadsheet applications including formulas and functions and their business applications, charts, modeling and analysis, pivot tables, statistics within a spreadsheet, interpreting results within an organization, applications to business areas like inventory management and return on investment.	- Corresponds to item 1 and 2 in the Course Description and Objectives Section. Also see the Business Analytics Project in Appendix A Overview and Assignment Summary documents.
	- Illustrate the use of database applications including data storage, database queries, reporting and exporting data for interpreting results and understanding data to support business decisions.	- Corresponds to Item 4 in the Course Description and Objectives Section of the Syllabus. Also see the PHP Project description in Appendix A Overview and Assignment Summary documents.
	- Be able to apply and evaluate the design of database and spreadsheet applications and use business intelligence processes in areas like reporting (dashboards, scorecards), predictive analytics (e.g., marketing campaigns, quality control) and big data (e.g., basic techniques to manage and analyze data streams). - Appendix A Overview and Assignment Summary documents	- Corresponds to items 1,2, 3, and 4 in the Course Descriptions and Objectives section of the Syllabus. Also see the PHP Project, ER Diagram, and Business Analytics Project descriptions in Appendix A Overview and Assignment Summary documents.

Course requires students to analyze and implement procedures that are applicable to the following problem domains i. Spreadsheet analysis, systems analysis and design, and decision support systems	-Develop the ability to value information systems and supporting concepts such as, business processes, business applications, software concepts, security concepts, and overall business systems.	- Corresponds to item 1 and 2 in the Course Description and Objectives Section of the Syllabus. Also see Harrah's Case Study in Appendix A Overview and Assignment Summary documents.
	- Illustrate the use of spreadsheet applications including formulas and functions and their business applications, charts, modeling and analysis, pivot tables, statistics within a spreadsheet, interpreting results within an organization, applications to business areas like inventory management and return on investment.	- Corresponds to item 1 and 2 in the Course Description and Objectives Section. Also see the Business Analytics Project in Appendix A Overview and Assignment Summary documents.
	-Be able to apply and evaluate the design of database and spreadsheet applications and use business intelligence processes in areas like reporting (dashboards, scorecards), predictive analytics (e.g., marketing campaigns, quality control) and big data (e.g., basic techniques to manage and analyze data streams). -Appendix A Overview and Assignment Summary documents	-Corresponds to items 1,2, 3, and 4 in the Course Descriptions and Objectives section of the Syllabus. Also see the PHP Project, ER Diagram, and Business Analytics Project descriptions in Appendix A Overview and Assignment Summary documents.

Department of
INFORMATION
SYSTEMS

ASU | W. P. CAREY
SCHOOL of BUSINESS
ARIZONA STATE UNIVERSITY

CIS 236 – Honors Information Systems
Fall 2014 Syllabus

Instructor:	**Aaron Read, Ph.D.**	**Last Updated: 08 / 19/ 14**
Office:	BA 319I	
E-Mail:	**Questions:** aaronreadquestions@gmail.com	
	Homework: aaronreadhomework@gmail.com	
	In Dire Class-Related Need: aaron.read@asu.edu	
	Note: I do not respond to emails on Sundays.	
Phone:	480-965-3252	
Office Hours:	T/Th 1:45-2:45 or by appointment.	

Course Web Page: myasucourses.asu.edu

Course Description and Objectives

As business professionals you will have the opportunity to make decisions USING Information Technology as well as decide WHAT Information Technology you will use to support your ideas about improving the organization. In order to perform well in both cases, you need to understand how IT works with people and an organization's processes to meet an organization's strategic objectives.

1) Understand what an information system is (people + procedures + IT) and be able describe the major implications of changing or developing a new system for an organization, including whether or not the system meets the goals of the organization
2) Have a general framework for understanding a business. Be able to understand how a business determines its strategy and how that strategy in turn affects its choices about business processes and Information Technology Purchases.
3) Have experience using, and be able to explain fundamental concepts of business analytics: information visualization and reporting, data mining, and big data
4) Learn fundamental usage of Microsoft Excel, Microsoft Access to perform quantitative analyses on data.

Course Materials

- Experiencing MIS (5th Edition), David M. Kroenke, Pearson/Prentice Hall, ISBN-13: 9780133517040
- Data Smart, John W. Foreman, Wiley, ISBN: 978-1-118-66146-8
- *You need to order this book from Amazon or other Online Vendor yourself. You may need to buy the Kindle version if you cannot find a physical copy. You can view Kindle books on your PC or smart phone.*
- Additional reading, notes, and class slides will be posted on Blackboard
- Laptop/Access to computer in class: You will need to be on a computer every day in class.

Data Smart will provide you with a hands-on experience with data analytics methods as well as real use of Excel. The purpose of reading this book is to understand what is going on under the hood of tools which automate these processes, not to master any mathematical theorems, algorithms, etc. You will use the first three chapters to learn grasping more advanced Excel topic and run through a data mining and text mining example. The remaining chapters will form the basis of a group project where your group becomes chapter experts and will write a report and present the chapter for the rest of the class.

Prep Work and Quizzes

Prepared class attendance is highly beneficial for not only grasping concepts, but also for your grade. There will be quizzes on days that reading is assigned as the homework. Other days you will be required to complete work to turn in before class, as well as helpful guidance on homework due following the class. Please notify me BEFORE class if you are going to miss via email. In addition to some lecture time, class time will be used to apply chapter concepts, learning software applications, and discussing relevant class issues.

Quizzes will be on Blackboard.

Tech Talks

Students will become experts on a particular software tip which familiarize students with the ASU computing environment and enable them to be more productive.. Each student will spend 5 minutes at the beginning of each class period demonstrating the software tip, and explaining its benefits. Additionally, students will need to demonstrate mastery of at least 10 of these tips. A signup sheet will be provided at the beginning of class.

Homework Assignments

Homework assignments will require students to apply the knowledge of the materials they are currently studying. It is important that students do their own homework to insure mastery of the course materials. All homework will be submitted electronically at aaronreadhomework@gmail.com. You must also make sure you include [HW#] (where # = the homework number) and your name in the title of the email.

Homework, Prep Work, and Quiz Grading Policy

Homework: For most homework, grading will be based off of whether or not you followed the directions. Even though part of the directions may seem trivial, please follow them to receive full credit. Use common sense as well. I will discuss the most common reasons for missing points in class. If you need further clarification or want to appeal a grade, please email me.

Prep Homework: All prep homework will be graded on a pass/fail basis, and will not receive feedback. Prep homework is meant to give you feedback on your own skills before attempting work in the classroom setting. Prep homework CANNOT BE TURNED IN LATE.

LATE WORK: *You are only allowed to turn in homework (no other types of Assignments) twice during the semester. Late work will only be accepted if emailed at beginning of the next class section, and will receive a* **30% Deduction in addition to any points normally taken off for the assignment**.

MAKE UP WORK: You may make up Quizzes, Homework, Prep Work, and Tech Talks if you email me (at aaronreadquestions@gmail.com) BEFORE the incident, not during class. I need documented proof of any emergency/school related reasons for not turning in coursework or missing on the day of your tech talk. If you are sick, email me as soon as you decide you are sick enough not to come to class, not right before class.

EXTRA CREDIT: Extra credit opportunities may be given for participation in external activities and for instructor-determined projects which enhance the student's learning.

Group Projects

Data Smart Project

Members of the class will form into 6 chapters to become experts on the assigned chapter. Chapters 4-9 will be assigned as group projects. They will present the chapter to the class as well as create a report which outlines the important concepts, Excel commands, application knowledge from the chapter. Groups may be up to 6 members.

Programming Project

For the programming project, each group will design, build, populate a PHP/MySQL database. The database will demonstrate the ability to dynamically display data based on the profile of a potential visitor. Students will develop a process model of a potential visitor and the decisions made by the software to assure that the right person is displayed the right data. Finally, the process will be tested. This project will be done in smaller groups of a maximum of 3.

Exams

Two exams will be administered during this course as outlined in the class schedule. If a student misses the midterm, the instructor will need documentation of the reason for missing the midterm. Midterm exam grade appeals are only accepted within the week following the midterm grade postings. Late appeals will not be considered. Please notify your instructor as soon as possible via email if you are going to miss the midterm examination. You cannot miss the final exam. **There is no make up for final**.

FINAL EXAM DATES AND TIMES: Your final exam date and time depend on when your class is held. Please note carefully when your class is held to find the appropriate time. Finals will be held in the same room where class is held.

Tuesday/Thursday Classes

9:00 - 10:15 AM	Thursday, Dec 11	7:30 - 9:20 AM Note: This may be changed to 8:00 AM at the mutual bequest of students and professor.
10:30 - 11:45 AM	Tuesday, Dec 9	9:50 - 11:40 AM
12:00 - 1:15 PM	Tuesday, Dec 9	12:10 - 2:00 PM
3:00 - 4:15 PM	Tuesday, Dec 9	2:30 - 4:20 PM
4:30 - 5:45 PM	Thursday, Dec 11	2:30 - 4:20 PM

Monday/Wednesday Class

Course Grading

Grades for this class will be based on course activities as outlined in the class schedule. Students must complete **all major course assignments** or the instructor may assign the grade of E. Grades will be assigned based on the following scale:

98.5-100%	**A+**
93-98.59	**A**
90-92.99	**A-**
87-89.99	**B+**
83-86.99	**B**
80-82.99	**B-**
77-79.99	**C+**
70-76.99	**C**
60-69.99	**D**
<60	**E**

Course assignments will be weighted towards the final grade as follows:

Tech Talks / Tech Mastery	**10 %**
Preparation and Quizzes	**15 %**
Homework Assignments	**20 %**
Group Project (team of 4-5)	**20 %**
Midterm	**15 %**
Final Exam	**20 %**
Total	**100 %**

Academic Dishonesty

Students are expected to abide by the highest standards of ethical conduct and the College of Business Student Academic Integrity Policy. The business curriculum is structured primarily to produce graduates who possess the knowledge and skills necessary for success in their professional careers. These skills include the ability to reason through a situation involving an ethical dilemma. Applying appropriate professional behavior as a student will develop into professional integrity when you enter your profession.

Academic dishonesty will not be tolerated in this course. The College of Business has established the following Academic Dishonesty Policy:

> *All students assume as part of their obligation to the University the responsibility to exhibit in their academic performance the qualities of honesty and integrity. All forms of student dishonesty, including cheating, fabrication, facilitating academic dishonesty, and plagiarism are*

subject to disciplinary action. The Code of Conduct and Student Disciplinary Procedures as adopted by the Arizona Board of Regents applies.

You are assumed to oblige with the terms and conditions of the ASU Academic Integrity specified in the web site: http://provost.asu.edu/academicintegrity

Specifically, the following actions are considered inappropriate conduct in this class:
- Providing or accepting assistance on homework and examinations (cheating by any method or means, including sharing information between class sections). Submitting any work that does not represent the students currently knowledge of the material submitted.
- Behaviors which are disruptive, which are insensitive, or which directly or indirectly inhibit others from working toward their academic goals.
- Behaviors which are disrespectful to classmates or to the instructor. This includes but is not limited to the following behaviors:
  - Showing up late for class
  - Doing homework for another class during the normally scheduled class time
  - Using your laptop (surfing the web) for anything other than class business
  - Talking during inappropriate times
  - Listening and or viewing audio/video devices during class
  - Not turning off your cell phone, beeper, etc.
  - Sleeping in class
  - Using any materials that are not class related (i.e. – newspapers, crossword puzzles, etc.)
  - Any other behavior that is not directly related to the content of the course
- Submitting work derived by another student or preparing work for another that is to be used as that person's own work. Using work of another constitutes plagiarism. Evidence of shared work will result in a grade of zero for all parties involved and subject to immediate removal and failure of the course.
- Lying to your instructor to receive a better grade, or allowance for a late assignment is considered an ethical breach of conduct.

In summary, students are expected to make an ethical and moral commitment to act appropriately in all academic activities and to not tolerate any dishonorable behavior on the part of other students. **Any breach of academic dishonesty may result in removal from this class.**

Class Schedule-Fall 2014-CIS 236*

T/TH Class	M/W Class	To complete before class	Class Activity
08/21	08/25	● Show up to class! ● Buy the Books ASAP!	● Class Orientation Discussion ● Read Course Syllabus
08/26	08/27	● Read ExpMIS Chapter 1 and Chapter 2	● **Quiz 1 on ExpMIS CH1, CH2** ● Discuss Chapter 1 and Chapter 2
08/28	09/03 **(No School labor day)**	● **Prep Work: Complete Tutorials 1 and 2 Before Class**	● Excel Part 1 ● Work on Excel Homework 1
09/02	09/08	● Read Chapter 3 Competitive Advantage ● **Harrah's Case: Turn in 4 responses to 4 of 6 questions (2-3 pages double spaced. Number responses!)** ● **Turn in Excel Homework 1**	● **Quiz 2 on Exp MIS CH3** ● Review Harrah's Case ● Discuss Chapter 3
09/04	09/10	● **Prep Work: Complete Tutorial 3**	● Excel Part 2 ● Work on Excel Homework 2
09/09	09/15	● **Homework: Complete Ethics Cases before class (2-3 pages double spaced in Total, answer all questions)** ● **Turn in Excel homework 2**	● Ethics Cases Discussion ● Ethics General discussion
09/11	09/17	● **Prep Work: Complete DataSmart Ch 1 Tutorial**	● Excel Part 3 ● W ork on Homework 3 in Class
09/16	09/22	● Read Exp MIS Chapter 4 Hardware Software ● Read Ch Ext. 8: Network Tech ● **Turn in Excel Homework 3**	● **Quiz on ExpMIS CH4 and CE 8** ● Memory Discussion ● The Cloud Discussion
09/18	09/24	● Read Exp MIS Chapter 5 – Database Processing ●	● **Quiz on ExpMIS CH 5** ● CH 5 Discussion ● Working with ERD
09/23	09/29	● **Homework: ERD Diagram** ● Exp MIS Chapter 7 Organizations and IS	● **Quiz on Exp MIS CH 7** ● **Discuss CH 7 (Beer Game)**
09/25	10/01	● Read CE 5-Using Access ● **Prep Work Access Tutorial 1 and 2**	● CE 5 Working with Access
09/30	10/06	● Chapter 8 Social Media / Supply Chain Management ● **Homework: Access Tutorial**	● **Quiz on ExpMIS CH8** ● Social Media Experiment
10/02	10/08	● Study for Midterm	**Take Midterm Exam**

10/07	10/15 (Fall Break 10/13)	● Read Data Analytics, Business Intelligence Overview ● Read Exp MIS Chapter 9	● **Quiz on Exp MIS CH 9, Overview Material** ● Data Analytics Overview Lecture
10/09	10/20	● **Prep Work: Pivot Table**	● OLAP, VISUALIZATION, data import ● COGNOS Insight demo
10/16 (Fall Break 10/14)	10/22	● **Homework: Chapter 2 Data Smart (Double Points)**	● Discuss Data Mining ● SPSS Modeler Tutorial *Turn in at End of Class* ●
10/21	10/27	● **Homework: Chapter 3 Data Smart (Double Points)**	● Discuss Big Data ● Hadoop Tutorial *Turn in at End of Class*
10/23	10/29	Prepare to work on group project	● Data Warehousing / Cleanup ● Work on Project
10/28	11/3	● **Turn in Presentation and Report before class Starts**	● **Group Analytics Projects Due at the Beginning of Class** ● Data analysis Presentations (Group Project-Chapter 4-9 DataSmart; all prepare, 3 chosen to present)
10/30	11/5	● Exp MIS CH 10 IS Management	● Quiz Exp MIS CH10 IS Management ● *Guest Lecturer*
11/04	11/10	● Intro to Programming Material ● **Prep Work: Hello World! Programming Setup**	● Intro to Programming ● Go over problems setting up WAMP
11/06	11/12	● Programming Concepts Day ● Prep Work: **Alice Installation; Alice Tutorial Completion**	● Alice Activity
11/13 (Veteran's day 11/11)	11/17	● **Prep Work: PHP Tutorial1**	● Decisions and Loops Programming in PHP
11/18	11/19	● **Prep Work: MySQL Tutorial** ● Read MySQL in PHP primer	● **MySQL in PHP**
11/20	11/24		● Functions and objects in PHP
11/25 (11/27 Thanks Giving)	11/26	● Turn in MySQL in PHP assignment	● Group Project Work Day
12/02	12/01	● Prepare for programming projects	● *Programming Project Presentation* ● **Programming Group Project Due at the Beginning of Class**
12/04	12/03	● Exp MIS Chapter 11 IS Management ● Exp MIS Ch 12 Security	● Quiz on Exp MIS CH 11 and CH 12 ● Guest Lecturer

| 12/09, 12/11 | | **Final Exams** | |

subject to change with notification

Appendix A: CIS 236 Overview

CIS 236 is an Honors course that includes advanced topics but also addresses the learning objectives of CIS 105. W. P. Carey School Honors Academy and Barrett Honors students are able to enroll in the course for Honors credit – they get credit for having completed the CIS 105 core course by enrolling in this Honors course. All business students in the W. P. Carey School must take CIS 105, 236 or its equivalent from another school/university. The course introduces students to information systems in business, business data analytics, systems analysis and design and it includes significant content in the use of important decision making, modeling and personal productivity software tools that both support and reinforce excellent problem solving and analysis skills. In addition, it covers concepts and software suites used for building predictive models for improving business processes (e.g., marketing through loyalty cards at Harrah's) and visualizations to support managerial decision making.

CIS 236 assignments have been designed to address common and important business problems that are precursors to more advanced forms of those problems that are addressed in follow-on core business courses. The business domain is rich in areas where problem solving necessarily involves decision support, conducting systems analysis and design initiatives and decomposing and modeling problems in a manner that can provide insight, support decisions and can encourage action. Most all business areas of study require Excel and database skills (for CIS 236, we use Excel, some ACCESS and MySQL, respectively). The approach is not to solely teach 'point and click;' rather, the approach is to leverage the software on difficult problem sets (difficult for freshmen) where appropriate in order to prepare students for more complex forms of those problems they will face in subsequent core courses that range from across the landscape of business domains. The assignments are designed to prepare students for more in-depth problem solving and critical thinking in accounting, finance, marketing, supply chain management, procurement, etc. All exercises do instruct in basic spreadsheet manipulation, but they also require decisions to be made and/or an analysis to be conducted. The material covered in Excel and MySQL are tested upon in examinations (overall 35% of grade) during the course; we also award 20% of the overall grade to the completion of hands-on assignments. A group project that involves systems analysis and design accounts for 10% of the grade (there are two group projects). Our rationale is that this hands-on use ensures familiarity beyond memorizing point and click solutions.

In this document, we have included templates that describe several exemplary class assignments and the final project. In the templates, we delineate between the rudimentary skills students gain, the critical thinking skills we seek to develop and we include, where relevant, the types of decisions students are asked to make given their formulations, analyses and synthesis. Excel assignments range from a focus on modeling, data manipulation and to decision support. A text that uses Excel to teach modeling and analytics is required; it covers basic mathematical optimization (including non-linear programming and genetic algorithms), clustering via k-means, spherical k-means, and graph modularity, data mining in graphs (such as outlier detection), supervised AI through logistic regression, ensemble models, and bag-of-words models and forecasting, seasonal adjustments, and prediction intervals through Monte Carlo simulation. A final project is a culminating experience that requires students to follow a complete systems analysis design lifecycle using a common and well-known methodology.

Course number: CIS 236   Harrah's Case Study

Assignment Type: (Check one)   ☒Assignment   ☐Examination   ☐Project

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Description: Students must analyze a case study about Harrah's use of data analytics for competitive advantage in the gambling industry, and defend their interpretations of the effective use of data analytics techniques and technologies to obtain competitive advantage.

Coverage of Rudimentary Skills: Students must be able to recognize components of an information system (hardware, software, data, procedures, and people). They must display proper writing and grammar skills, as well.

Critical Thinking Learning Objectives: Students must be able to critique attempts to obtain competitive advantage from the description of an organization and its actions. They must be able to describe how an information system supports such a competitive advantage. They must also understand how a data warehouse rearranges transactional data for decision support at the strategic and operational level. Students will be expected to foresee how similar customer loyalty applications could apply to generating competitive advantage in other industries.

Decisions/Actions Required: Determine whether or not Harrah's use of data analytics will result in a sustainable competitive advantage. Assess whether or not Harrah's approach to data analytics can be applied in other industry context (e.g. retail, services, manufacturing, etc.).

Course number: CIS 236   ER Diagram

Assignment Type: (Check one)   ☒Assignment   ☐Examination   ☐Project

Description: Students are asked to create an entity relationship diagram for a parking pass database and implement it in Excel. Students must correctly use ER diagram symbols and correctly identify foreign keys so that the database contains the correct information. This information will enable a university or other organization to store and utilize transactional data.

Coverage of Rudimentary Skills: Students will learn to use a diagramming tool to construct ER diagrams.

Critical Thinking Learning Objectives: Be able to correctly analyze foreign key placement to establish the relationship between two entities in a database in order to properly link transactional information in different database tables. This requires students to use rules of foreign key and primary key placement to solve an unstructured problem. They must criticize the placement of foreign keys in a table and demonstrate how this will violate rules. They must also understand the nature of the relationship between entities—how many of one entity can participate in a relationship with another entity.

Decisions/Actions Required: Students must evaluate whether or not an ER diagram, and its implementation in a database, accurately reflect business rules.

Course number: CIS 236   Business Analytics

Assignment Type: (Check one)   ☐Assignment   ☐Examination   ☒Project

Description: Students will read and analyze a data mining algorithm presented in *Data Smart* by John W. Foreman and develop a report which analyzes the algorithm's method of classifying or predicting business-related outcomes. They must also be prepared to answer questions and defend their responses without notes. Students will then make their arguments in front of the class as a measure of their successful analysis.

Coverage of Rudimentary Skills: Students will learn how to implement the analytics algorithms in *Data Smart* using Excel functions and charting capabilities.
Critical Thinking Learning Objectives: Students must be able to internalize and analyze how an algorithm works and be able to summarize it in their own words. They must be able to reconstruct the functions of the algorithm to specific functions in Excel. They must also create an example application of the algorithm in another business problem where decision support is needed. Decision support application areas include segment customers based on past purchasing data to better target advertising campaigns, forecasting demand for products, and optimizing resource allocation to lower costs. To correctly apply these algorithms requires the students to be able to formulate appropriate data types for the input to the algorithm, and describe why the output of the algorithm would provide business value.
Decisions/Actions Required: Determine whether or not a business decision (customer segmentation, resource allocation, demand forecasting) can be appropriately supported by the use of a data analytics algorithm.

Course number: CIS 236   PHP Project

Assignment Type: (Check one)   ☐Assignment   ☐Examination   ☒Project

Description: Students will create and populate a database using PHP and SQL to support a photo uploading application. The students begin with a basic template for creating a database, but must make modifications according to an analysis of business needs. They must propose requirements and acceptance tests, along with the creating the implementation of the database. Examples of business requirements include displaying the number of items in inventory, displaying the results of simple queries, and being able to enter data. The project does not focus the students on developing programming mastery only, but on helping students see the connection between business requirements, implementation, and testing.

Coverage of Rudimentary Skills: PHP syntax, MySQL syntax, knowledge of development tools like WAMP and Notepad++.
Critical Thinking Learning Objectives: Be able to gather and infer requirements based on realistic business needs. Be able to evaluate whether or not a system has met certain business requirements through the design and implementation of functional tests.
Decisions/Actions Required: Synthesize and execute critical steps from requirements gathering to implementation and testing to relate to the full systems analysis and design life cycle with the creation of a business information system.

CIS 236

Group Project Programming

The purpose of this project is to help expose you to all aspects of the systems analysis and design process through the creation and enhancement of a simple photo viewing application. There will be four roles on the project: A systems analyst, a designer, and two programmers.

You will also learn basic SQL commands in conjunction with PHP, the installation and configuration of a WAMP or MAMP web-server.

Systems Analyst:

1. Requirements—estimating how long it will take, making sure the requirements are
    a. The requirements must be complete
    b. Prepares tests initially for the Tester
    c. Checks off that requirements match functionality
2. Quality Assurance
    a. Build a test plan and a set of acceptance tests
    b. Run the tests, make sure the tests are complete
3. Programming
    a. Programming spot 1
    b. Programming spot 2
    c. (5 Group members) Programming spot 3 (additional functionality required)

Functionality

Required:

- Your database will only contain one table which must have a unique ID and multiple
- Add, Edit, View, and Delete items from the table in the database
- There should be no significant bugs which prevent these basic functionalities

Choose from the following (to be determined):

- Show last viewed photo
- View Count for each item
- Order items by most viewed
- Show last viewed item
- Filter photos by a certain criteria

Harrah's High Payoff from Customer Information

Introduction

Harrah's Entertainment, Inc. (or simply Harrah's) is assuming a leadership role in the gaming industry through a business strategy that focuses on knowing their customers well, giving them great service, and rewarding their loyalty so that they seek out a Harrah's casino whenever and wherever they play. The execution of this strategy has involved creative marketing, innovative uses of information technology, and operational excellence. These component parts first came together in 1997 and have resulted in many benefits, including:

- A doubling in the response rate of offers to customers;
- Consistent guest rewards and recognition across properties;
- A brand identity for Harrah's casinos;
- An increase in customer retention worth several million dollars;
- A 72 percent increase in the number of customers who play at more than one Harrah's property, increasing profitability by more than $50 million; and
- A 62 percent internal rate of return on the information technology investments.

In the following sections, Bill Harrah's entry into the gaming industry and the customer-oriented values that he held are discussed. These values continue today and are experienced by customers in the 21 Harrah's properties across the country. Harrah's business strategy is described, focusing on the branding of the Harrah's name and customer relationship management. In order to execute their business strategy, substantial investments in information technology (IT) were required in order to integrate data from a variety of sources for use in Harrah's patron database (an operational data store) and the marketing workbench (a data warehouse). This infrastructure supports operations, offers, Total Rewards (a customer loyalty program), and analytical applications. Special attention is given to the use of IT to support "closed loop marketing." The impacts of Harrah's initiatives are discussed, along with future directions and the lessons learned.

Company Background

In October 1937, Bill Harrah opened a bingo parlor in Reno, Nevada. He focused on customer comfort, running fair games, and ensuring that customers had a good time. In 1946, Harrah purchased The Mint Club, which took him from the bingo parlor business to full-scale casinos. After renovating the club, it was reopened as Harrah's Club and began the Harrah's style of casino entertainment. Harrah's was the "friendly casino," where employees knew the customers' names. In 1955, Harrah opened another renovated casino, this time on the south shores of Lake Tahoe. The gaming clubs at Harrah's Reno and Lake Tahoe were prosperous throughout the 1960s and 70s as Harrah continued to expand and improve these properties. By 1971, Harrah recognized that the practice of

going to local bankers or competing gamblers to borrow money for supporting growth was limiting. He took his company public and became the first purely gaming company to be listed on the New York Stock Exchange.

Bill Harrah's vision for growth was continued by Philip Satre who led Harrah's entry into the Atlantic City market and was named president in 1984. In 1993, legislation was passed that allowed gambling on Indian reservations and riverboats. Seizing the opportunity, Harrah's quickly expanded into these new markets, through the building of new properties and the acquisition of Showboat casinos, the Rio All-Suite Casino, and Players International. Entering the new millennium, Harrah's had 21 casinos, making it one of the world's largest gaming companies. Harrah's has sites in every major U.S. market where gambling is allowed. Figure 1 shows the various casino locations. These casinos and supporting hotels employ over 40,000 people, serve over 19 million customers, have 11,521 hotel rooms, 92 restaurants, 36,635 slot machines, 1,075 table games, and over 1 million square feet of gaming space.

Figure 1: Locations of Harrah's 21 Casinos
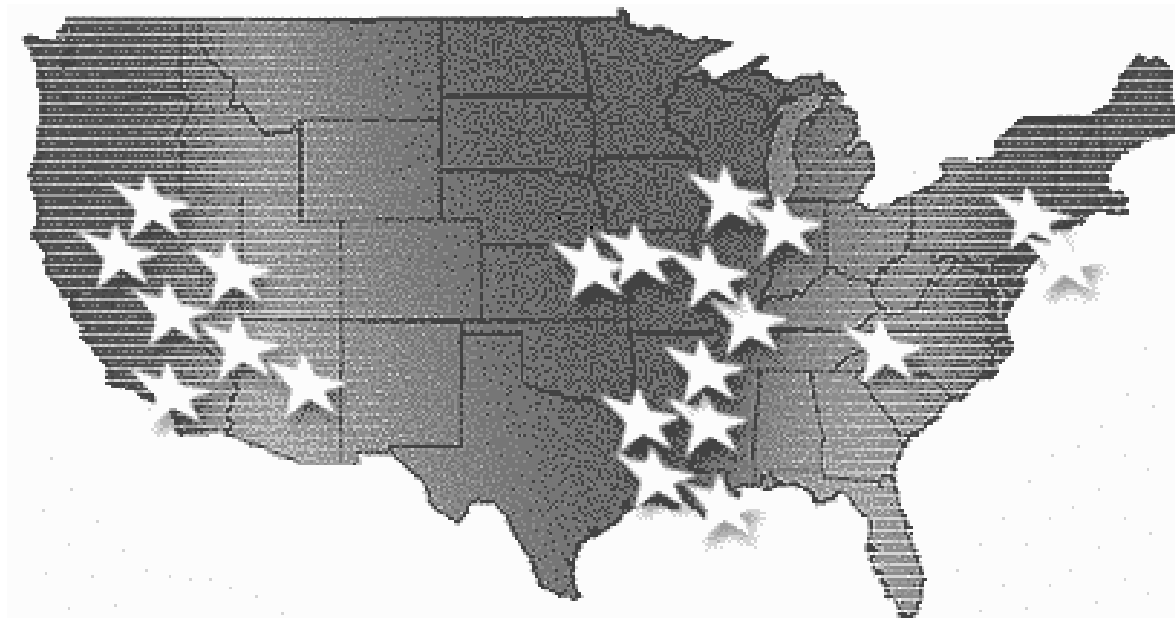
Harrah's Business Strategy

The decision to expand into additional gaming markets was a critical part of Harrah's business strategy. The growth of these markets was considered to be inevitable and helpful to Harrah's and the industry. As management thought about how it could create the greatest value for its shareholders, it was decided that a brand approach should be taken. With this approach, the various casinos would operate in an integrated manner rather than as separate properties. This was a radical paradigm shift in the gaming industry where casino managers historically ran their properties as independent fiefdoms and marketing was done on a property by property basis. With the new approach, there would be commonalties in the gambling experience for customers across the various casinos. Advertising and offers would promote the Harrah's brand. There would be recognition and reward programs for customers who cross-played at more than one of Harrah's properties. Harrah's mission was to build lasting relationships with its customers.

Also motivating the strategy were the experiences of some of the new Las Vegas hotels and casinos (e.g., the Bellagio and Paris) that had invested vast sums of money in lavish hotels, shopping malls, and attractions such as massive dancing water shows and a replica of the Eiffel Tower. While these malls and attractions have been highly popular, their great costs have cut investment returns in half. Harrah's wanted to take a different, more cost-effective route that not only attracted customers, but also maintained and enhanced customer relationships.

Critical to their strategy was the need to understand and manage relationships with their customers. They believed that strong customer service relationships build on a foundation of customer knowledge. To build this foundation, Harrah's had to learn about their customers' behaviors and preferences. They had to understand where their customers gambled, how often they gambled, what games they played, how much they gambled, and what offers would entice them to visit a Harrah's casino. Armed with this information, Harrah's could better identify specific target customer segments, respond to customers' preferences, and maximize profitability across the various casinos.

A key addition to the Harrah's management team was Gary Loveman who was named Chief Operations Officer (COO). This former Harvard professor had the understanding and skills needed to analyze customer behavior and preference data and to put programs in place to capitalize on this knowledge. He helped make Harrah's customer relationship management (CRM) strategy a reality.

To generate the necessary data, Harrah's had to make a substantial investment in information technology. It had to capture data from customer touch points, integrate it around the customer, and store it for later analysis. In order to understand customers' preferences, Harrah's had to mine the data, run experiments using different marketing interventions (i.e., special offerings), and learn what best met customers' needs at the various casinos. From these requirements, Harrah's Winners Information Network (WINet) emerged.

WINet: Creating a Single Customer View

In 1994, Harrah's began work on WINet under the leadership of John Boushy who at the time served as Harrah's CIO and Director of Strategic Marketing. The purpose of WINet was to collect customer data from various source systems, integrate the data around the customer, identify market segments and customer profiles, create appealing offers for customers to visit Harrah's casinos, and make the data available for operational and other analytical purposes. The repository for this data uses a patron database (PDB) that served as an operational data store.   It provided a cross property view of Harrah's customers. In 1997, Total Gold, a patented customer loyalty program was put in place, through which customers could earn points for their gambling activities (e.g., playing slot machines) and redeem their points for free retail products, rooms, food, and cash. The marketing workbench (MWB) was also implemented to serve as a data warehouse for analytical applications.

The development of WINet was not without problems. For example, some complicated queries on MWB, originally an Informix database, took so long to run that they never finished within the computing window that was available. NCR, which had been providing bench marking services for Harrah's, offered to run the queries on their Teradata database software and hardware. The performance improvement was so dramatic that NCR was brought in to redesign the system on NCR Teradata and NCR WorldMark 4700 UNIX System**.**

By 1999, PDB had increased in size to 195 GB and stored data on over 15 million customers, while MWB stored 110 GB of data. The MWB was smaller than PDB because performance problems on the data warehouse limited the amount of historical data that could be stored. At the same time that Harrah's was considering moving to NCR, a decision was made to review the data access tools that marketing used. The outcome was a switch to Cognos Impromtu and SAS. Marketing analysts at the corporate and individual property levels use Impromtu to run predefined reports and queries and to execute ad hoc queries. Analysts use SAS for market segmentation analysis and customer profiling.

Figure 2 shows the timeline for the development of WINet and Figure 3 presents its architecture. The component parts of WINet are described in the following sections.

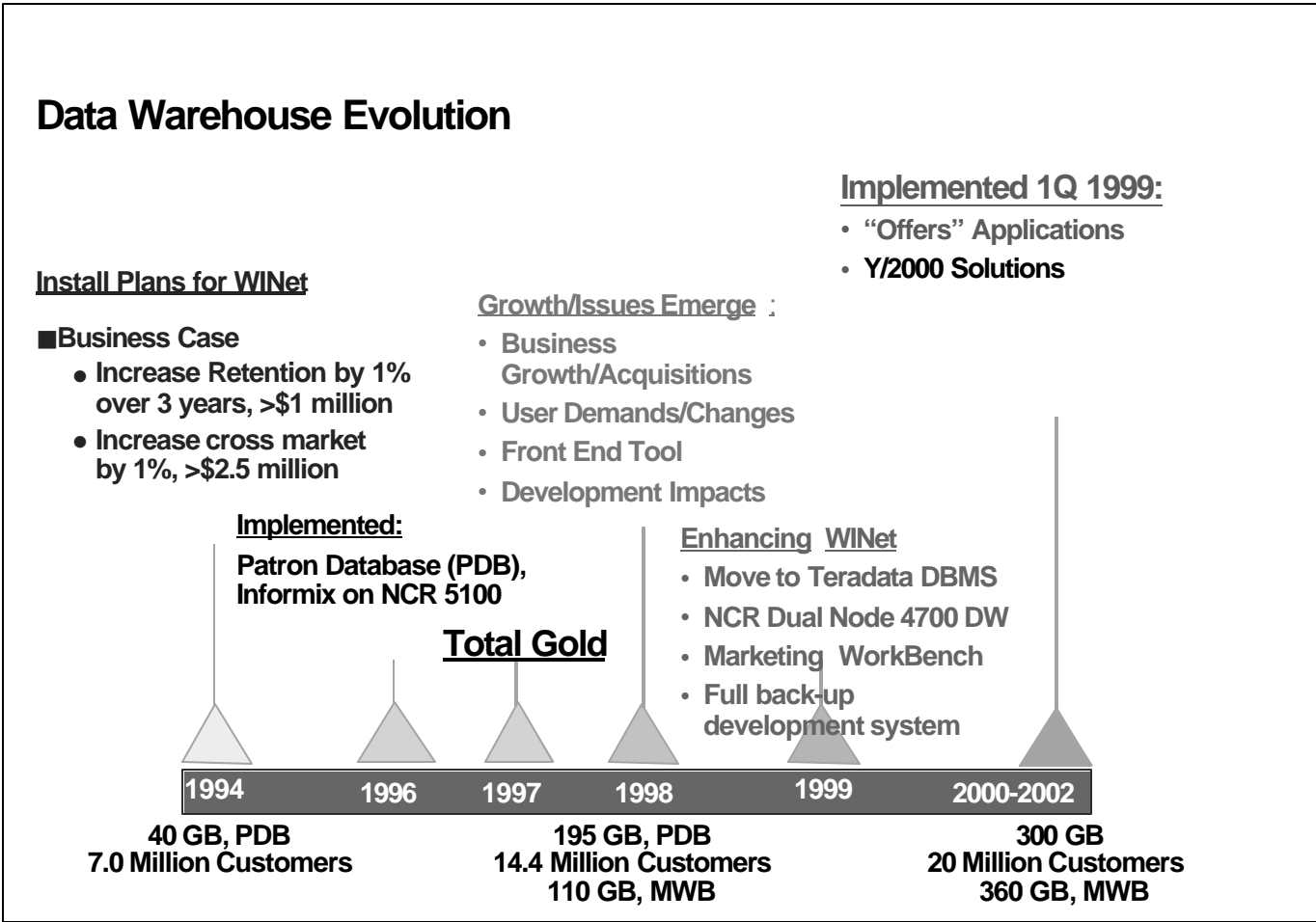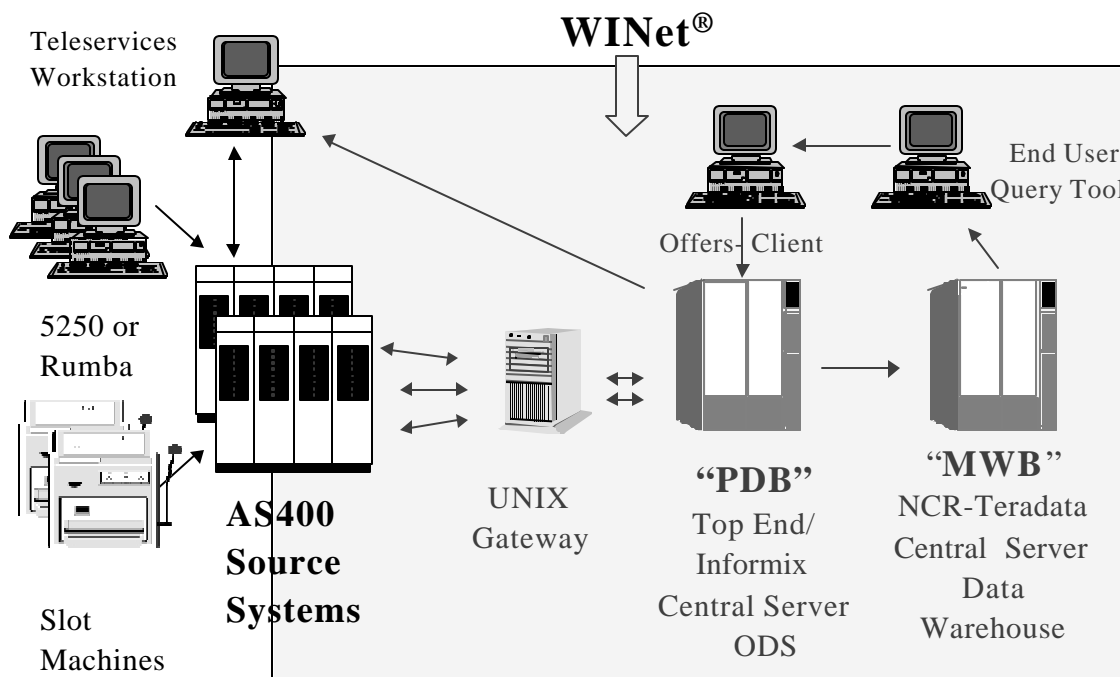Figure 2: Timeline for the Development of WINet

Figure 3: WINet Architecture

Data and Source Systems

Data is captured and collected from a variety of source systems. The hotel system records the details of a customer's stay, demographic data (e.g., home address), and preference data (e.g., smoking or non-smoking room). Data recorded from tournaments and special events (e.g., wine tasting weekend, slot machine tournaments) are included. Most players obtain a loyalty card (e.g., Total Gold) which they use to obtain points that can be redeemed for rewards (e.g., free meals, tickets to shows). In the case of slot machine play, the customer inserts the loyalty card into the machine and every play is recorded. With table games (e.g., blackjack), the player gives the card to the dealer and the pit boss enters into a PC networked to PDB the game played and the minimum, average, and maximum amount bet over a period of time (e.g., typically every two hours). After a customer visits a casino and is in Harrah's system, he or she is a candidate for special offers (e.g., $50 in free chips if the customer returns within the next two weeks and plays for at least three hours). Data on the offers made and redeemed are recorded for each customer.

A variety of source systems are involved. Some of them are very specific to the gaming industry, such as the slot data system, which captures data automatically from slot machine play. Others such as the hotel reservation system are more generic and involve human data entry. The systems that require human input use IBM 5250s or Rumba

terminal emulation for data access or entry. All of the transactional systems run on IBM AS400s. Harrah's has no mainframe.

Patron Database

At the end of the day for each source system (the definition of "end of day" varies with the system), relevant data is extracted for loading into the PDB. First, however, validity and "saneness" checks are performed. Checking for a valid address is an example of a validity check. A saneness test checks whether the data is reasonable, such as the "drop" from a 25 cent slot machine (e.g., a $1000 drop in a hour is not reasonable). Data that fail a test are placed in a suspended file and manually reviewed. At 7:00 a.m., the data is loaded into PDB from the casino, hotel, and event management systems. The load is completed and available for use by noon. In terms of source systems, no matter which casino a customer goes to, the details of every visit are captured and ultimately find their way into PDB. The data is available by customer, casino, hotel, event, gaming product, and tracked play. Every customer is assigned an identification number, and the data about the customer are joined using the ID as the primary key. Unless needed (e.g., such as with a promotional offer), customer names and address are not used with Harrah's applications.

Marketing Workbench

Marketing Workbench (MWB) was created to serve as Harrah's data warehouse. It is sourced from the patron database. MWB stores daily detail data for 90 days, monthly information for 24 months, and yearly information back to 1994. Whereas PDB supports on-line lookup of customers, MWB is where analytics are performed. Marketing analysts can analyze hundreds of customer attributes to determine each customer's preferences and predict what future services and rewards they will want. For example, Harrah's might award hotel vouchers to out-of-state guests, while free show tickets would be more appropriate for customers who make day trips to the casino. A major use of MWB is to generate the lists (i.e., "list pulls" in Harrah's terminology) of customers to send offers to. These lists are the result of market segmentation analysis and customer scoring using MWB.

Operational Applications

The Patron Database supports a variety of operational applications. For example, a valued customer may be a first time visitor to a particular Harrah's property. When the customer checks in to the hotel, the service representative can look up their profile and make decisions about how to treat the customer, such as offering free event tickets or meals. Another example is a pit boss who notes that a valued customer has been gambling heavily for a long period of time relative to the customer's profile and gives the customer a coupon for a free show.

WINet Offers

WINet Offers is Harrah's in-house developed application for generating offers to Harrah's customers. To create an offer, a marketing analyst works with customer segments and profile data in MWB to create a list of IDs of customers who are in the targeted segment and fit the desired profile. These IDs are then fed into PDB, and then a program generates a customized mailing and offer for the customers. PDB also records whether the offers are accepted or not. The offers are also connected to hotel systems so that rooms can be reserved for customers who accept offers. Some campaigns are run on a scheduled basis while others are ad hoc. The offers can be generated at the corporate level to support the Harrah's brand or be created by an individual property (i.e., to support a mid week slot machine tournament). There are more than 20 million customer offers annually, and Harrah's tracks each offer to determine when and how offers are redeemed and how marketing activities influence customer behavior at a detailed segment level.

Total Rewards

Total Rewards is Harrah's customer loyalty program. It tracks, retains, and rewards Harrah's 15 million customers regardless of which casinos they visit over time. Total Rewards was originally introduced as Total Gold in 1997, but it was renamed in July 1999 when a three-tiered card program– Total Gold, Total Platinum, and Total Diamond – was introduced to give more recognition to Harrah's most active and profitable customers. Customers accumulate Reward Credits (points) based on their gaming and other activities at any of Harrah's properties. These Reward Credits can be redeemed for comps on hotel accommodations, meals, and shows and cash can be redeemed at any property. At specified Reward Credit thresholds, customers move to the next card level (e.g., from Gold to Platinum) and qualify for the privileges associated with that level (e.g., preferred restaurant reservations and seating, priority check-in at hotels). Customers can check their Reward Credits at any time by entering their card into a slot machine or kiosk or by logging in to harrahs.com . Total Rewards members are also sent offers of cash and comps for use at local Harrah's casinos and destination resorts such as Las Vegas and Lake Tahoe. Figure 4 shows a customer's view of the Total Rewards program.

Figure 4: Customer View of the Total Gold™ Program
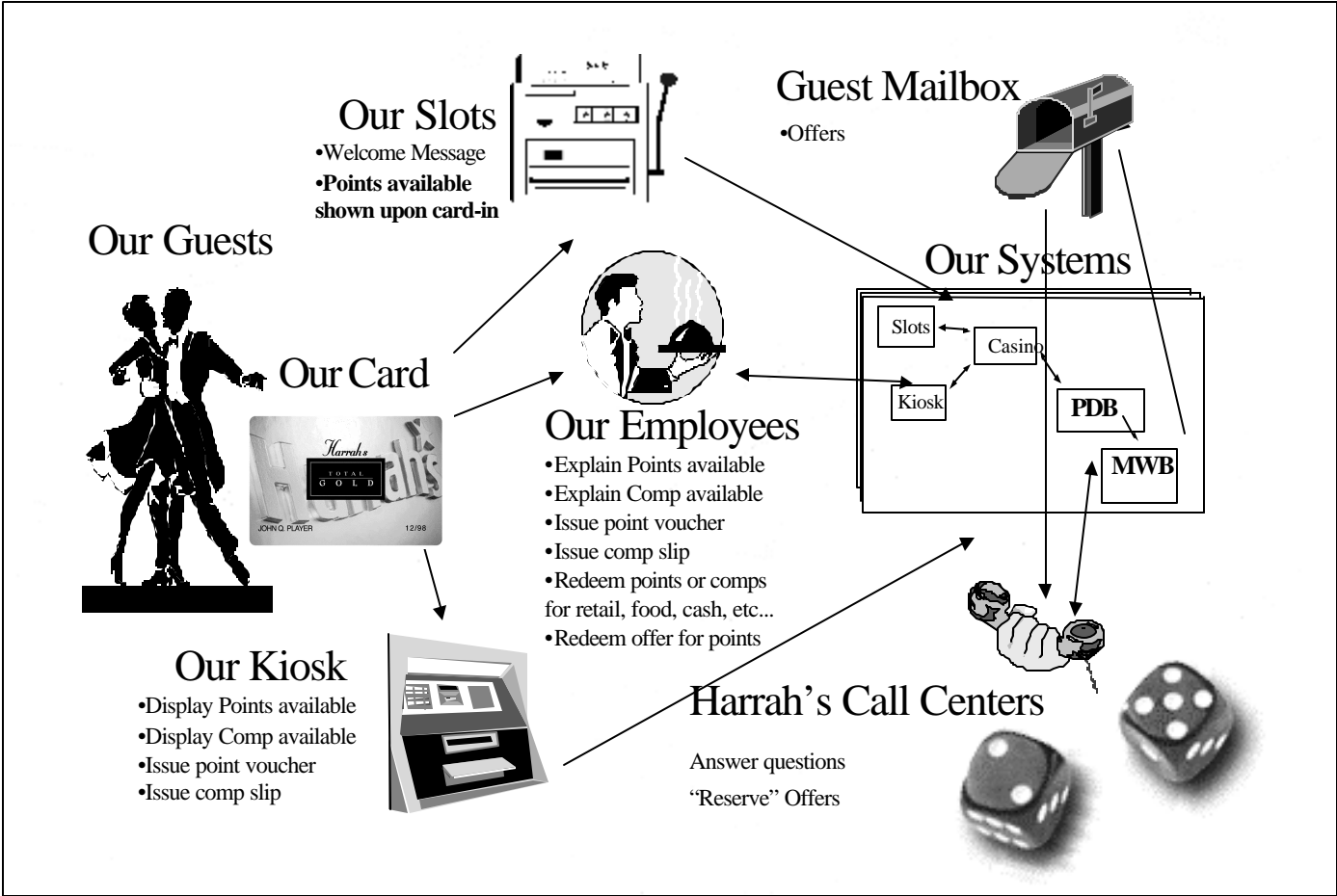

Closed-Loop Marketing

Like other casinos, Harrah's previously extended offers to customers based primarily on observed gaming worth. Over the years, intuition-based beliefs—called *Harrahisms*— developed for what did and did not work with their marketing campaigns. *Harrahisms* were never tested. With WINet, the foundation was in place for a new, more scientific approach. Campaigns could be designed, tested, and the results retained for future use. This data-driven testing and learning approach is called "closed loop marketing" and is shown in Figure 5. Its goal is to learn how to influence positive changes in customer behavior. Harrah's can learn what types of campaigns or treatments provide the highest net value.

Figure 5: The Closed-Loop Marketing Process
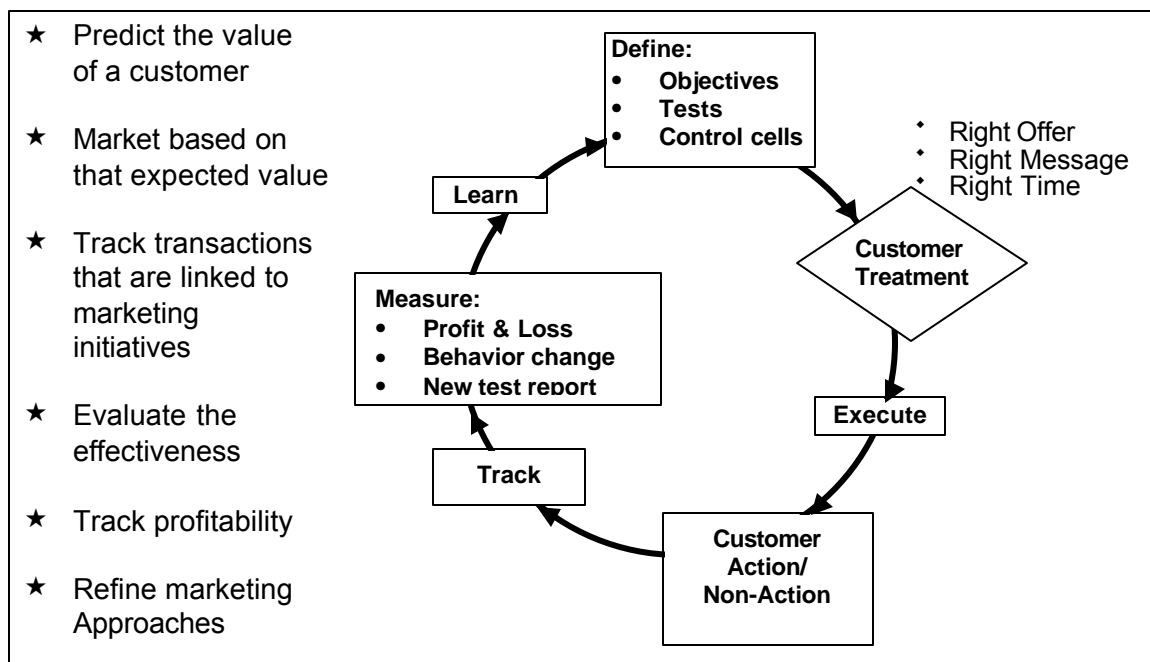
Closed-loop marketing begins with a definition of quantifiable marketing objectives, characteristics of the test procedure, and expected values of the customers selected for the test, who are divided into experimental and control groups. Based on what is already known about their gaming customers, the test campaign (customer treatment) is designed to provide the right offer and message at the right time. The selection of the customers and their treatments are based, in part, on Harrah's Customer Relationship Lifecycle Model, which is shown in Figure 6. Customers are offered customized incentives designed to establish, strengthen, or reinvigorate the relationship depending on their positions on the customer lifecycle and the time since their last visit. For example, a new customer might have characteristics that suggest that the customer has high lifetime potential value. Harrah's is likely to make an exceptionally generous offer to this customer in order to build a relationship. Or, an analysis of the customer data may reveal that a customer is "past due" to visit a Harrah's casino based on their previous gambling history. This kind of customer is also likely to receive a targeted message and offer in order to reinvigorate the relationship.

Figure 6: Harrah's Customer Relationship Lifecycle Model
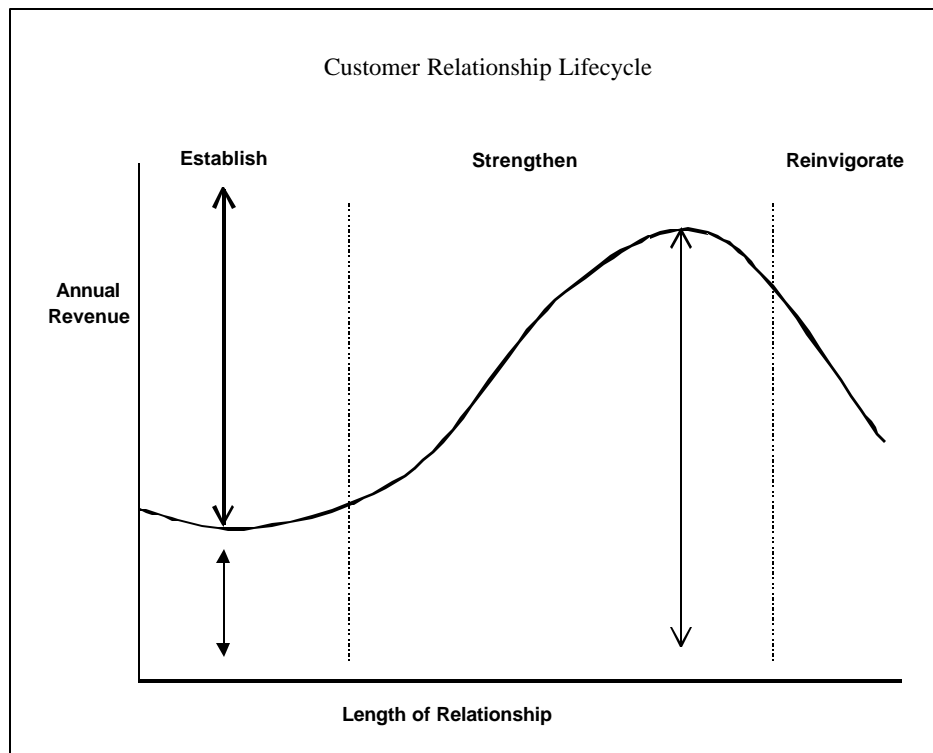
Each customer's response to the campaign is tracked and analyzed in detail. Not only are response rates measured, but other metrics as well, such as revenues generated by the incentive and whether the incentive induced a positive behavior change (e.g., increased frequency of visit, profitability of the visit, or cross-play). Based on the net value of the campaign and its profitability relative to other campaigns, Harrah's learns which incentives have the most effective influence on customer behavior or provide the best profitability improvement opportunities. This knowledge is used for continuous refinement of marketing approaches. Literally thousands of experiments of this kind have been conducted.

Several examples illustrate the use and value of closed-loop marketing. Two similar groups of frequent slot machine players from Jackson, Mississippi were identified for an experiment. Members of the first group were offered a marketing package of a free room, two steak dinners, and $30 in free chips at the Tunica casino. Members of the second group were offered $60 in chips. The second, more modest offer generated far more gambling, suggesting that Harrah's was wasting money offering Jackson customers free rooms and meals. Subsequent offers in this market focused on free chips, and profits nearly doubled to $60 per person per trip.

Another test focused on a group of monthly players who Harrah's thought could be induced to play more frequently because they lived nearby and displayed traits such as

hitting slot machine buttons quickly (i.e., "high velocity" players). To entice them to return, Harrah's sent them free cash and food offers that expired in two weeks. The group's number of visits per month rose from 1.1 to 1.4.

The process and technologies that enable closed-loop marketing are shown in Figure 7.

Figure 7: Technologies Enabling Closed-Loop Marketing
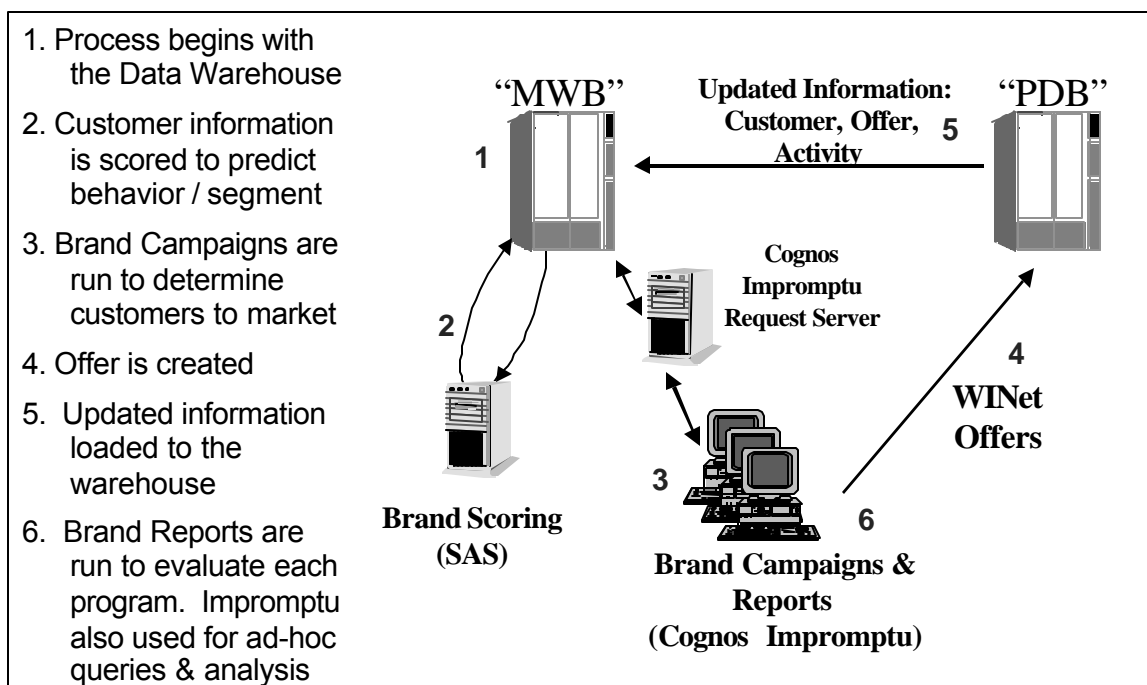

The Impact

Harrah's business strategy and the use of information technology are unique in the gaming industry and are more like the approaches taken in retail and financial services. The results are impressive and other casinos are copying some of Harrah's more discernable methods. Harrah's stock price has risen in response to a doubling of the company's earnings over the past year. The creation of the Harrah's brand, Total Rewards, and cross marketing have resulted in a 72 percent internal rate of return on investments in information technology.

The effectiveness of Harrah's closed loop marketing approach can be seen by how it has affected "same-store sales" (i.e., gambling revenues at a single existing casino). In 1999, Harrah's experienced truly significant "same-store sales" revenue growth of 14 percent, which corresponds to an increase of $242 million over 1998. Harrah's grew revenues faster than their competition almost everywhere they do business – in some cases doubling and even tripling the market average of "same-store" sales.

Same-store sales growth is a manifestation of increased customer loyalty, which is driven by three key contributors to business value: (1) frequency of visits, (2) profitability per visit, and (3) cross-market play. Consider some specific examples of improvements in these areas.

Harrah's is successfully increasing trip frequency from a segment of customers who have historically visited its properties infrequently. Before the marketing campaign, customers visited Harrah's casinos in the central region of the country (i.e., the central division) 1.2 times per month. After customizing the offer, and tailoring the message, Harrah's is now receiving 1.9 trips per month from these same customers. And, more customers are visiting as represented by the percent of custome rs visiting; see Figure 8.

Figure 8: Increase in Frequency of Visits
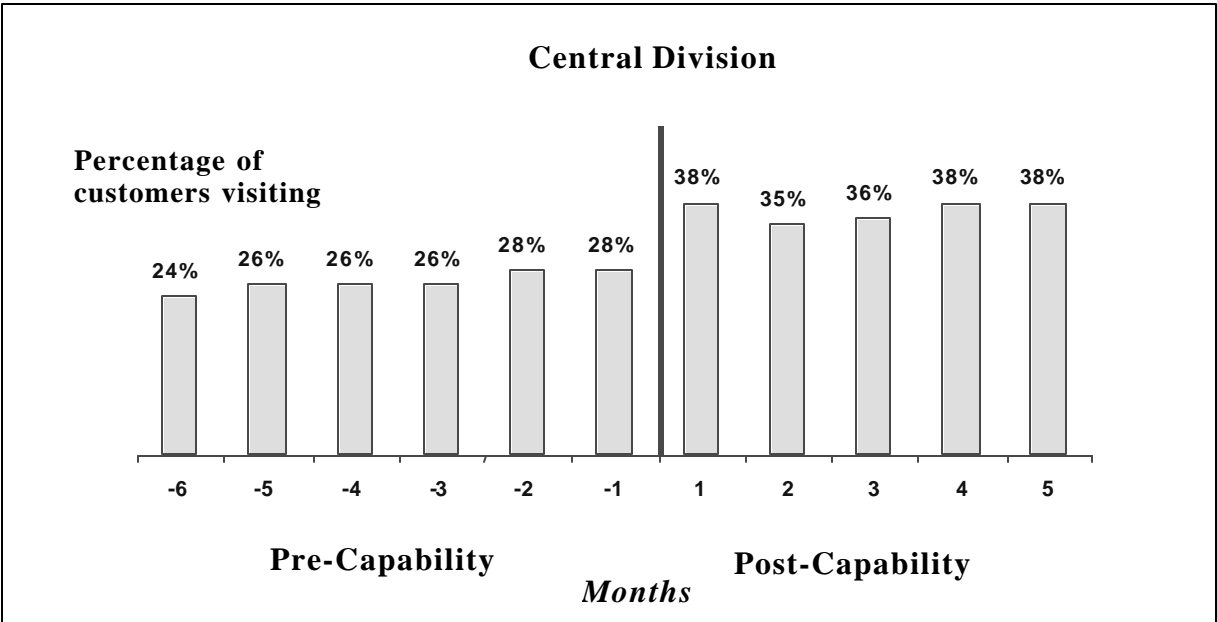
The effectiveness of Harrah's direct mail program has been significantly enhanced. This is illustrated by a recent campaign for Harrah's property in Tunica, where Harrah's more than doubled the profitability per customer visit; see Figure 9.

Figure 9: Impact of Direct Mail Program on Profitability in Tunica, MS
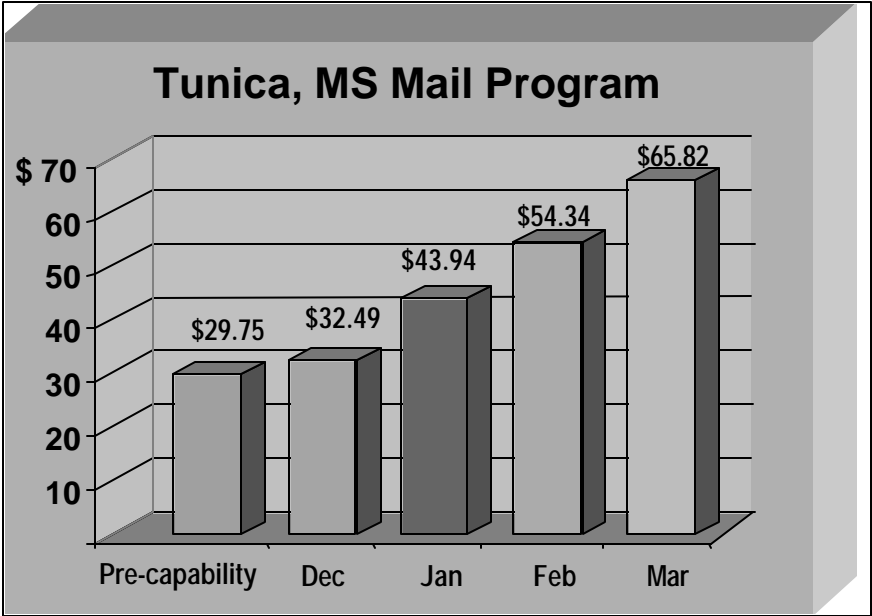
Figure 10 demonstrates Harrah's success at getting customers to play at more than one Harrah's casino. Over the last two years, the percentage of total revenues generated from cross-market play went from 13 percent to more than 22 percent. At the Harrah's Las Vegas property, the contribution to revenues from cross-market play more than doubled, growing from $23 million in 1997 to $48 million in 1999. This increase came during a time when room supply nearly doubled in Las Vegas with the development of new luxury casinos (e.g., the Bellagio, Venetian, and Mandalay Bay) at a capital investment of over $3.5 billion.

Figure 10: Cross-Market Play (Aggregate)
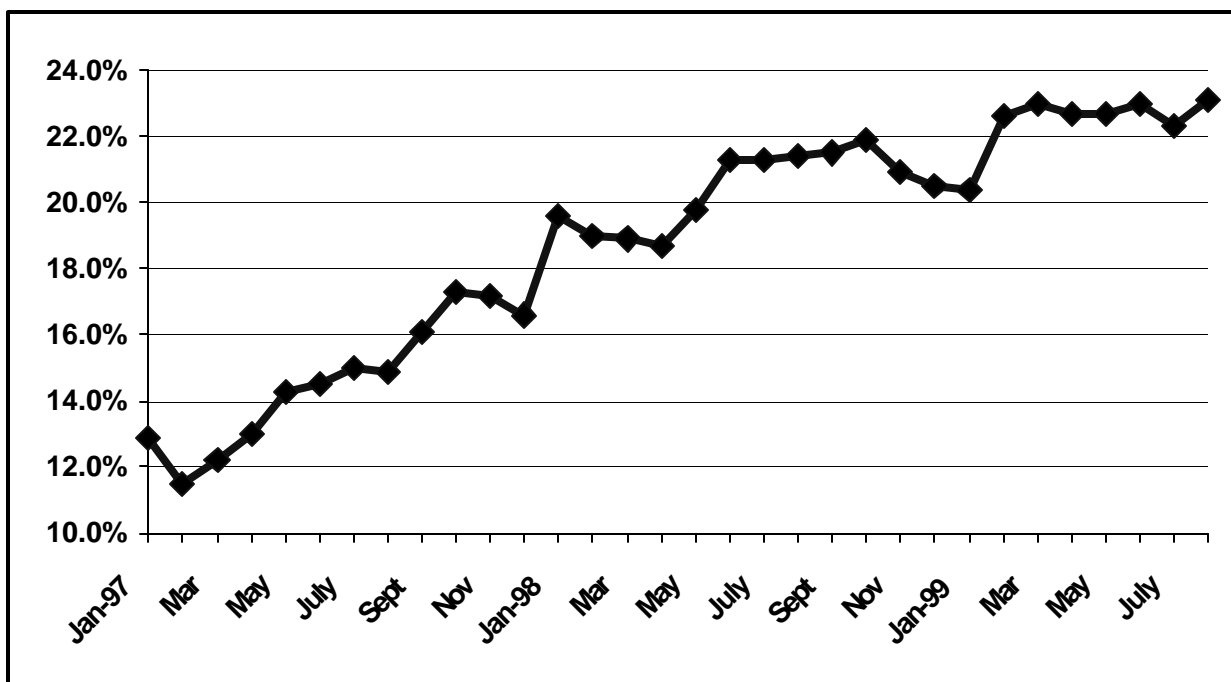
Future Directions

The capabilities that Harrah's has developed form the basis for a sustainable competitive advantage and are the foundation for complementary segues into future growth using additional technologies and decision-making science. Future directions include:

- Harrah's will introduce a revenue management system that insures that customers are offered rooms at the right rates. This system will help Harrah's optimize the returns from its scarce room inventory. The price of the room will reflect the current and historical demand for rooms at that time of year and the customer's expected theoretical value from gambling at Harrah's casinos.

- Harrah's will extend its systems to eCRM, through advanced Internet access, networking their reach to current customers as well as acquiring new ones. All information that is currently available through non-Internet channels will be available through the Internet relationship management channel.

- Harrah's will also enhance its data warehouse to provide one source for enterprise-wide information. This enhancement will involve the addition of data about customers, product sales, financial results, and labor costs/employees. This single repository of data will allow Harrah's to analyze and understand its customers, products, and customer service in new ways. For example, Harrah's will be able to

analyze the slot machine play patterns of its most avid and profitable customers and to use this information in deciding where to place particular slot machines.

Lessons Learned

The experiences at Harrah's provide several lessons that can benefit other companies embarking on a customer relationship management initiative.

- **Link the business and warehouse strategies.** Throughout its history, Harrah's has focused on building relationships with customers. The coming together of advances in information technology and the expansion of gaming markets gave Harrah's the opportunity to use data warehousing to implement a brand strategy. A business strategy supported by data warehousing has led to fundamental changes in how the company is run and a leadership position in the gaming industry.

- **Focus on business change management and link that to the success of the project.** Because Harrah's was moving from a property to a brand-centric view of customers, there was a need for business change, not just technical changes. Strong senior executive support was key to the overall success. Also important were changes in incentive systems at the property level to reward cross-property play.

- **Have strong involvement from the business units.** Harrah's was fortunate that in the beginning of its data warehousing initiative that the same person was both the CIO and Director of Strategic Marketing. This heavy involvement by the business units has continued throughout the project. They have taken on tasks such as planning for warehouse usage, helping develop training and certification programs for new users, and developing reports for the properties to use.

- **Have a scalable architecture.** While Harrah's initial architecture was satisfactory for the patron database, it proved to be inadequate for the marketing workbench. After considerable effort to work with what was already in place, Harrah's ultimately turned to NCR to provide an architecture that would provide satisfactory response times to users' queries. Companies often fail to create a data warehousing architecture that scales to meet future needs.

- **Include short-term milestones and prototyping.** Initially, Harrah's did not use short-term milestones and prototypes. This was a mistake and contributed to problems, such as with performance on users' queries. After this experience, future phases of the project included proofs of concepts, prototypes, and quicker deliverables.

- **Manage the consulting relationship.** Since Harrah's did not have data warehousing experience, it sought external assistance. Harrah's used NCR's Professional Services group to augment internal staff. Harrah's did not

"outsource" the project, but rather, "co-sourced" it by identifying internal IT management responsible for the project and the relationship with NCR.

- **Plan for knowledge transfer and in-house expertise.** It is common for companies to hire consultants to help with their data warehousing projects. Most companies initially have little in-house data warehousing experience and consultants can move the organization more quickly up the learning curve. However, it is important to ultimately have internal data warehousing expertise. This can be achieved by hiring experienced data warehousing professionals and having a formal plan for knowledge transfer from the consultants to internal personnel. Harrah's used both of these approaches successfully. They also utilized considerable in-house training on data warehousing.

Conclusion

Harrah's has left little to chance. It has invested more than $100 million in computers and software to develop what is widely regarded as the industry's most sophisticated "frequent bettor" program. With the Total Rewards program, which contains the world's largest database of casino customers, they have been able to create sustainable loyalty, a dominant competitive advantage, and insulate the business from local market volatility.

Their innovative idea was to grow by getting more business from Harrah's existing customer base. This approach was in contrast to the prevalent strategy of building ever more elaborate and splashy new casinos. Gary W. Loveman refers to their success as "the triumph of software over hardware in gaming."

The Total Rewards program has increased traffic in Harrah's casinos, and marketing programs driven by data from the warehouse are increasing retention. Keeping customers goes right to the bottom line. An increase in retention of just 1 percent is worth $ 2 million in net profit annually. So far, Harrah's is enjoying an increase in retention of a couple of percentage points, thanks in large part to its data warehouse.

Closed-loop marketing is contributing to Harrah's competitive advantage. According to Tracy Austin, vice president of Information Technology Development, by combining product information with customer behavior, "no one can touch us." Overall, the data warehouse is turning up nothing but aces for Harrah's. Harrah's "gamble" on technology is paying off.

Questions for Discussion

1. Discuss the factors that drove Harrah's customer relationship strategy.
2. Discuss whether Harrah's business and IT strategies were aligned, and what factors contributed to or detracted from achieving alignment.

3. Discuss the integration between Harrah's patron database and the marketing workbench.
4. Give examples of how Harrah's has implemented closed loop marketing.
5. Does Harrah's have a sustainable competitive advantage? Can other companies duplicate what Harrah's has done? Discuss.
6. Discuss the privacy and security issues associated with what Harrah's is doing. Are there concerns and how can Harrah's address them?

Textbook: **Experiencing MIS, 5th Edition**

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