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Development of a Student Business Application Database

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Final Project/Thesis

Disclaimer

Development of a Student Business Application Database

By

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Abstract

ONYX ONE is a nonprofit organization that provides under-privileged youth under the age of 18 and underserved communities exposure to computer and technology training that would otherwise not have the ability to gain such knowledge. In addition to class based learning, other resources are available to the students, such as, computer lab time.

Currently, the company tracks much of their business transactions through Excel spreadsheets and Word documents. Excel has a limitation on the number of records that can be stored in a worksheet, thereby increasing the number of worksheets created, the location of storage, and minimizing business productivity. Due to these limitations there is a need to store data in one central location.

The company required the creation of standard reports to reflect; invoice and billing, student accounts, class management, sponsorship company information, potential students' inquiry, and income verification to increase the organization's success.

It is the goal of this project to deliver a state-of-the-art fully functioning Student Business Application Database. The system must effectively integrate with Crystal Reports XI utilizing the enterprise schema to obtain essential data for the Student Business Application.

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List of Abbreviations and Symbols

SBA ~ Student Business Application

CRXI ~ Crystal Reports 11

MSCIT ~ Master of Science Computer Information Technology

WBS ~ Work Breakdown Structure

MS ~ Microsoft

VBA ~ Visual Basic for Applications

TCO ~ Total Cost of Ownership

Chapter One: Introduction

Statement of the problem to be investigated and goal to be achieved

ONYX ONE is a nonprofit organization that provides under-privileged youth under the age of 18 and underserved communities exposure to computer and technology training that would otherwise not have the ability to gain such knowledge. In addition to class based learning, other resources are available to the students, such as, computer lab time.

They offer custom curriculums to direct students down a certain IT path. Moreover, an individual can just take courses without being in a designated career path. A student must take a computer literacy course or demonstrate a level of computer competence before engaging in the program.

ONYX ONE is a very small organization which aims to obtain a partnership with another nonprofit agency. The potential business relationship that may form will not affect the project presently. However, it will expand the locality of members. This affiliation will increase the size of the database due to the membership multiplying.

Currently, the company tracks much of their business transactions through Excel spreadsheets and Word documents. Excel has a limitation on the number of records that can be stored in a worksheet, thereby increasing the number of worksheets created, the location of storage, and minimizing business productivity. Due to these limitations there is a need to store data in one central location.

The company required the creation of standard reports to reflect; invoice and billing, student accounts, class management, sponsorship company information, potential students' inquiry, and income verification to increase the organization's success.

List of reports generated:

- *Payment Report* ~ reflects fees paid or overdue reports based on the selections made by the user.
- *Student Management Report* ~ reflects student information for specific students or all students based on the selections made by the user.
- *Class Management Report* ~ displays the list of classes offered for the current month or previous months based on the selections by the user.
- *Income Verification Report* ~ displays income requirements
- *Sponsorship Company* ~ displays companies that provide funds to the organization
- *Instructor Accounts* ~ list of instructors and area of expertise
- *Marketing Analysis* ~ list potential student inquiries and status of enrollment

Relevance, significance or need for the project

This project developed a Student Business Application database that incorporates the companies' business functions. The new database stores student information, membership fees, classes, instructors, potential students, sponsorship information and income eligibility requirements. Standardized reports were created from the database using Crystal Reports XI. These reports offer flexibility to the end-user in terms of what

data is displayed through the use of prompts. Authorized individuals, determined by the Business Manager, are the only personnel allowed to directly access the database. This new database has enhanced company growth by offering stability, upgradeability, and an improved storage mechanism. After review of this thesis, a person will be able to follow the project management methodology discussed in succeeding pages of analysis, implementation, and maintenance of a database system to achieve successful performance.

Barriers and/or issues

There were three major constraints to this project. The first was a budgetary constraint. The budget allocated for this project limited the choices of software. The company wanted to use the existing hardware. Software was carefully considered and current personnel were tasked with assisting the project.

The second constraint was a result of the first constraint. Since current personnel were utilized on the project, there were time constraints due to the fact that regular job responsibilities took precedence over the project.

The final constraint was the geographical location of the project personnel. The project manager and developer were in the Eastern Standard Time zone while the Business Manager worked in the Pacific Standard Time zone. This geographical location created a three-hour difference between the stakeholder and the project developer, which affected communication. The availability of funds did not allow for the expense of having a

project manager and developer onsite. Therefore, each team member worked remotely communicating with the stakeholder via email, telephone, and online conferencing.

Current Process

At present time, a spreadsheet was used to track student information, membership fees, sponsorship companies, and classes. This information was not only captured in spreadsheets, but also in Word documents. The company did not have a formal procedure in place to handle data management (***see Table 1.0 Student Information***). Microsoft Word was also used to capture class titles and description. The funds received from donation were stored in an Excel spreadsheet in order to calculate contributions. Whatever storage mechanism was convenient for the user in regards to entering information the user utilized.

Table 1.0 Student Information[1]

StudentID	First Name	Last Name	Address	Phone
333-33-3333	John	Doe	88 West North Field Los Angeles, CA 92031	213-456-8855
222-22-2323	Jane	Candy	981 Mesa Drive Barstow, CA 92311	760-254-6060
123456789	Mike	Downs	88 Main St. Barstow CA	7602520202
456123789	Leo	Santos	8547 111th Street Watts, CA 92405	(323) 427- 0000
858522233	Jackie	Froster	8547 111th Street Watts, CA 92405	(323)4240000
StudentID is being stored as students SSN, but in EXCEL the StudentID is not the SSN.		The students name is separated into two fields in, however in EXCEL it is stored as one field. The students address fields are separated in EXCEL into street address, city, state, and zipcode ***(see Figure 1.0 Student List)***		

[1] Information in the table has been changed to protect the privacy of students.

ONYX ONE did not have standard automatic generated reports to portray their business transactions. For example, in order to produce a Membership Fee Past Due report, someone would review the spreadsheet and write down the students' data whose accounts were past due. Then, a report and delinquent letter was created in MS Word that was sent out to students.

Below are examples of documents ONYX ONE used to store student data, payments, and class schedules.

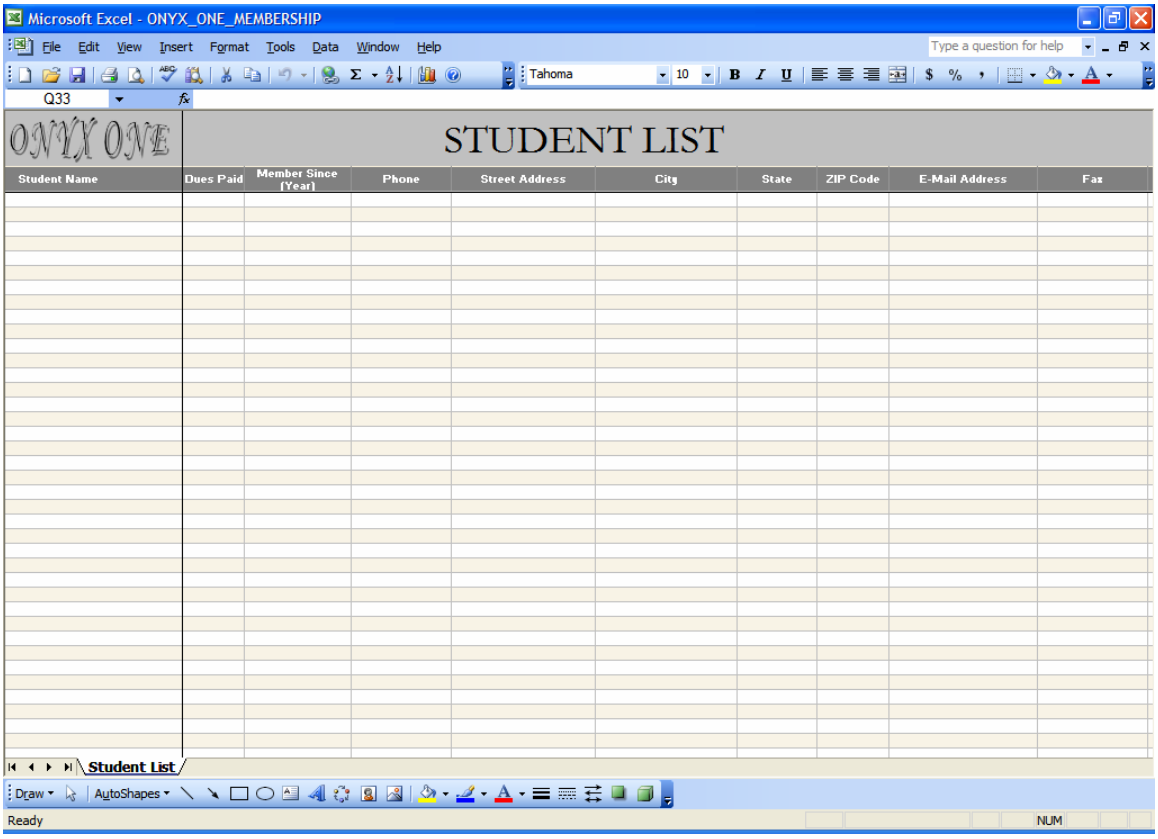

Figure 1.0 Student List

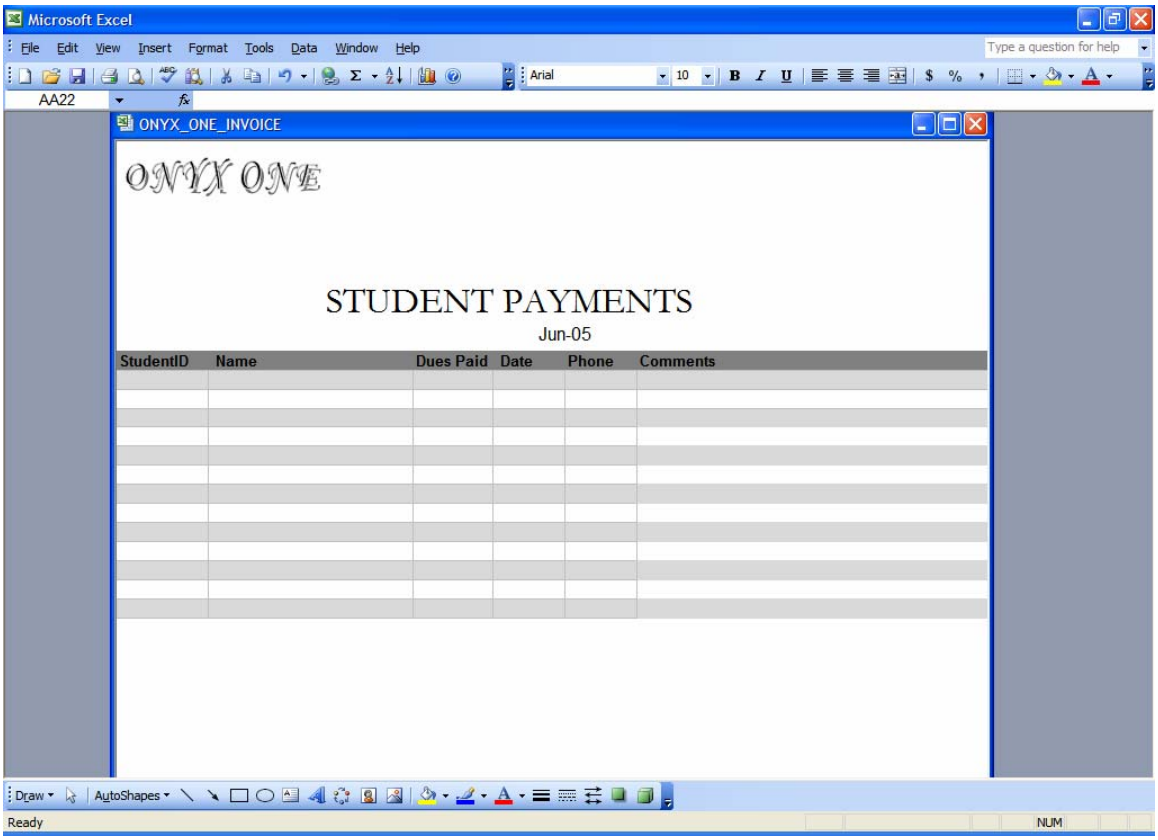

Figure 2.0 Student Payments

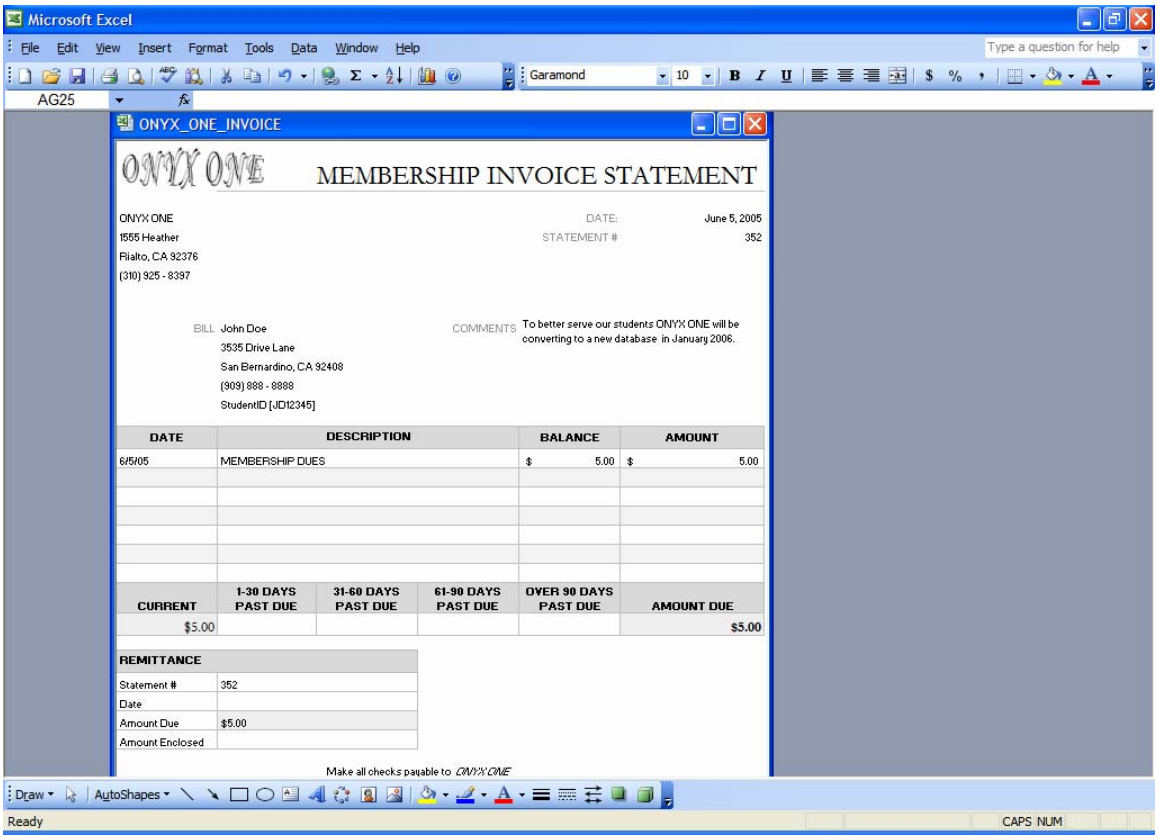

Figure 3.0 Membership Invoice Statement

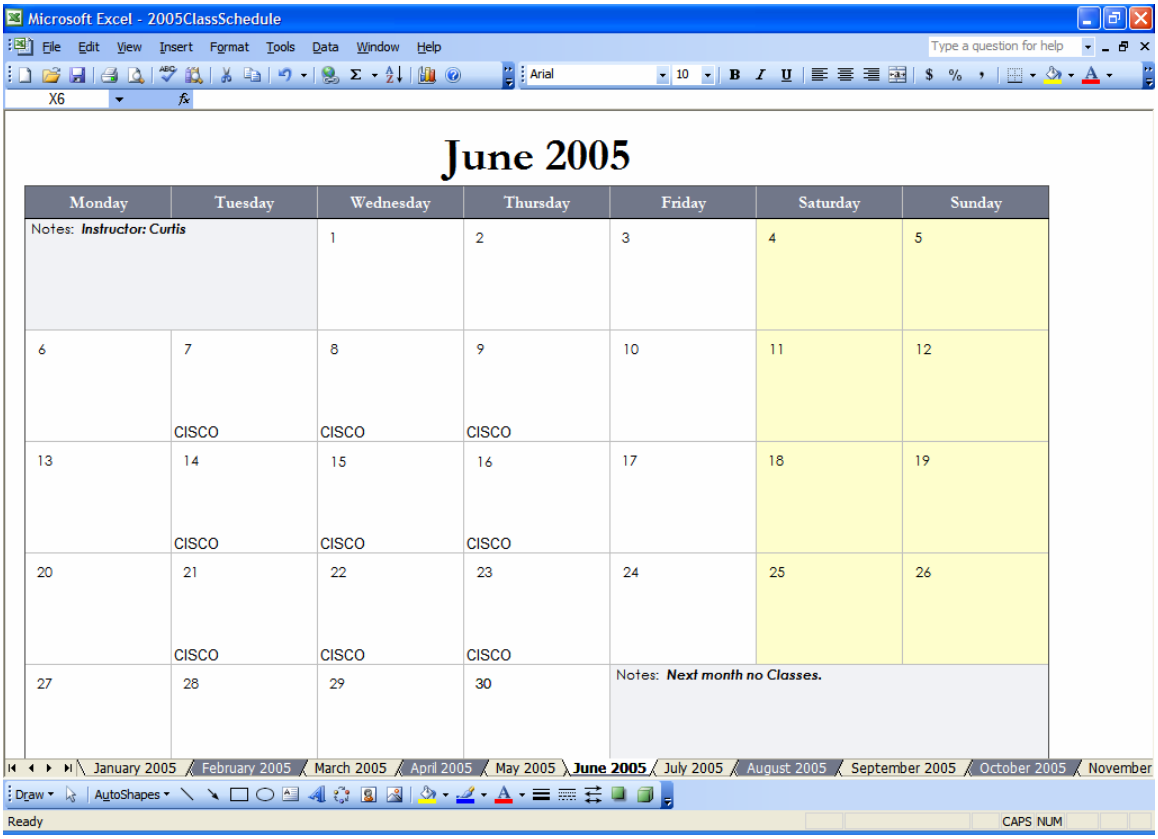

Figure 4.0 Class Schedule

Project Scope

It was the goal of this project to deliver a state-of-the-art fully functioning Student Business Application Database. The system effectively integrated with Crystal Reports XI utilizing the enterprise schema to obtain essential data for the Student Business Application.

Furthermore, the system was designed to assist in making ONYX ONE operations as efficient as possible by sharing vital data between end-users, tracking data for reporting and future operations.

Moreover, the project entailed the implementation of the Student Business Application functional capabilities to address ONYX ONE business process requirements:

- Invoicing / Billing
- Student Management
- Class Management
- Instructor Management
- Marketing Management
- Income Verification
- Fund Management

In support of these core business processes, the application allows a user to:

1) Store student data (i.e., name, address, phone, etc.)
2) Track invoices and billing data
3) Monitor classes and workshops offered (i.e., workshop/class name, category, description, etc.)
4) Store instructor data
5) Generate a report in Crystal Reports XI while retrieving the data from the application
    5.1) Payment Report
    5.2) Student Management Report

5.3) Class Management Report

5.4) Fund Management Report

5.5) Income Tracking Report

Definition of terms

Walkthrough ~ often called peer reviews, are reviews of a software product (design, specifications, code, test, procedures, etc.) conducted by the peers of the group whose work is being reviewed. (Christensen 33)

Waterfall Model ~ classical model of development for both hardware and software. (see figure 5.0)

Activity ~ is a large amount of work

Task ~ a smaller amount of work

Defect/Bugs ~ it is glitch in the software that may cause it to behave incorrectly, and not according to its specification

Error ~ mistake, misconception, or misunderstanding on the part of a software developer

DBA ~ Database Administrator

Summary

The project was designed to address the desire of ONYX ONE to gain partnerships with another company in the near future. In this previous section we learned that the Student Business Application has the functionality to handle the following business processes: invoice/billing, student management, class management, fund management, income tracking and instructor management. The constraints; budget, personnel resources, and zone location were not enough to prevent the project from being implemented. The reader must understand the key terms listed above before succeeding on to the next sections.

Chapter Two: Review of Literature and Research

Overview of all literature and research sources on the project

Upon taking on any project several methodologies have to be defined to aid in the success of the project. The Project Manager had to determine how the project was to be managed and how it would be organized in order for development efforts to flow. Much research and analysis was performed in examining which technique was best suitable for the SBA implementation.

Selecting the most effective life cycle model to follow was the first decision made. After researching several different methodologies, it was determined by the developer that Plutus Enterprises' methodology was most relevant. The developer was most familiar with this particular methodology. It has been utilized in many previous projects the developer has worked on and proved to be very successful. It allowed for easy guide of the project. Following this model alleviated errors and rework during development because analysis was constantly being reviewed.

Second, the Project Manager was tasked with reviewing project management tools. There is several effective project management tools used in the industry and the Project Manager chose to use MS Project. Microsoft Project is a user-friendly tool that is common in today's global market. Presently, it is a standard method used among businesses for project tracking. In concern of the budget constraints, Microsoft Project was most cost efficient since the developer had it already installed.

Third, previous projects and professional mentors were also consulted on the Student Business Application system. Past project experience influenced many of the decisions made during the length of the project. Utilizing knowledge gained from past experience impacted the direction of the project and prevented new processes from being created that in essence are already in forced.

Finally, the developer explored different database application vendors to establish the perfect fit. The database solution selected had to handle the workload and agree with the budget. Research was performed on current relational database management systems. The current commercial off the shelf products that were considered were Access and an open source solution MySQL.

Research methods used

Multiple research techniques and tools were used for this project because it was important to identify, understand, and document the current business processes of ONYX ONE. Interviewing with the stakeholder to gather user requirements was a key method used to successfully complete the project. The main objective of these interviews was to discover information about the organization, understand the business functions of ONYX ONE, gather information about current processes, and identify current business process problems.

Additional research was conducted using the World Wide Web (WWW). The web contains a wealth of information related to this topic. There are many database solutions available in today's market. These solution range from commercial-off-the-shell products to highly customized packages. With this in mind, database solutions were easily compared with the use of the Internet. The World Wide Web allowed for instant information from companies that would otherwise, take weeks to receive.

Furthermore, books were consulted for clarification and techniques used throughout the implementation of the project. Books gave the student the foundation to understand and pursue techniques used in this implementation. Many books were referenced from past courses taken. These books assisted in the analysis and implementation phases of the Student Business Application database development project.

Literature and research that is specific/relevant to the project

1.0 Publishers / Online Stores

Software publishers' websites were visited to determine the product price and benefits of installing the particular software. Online stores were also reviewed for price list. Some online vendors offered discounts or reduced product than the publisher site.

The following sites were referenced:

Table 1.0: Publishers / Online Store Websites

Publishers / Online Store	Product	URL
MySQL AB	MySQL	www.mysql.com
Microsoft	Microsoft Access 2003	www.microsoft.com
Amazon.com Inc.		www.amazon.com
Shopzilla, Inc.		www.shopzilla.com
SoftwareOutlet.com		www.softwareoutlet.com
CompUSA Management Company		www.compusa.com
OMX, Inc (OfficeMax)		www.officemax.com or www.omx.com

1.1 Books and Technical Journals

There were several books referenced throughout the course of this project. These books gave the student the foundation to understand and pursue techniques used during the implementation. The majority of books came from previous courses taken at Regis University.

The following books were referenced:

- Systems Analysis and Design
- Effective Project Management
- Crystal Report 9 Essentials
- Practical Software Testing

- The Project Manager's Guide to Software Engineer's Best Practices
- Access 2003 VBA

2.0 Available Database Solutions

Microsoft Access 2003 and MySQL were identified as potential relational database solutions for this project. Each programs' capabilities were reviewed specifically for use in small business environment, abilities to meet business requirements of ONYX ONE, and scope of the project.

2.1 MySQL

MySQL, the most popular open-source SQL database management system, is developed, distributed, and supported by MySQL AB. MySQL enables organizations to cost-effectively scale-out their database infrastructure so they can exponentially grow their transaction volumes. Moreover, the database is functional across several different platforms.

MySQL offers the following characteristics:

- Is a database management system.
- Is a relational database management system.
- Software is Open Source.
- Database Server is very fast, reliable, and easy to use.
- Server works in client/server or embedded systems.
- A large amount of contributed MySQL software is available.

MySQL reduces the Total Cost of Ownership (TCO) of database software by:

- Reducing database licensing costs by over 90%
- Cutting systems downtime by 60%
- Lowering hardware expenditure by 70%
- Reducing administration, engineering and support costs by up to 50%

("Lower Database TCO," 2005)

MySQL software packages are available in two versions; MySQL Community Edition and MySQL Network. First, MySQL Community Edition is a free downloadable version of the software. This free version has licensing requirements that a company must abide by to use the software. The MySQL software uses the GPL (GNU General Public License), http://www.fsf.org/licenses/, to define what a company may and may not do with the software in different situations. Secondly, MySQL Network is available for users who want access world-class support services, Knowledge Base and certified software. This subscription service is designed to save developers and DBAs time and effort (www.mysql.com). This package offers services at different levels; basic, silver, gold, and platinum to meet the need of the organization. The basic package starts as low as $595 per year and increases to platinum as high as $4995 per year for the platinum edition.

2.2 Microsoft Access 2003

Another database solution reviewed for the SBA project was Microsoft Access 2003. The benefits of deploying Access 2003 are endless. Access 2003 creates powerful database solutions, incorporate multiple data sources, links business systems and shares information more efficiently. It is a database tool that is advanced enough for the experienced developer, but user-friendly and easy to learn for the beginning developer.

Access has the ability to support many data formats including; Extensible Mark-up Language (XML), OLE, Open Database Connectivity (ODBC), and MS Windows SharePoint Services.

The linking of business systems function enables the developer to access tables from different Access databases, spreadsheets, ODBC databases, SQL server databases, and other data sources.

The capacity to share information between users has increased the power of Access 2003. This feature enhances a company's communication structure among the organization.

One can share business data with confidence by way of:

- Export and import data, and link to lists on Windows SharePoint Services sites where other team members can access the data.

- Publish forms and reports on the Web and bind your information to a record source to display, update, and work with data from the database.
- Use compatible file formats: Access 2003 uses Access 2000 as the default file format for new databases. This allows for easy deployment while maintaining capability with users and solutions.

Microsoft offers different pricing levels dependent upon the licensing and upgrade eligibility requirements. The price for a new user is $229 per license. If the current system meets the upgrade eligibility requirements, then the software is only $109 per license user (“How to Buy,” 2005)

3.0 Database Solution Selected

Although, MySQL is a fast open source software that can assist in solving the scalability needs of today's economy without impacting the stability of mission-critical infrastructure, its licensing cost would have placed the project above the budget limitation. ONYX ONE had a strict budget that minimized decision in selecting software packages.

After careful analysis of the two database solution alternatives, Microsoft Access 2003 was selected for its ability to access information from multiple sources, share information, present a user-friendly environment, and keep costs down. Technical support and training assistance, time, and the developers’ learning curve were other elements that were critical in the decision to use Access 2003. The developer was knowledgeable in Access 2000, which also persuaded the selection of Access 2003.

Summary of what is known and unknown about the project topic

The Student Business Application project was a needed solution to increase ONYX ONE's operations. The current situation offered no organization, nor was it efficient to handle ONYX ONE's vision for growth.

It was determined that the company required a database solution to become more competitive. The solution that was decided upon met both budget limitations and user requirements. This solution also stayed within the scope of the project and was easy to train users on the application.

The SBA was designed to house the following data:

- student information
- membership fees
- income verification
- instructors
- sponsorship company
- classes
- potential student inquiry

The reporting needs of the company were satisfied using CRXI. This reporting tool is user-friendly and integrates well with Access 2003. The stakeholder had already selected CRXI as its reporting tool because the user was familiar with this software. The project schedule limited the training of the new system, which further reduced the students'

ability to refer another reporting technique. There was not enough time to train the users on a new reporting tool; therefore, it proved to be more beneficial to implement a tool the user has some degree of knowledge on and build upon that.

The contribution this project will make to the field

This application offers the company the ability to audit company status and enforce progression. It is a database solution that can easily be implemented or tweaked to fit another small-medium size organizations business practices.

The project exposed the developer to the various stages of project development from start to finish. The developer selected the appropriate project management tool, project methodology, and database solution based on the feasibility of the project. The necessary skill set to implement a full life cycle database solution was demonstrated to the information technology industry throughout the life of the project.

The project proves to the industry that one can plan, organize, manage, and execute a thriving technology project that adheres to budget constraints.

Chapter Three: Project Methodology

Life-cycle models to be followed – Project Strategy

The primary goal of this implementation is to provide a software solution that properly supports ONYX ONE's business needs. This fully integrated solution will allow ONYX ONE to meet the challenges of today's competitive high-speed business environment.

The use of Plutus Enterprises methodology, achieves two primary objectives. The first objective is to ensure high quality deliverables. This is facilitated by setting realistic expectations and thereby eliminating surprises.

The second objective allows for effective management of resources. The use of the methodology ensures that appropriate skills are deployed at the right time within the project's lifecycle. By effectively achieving the outlined goals, the stage is established for consistent and thorough delivery of a robust system that meets the business needs.

This methodology is very similar to the Waterfall Model (*see figure 5.0*) used for both hardware and software development. The project is expected to progress down the (primary) path through each of the phases (requirements, design, coding and unit test, integration, and maintenance) of development with deliverables (software requirements specification, design documents, actual code, and test cases, final product, product updates) at each stage (Christensen, 2001, p.185).

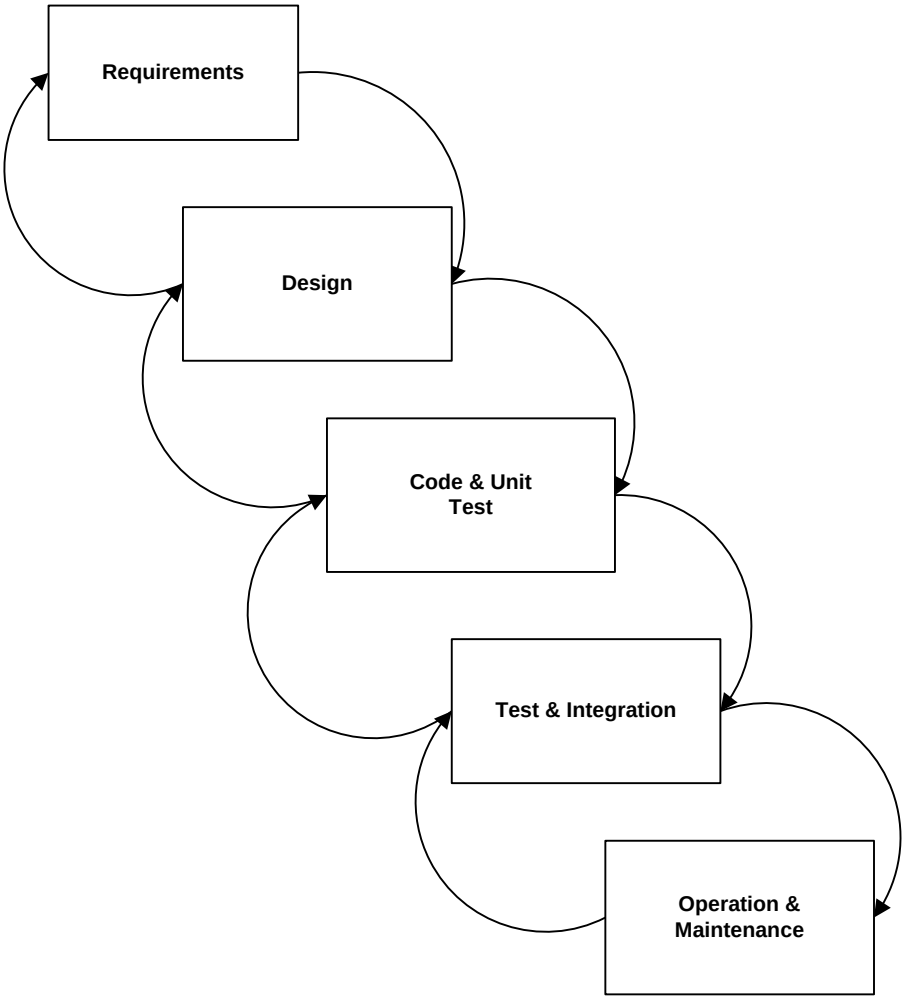

Figure 5.0: Waterfall Life Cycle Model

Specific procedures

1. Phase I - Analysis Phase

The analysis phase incorporates the steps below identified in figure 6.0. The steps detail the functions performed during each procedure.

1.1. The Analysis Phase ***(see figure 6.0)*** delivered:

- Confirmation of Business Processes / User Needs
- Understand the current business process and methodology
- Analysis of alternative solutions
- Create design document
- Determine business rules
- Determine constraints and ensure that the first milestone will be met

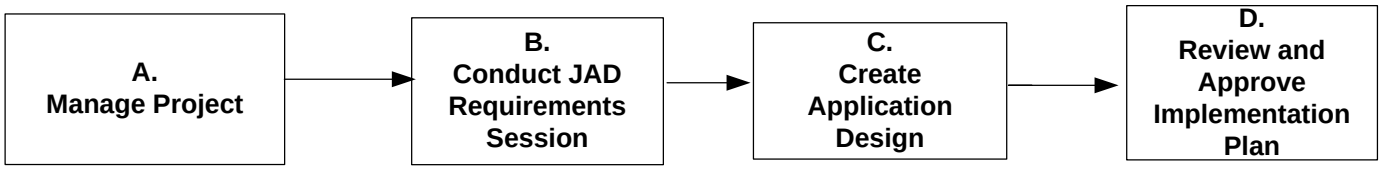

Figure 6.0: Analysis Methodology (Phase I)

A) Manage Project

The project management activities included the traditional management activities of planning, organizing, influencing and controlling. The first step in the project flow "*Plan Project*" is a critical project management responsibility and prerequisite in the success of the overall project (Plutus Enterprises, 2000, p.7).

The project manager developed the project scope, accompanied by a solid team structure with detailed descriptions of roles and responsibilities. After review of resources and a meeting with the Business Manager; a well-developed project schedule and work breakdown structure was created with major milestones identified. The budget that was provided for this project guided many decisions during the course of the project.

B) Conduct Joint Application Development (JAD) Requirement Sessions

The developer facilitated analysis and requirements definition sessions that provided the information necessary to develop business process flows. The meetings involved the CEO, Business Manager, end users, project manager, and developer. After the JAD sessions, an established concrete definition of the business requirements was created to reflect the company's business structure.

C) Create Application Design

Based on the requirements, a preliminary design was created by the developer. It was a high-level design of what the organization needed and their goals recognized in the JAD sessions. A notational design was diagramed adding application clarity while potential software solutions were still under review. The end users reviewed the application design and made changes based on hypothetical events.

D) Review and Approve Implementation Plan

A meeting was held to review all design documents. An implementation schedule was established and approval of solutions was signed-off by the Business Manager.

2. Phase II – Implementation Phase

The implementation phase incorporates every aspect of the project that was determined in the "Analysis Phase," and applies the specific details of; scope, schedule, resource changes, and modifications.

2.1. The Implementation Phase ***(see figure 3.0)*** delivered:

- A detailed analysis and design
- Prototypes of the implementation solutions
- A user training document

- A live production system
- System test scripts
- A system test log document
- Sign-off/Approval documents

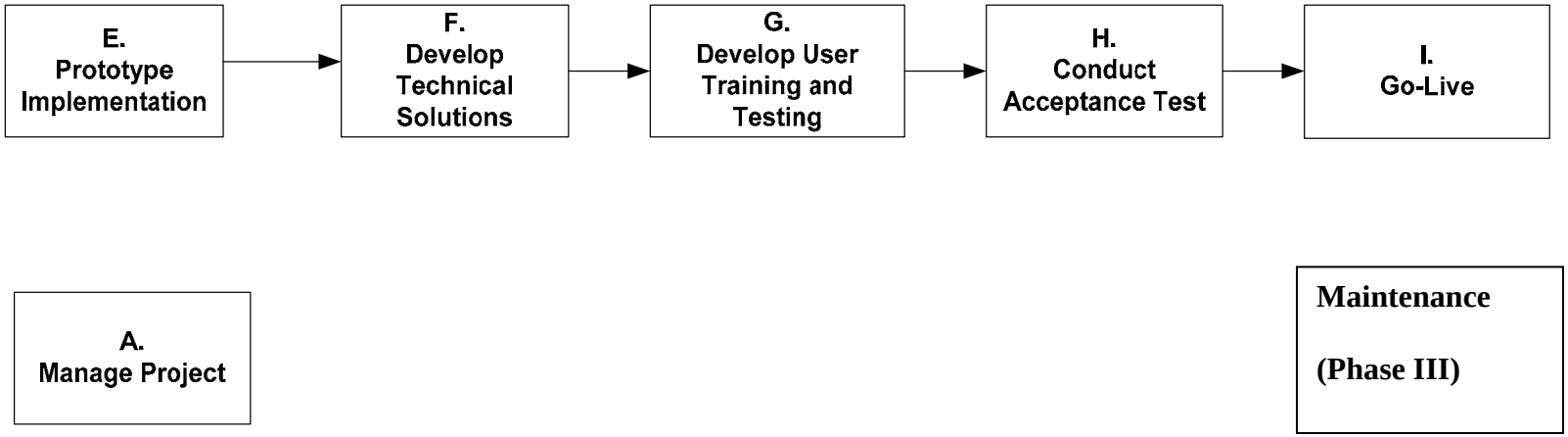

Figure 7.0: Implementation Methodology (Phase II)

E) Prototype Implementation

This phase refines the application of business processes to the system. The use of a prototype to simulate the business environment within the context of the application clarifies requirements (Plutus Enterprises, 2000, p.12). The design was created after the software application was selected by the developer. It is at this stage in the project that open issues were resolved and modifications addressed. The prototype was a product of the high-level application design created in the Analysis Phase.

F) Develop Technical Solutions

In this phase, the developer accomplished the construction of all interfaces, conversions, reports, modifications and new enhancements to the Student Business Application system.

The developer used Crystal Reports XI to create reports, identified in the JAD sessions, to facilitate effective operation of ONYX ONE. These reports were used for audit, control, and marketing purposes by the company.

G) Develop User Training and Testing

The developer created test scripts used to train users during this phase. Normally, training would be accomplished in a class room setting; however, due to the size of the project and individuals authorized to access the application, training was

conducted via one-on-one on a PC in the office. There were only three individuals authorized to access the system, which eliminated the need for a huge training class.

While the users were being trained to perform procedures step-by-step, defects were discovered. The developer found it time effective to make corrections and test them during the training phase. Care and caution was exercised to ensure trainees were not confused during this process.

The users were also trained on generating the reports using Crystal Reports. The generation of reports was a fairly simple process. The users basically needed to confirm their connection to the database and understand what the different reports portrayed. There are a few questions the system prompts the user to answer on a couple of reports, but the answers are straight forward. For example, a payment report would prompt the user to provide a month or a report period input only. Data would then be extracted based on the users input.

The reports were also reviewed for accuracy of information. If the data was incorrect, it was noted and fixed by the developer. For example, a miscalculation of payments on the payment report or the incorrect phone number displayed for a particular student.

H) Conduct Acceptance Test

This phase determined the accuracy and integrity of the solution implemented by the developer. It was in this phase that the users actually approved the system and reports as meeting requirements. The defects found during training were corrected and retested by the developer. The users went through test scripts to make certain there were not any defects and ensured the system and reports were reliable. After testing the system and reports, the users, deemed the Student Business Application database as functioning appropriately and acceptable.

I) Go Live

During the Go-Live phase, the production environment was prepared and sign off procedures were authorized. The data was validated by the user. A Go/No-Go decision was made and cutover to production was completed**.** All documents at this time were turned over to the stakeholder if not previous delivered.

The final implementation was performed on January 17, 2006, when ONYX ONE began to use the Student Business Application database to handle its business transactions. The day prior to implementation the Business Manager performed a final test ensuring system functionality, connectivity and operability.

3. Phase III – Maintenance Phase

The developer worked side-by-side with the end users for two weeks following “go-live” and monitored the system to ensure reliability. The defects discovered were immediately addressed to prevent delays in production. The project manager confirmed that documents relating to the project were delivered to the Business Manager.

3.1. The Maintenance Phase delivered:

- Requirements Document
- User Training Manual
- Technical Document

Formats for presenting results/deliverables

Each phase of the Student Business Applications project required deliverables to be presented to the stakeholder. Deliverables were presented to the appropriate personnel to review and make any corrections necessary. Upon review of the document(s), if it meets the executors’ approval then a sign-off sheet was completed. The sign-off sheet guaranteed that the document has met the qualifications discussed in meetings, thereby, influencing the implementation of the Student Business Application. By signing the sign-off sheet, the approver agrees that the information contained in the document is accurate and correct. When a discrepancy is noted, the sign-off sheet is evaluated by the developer for signature verification.

Some walkthroughs were conducted during the design of the system to monitor status as well as, uncover any misunderstandings. Walkthroughs minimized rework and reduce design defects by eliminating problems that could have been potential bugs in the system.

Review of the deliverables

The items listed below are a set of documents that were created to support the SBA project and provided to the stakeholder for reference.

List of deliverables:

- *Requirements Document* ~ details system, technical, and functional requirements that were defined by the users.

- *Design Document* ~ is a detailed view of how the many components of the information system should be physically implemented according to Burd, Jackson, and Satzinger (2002).

- *User Manual* ~ provides step-by-step procedure to perform different functions in the application.

- *Test Scripts* ~ are step-by-step commands that will carry out a user's request. The scripts also show the result the user should receive after executing the command.

- *Data Dictionary* ~ contains a list of all files in the database; the number of records in each file, and the names and types of each field.

- *ERD* ~ is an Entity Relationship Diagram that models the application and its components. It shows the relationships of the different components and business rules.

- *Project Plan* ~ describes the plan for working on a software development project. It includes information on deliverables, schedules, and responsibilities.

- *Test Log Document* ~ this document is a diary of the events that take place during the test according to Burnstein (2003).

- *Sign-Off/Approval Documents* ~ these documents are signed statements by the approver, agreeing that the information contained in the document being reviewed is approved.

Resource requirements

The size of the project did not require a lot of personnel, nor did the company have the personnel to aide in the development efforts. There was primarily one individual who worked on the project which was the CEO. The CEO performed the functions of the Business Manger during times of extended absence.

The CEO was very enthusiastic about the project. His knowledge in networking and business along with his vision for the company influenced many of the decisions. The Business Manager involved in the project spent a lot of time out of the country, during development; therefore, a majority of the decisions were finalized by the CEO.

There was effective communication among the project staff. Each team member was eager to complete implementation of the system The CEO wanted to implement this application, but because of limited resources had apprehensive notions and seriously doubted the teams' capability to follow through. Due to limited resources available to the student, opportunities to excel presented themselves as the student assumed the roles of project manager, system analyst, and developer.

The size of this project was large enough for one person to manage and apply the many different skill sets that were learned throughout the MSCIT program. For example, project management, the student developed a project plan; determined the project scope, created a work breakdown structure and managed the entire project. Also, features of the database were created using SQL and Visual Basic for Applications (VBA). Furthermore, the developer created test scripts that were used in the training and testing of users. These are only a few skills that were employed throughout the course of the project.

Summary

The System Development Life Cycle used in the SBA project proved to be very effective continuously throughout the project. Following the Plutus Enterprises' methodology, allowed for easy guidance from analysis to implementation. As a final result, this methodology assisted the student in a successful implementation of the Student Business Application.

Chapter Four: Project History

How the project began

The Student Business Application system was initiated by ONYX ONE so they could become better organized and competitive in the industry. The company did not have any standard methods to function successfully if they were to expand. ONYX ONE does not have a database and felt that in order for their company to grow a database was necessary. Auditing requirements, marketing, and simply tracking business transactions meant several reports were going to have to be built.

Therefore, the stakeholder was tasked with the responsibility of finding a solution. He had to analyze their budget and seek out alternatives to implement the Student Business Application database.

Due to budget limitations finding consultants to work on the project was nearly impossible. Although it would be a difficult task the stakeholder contacted a former colleague and proposed the idea. By the end of the conversation, a formal meeting was planned and a proposal was presented a couple of weeks later. After approval of the proposal the project was soon underway.

How the project was managed

Once authorization was given, sole management of the project was conducted by the author who initiated and implemented the project. The stakeholder was consulted on any major changes or issues that arose.

The Project Manager selected the project management tool, MS Project, to assist in creating the project schedule. Microsoft Project was used to track activities, tasks, due dates and milestones for the project.

The work break down structure that was used throughout the development of the project is graphed below. The WBS was created from the timeline produced in MS Project.

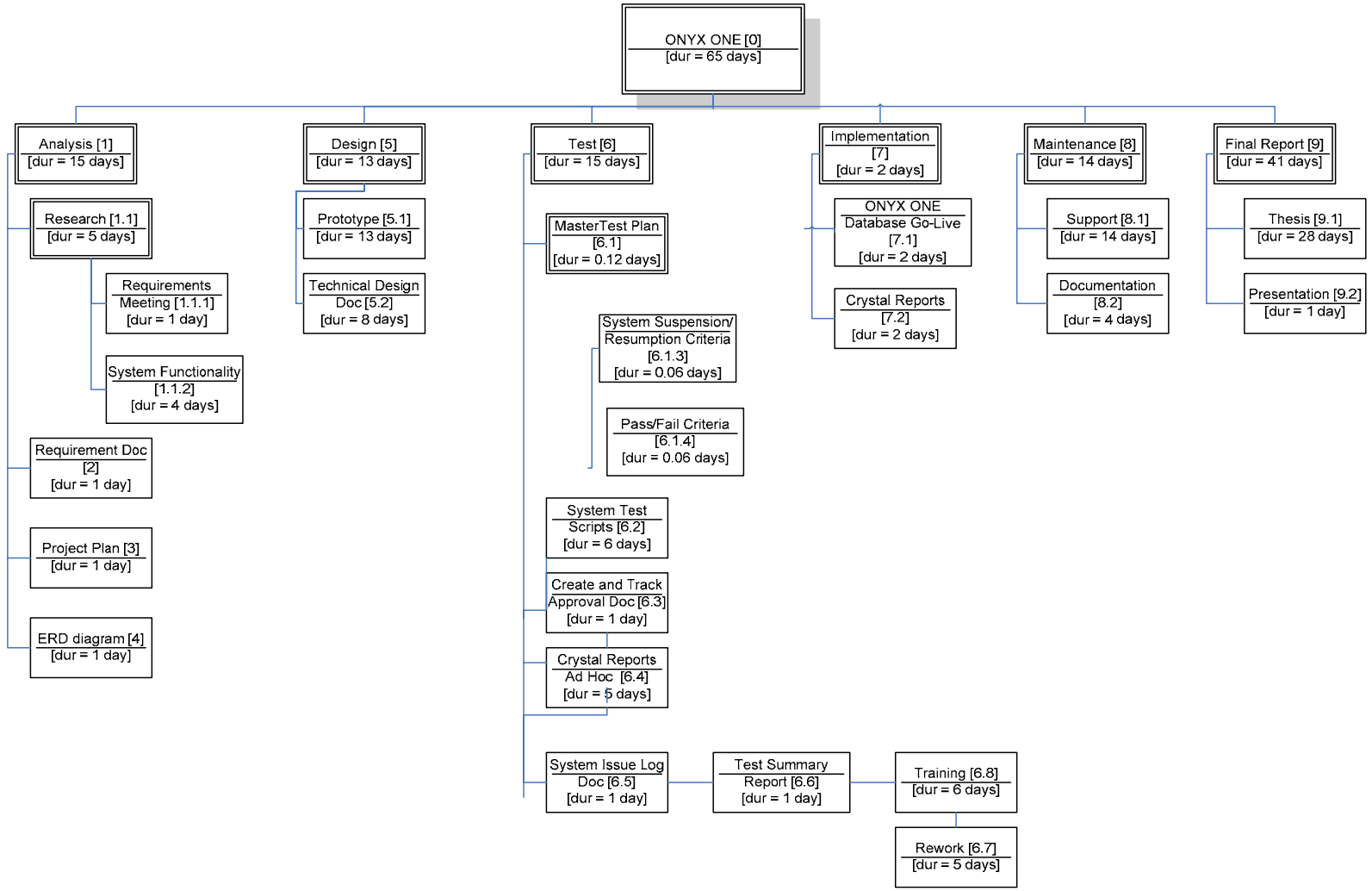

Figure 8.0: Work Breakdown Structure

Significant events/milestones in the project

There were four milestones that were critical to the development and implementation of the SBA project. Each milestone required management approval before proceeding further with the project. The first milestone, the project proposal, was approved in September of 2005; however, the project did not start until October of 2005.

The second milestone, the requirements document, was approved in October of 2005. This document portrayed the end users requirements. The developer showed through this paper understanding of what the users requested. Therefore, approval was important to confirm clarity of the developers knowledge of what was needed.

The third milestone, the application design document, depicted graphically what the requirements document noted. Obtaining approval at this stage, not only showed the developers knowledge of requirements, but also her ability to portray that functionality systematically.

The last milestone was reach when the final turnover plan was approved. This decided the Go/No-Go decision to go-live. This was a very critical milestone because production could have been halted. However, the users were satisfied with the system and preceded with the implementation of the Student Business Application project.

Changes to the project plan

A few changes occurred during the life of the project that altered the timeline somewhat, but the alterations were not significant enough to neither prolong the project nor keep milestones from being met. The project manger initially overestimated task duration in the project schedule for the purpose of unforeseen issues. The project manager managed on the philosophy of overestimate and over deliver. This approach proved to be very effective throughout the project life cycle. Alterations to the SBA did not have significant impact on the schedule, thereby allowing the student to meet deadlines.

The stakeholder also wanted to capture more data than was first planned. Originally, the only data to be stored in the system was student accounts, classes, instructors, and membership fees. After several meetings and suggestions given by the developer, the stakeholder decided to recognize potential students who request information about the program for market analysis. The plan was to continue monitoring sponsorship contributions in Excel spreadsheets; however, it was better for reporting purposes and updating to store the information in the database. The requirement of all students to pay membership fees was changed to reflect those who were considered low income and had a fee waiver.

This altered the design of the database. The functionality had to be edited in order to accommodate the new data. Ownership of the company also changed which impacted development because business processes changed slightly.

Evaluation of whether or not the project met project goals

ONYX ONE considered the project a success after go-live. All requirements and objectives outlined by the stakeholder were achieved. There were additional functions in the system that were not required, but added to enhance the product.

The two individuals who will actually use the system felt the ease of working more efficiently. The Student Business Application reduced errors that occurred and the loss of data because information was not being stored in one stationary location. The company now has the capability to operate more professionally.

Discussion of what went right and what went wrong in the project

The project was a straight forward implementation that given the developers' past experience was not difficult to implement. From previous experiences it has been known for projects to go over budget and time; however, this project was completed in the allotted time and within budget.

This system was designed with the mindset of future upgrades that the stakeholder is considering. Currently, it has all the functions defined in the requirements document and project scope.

The reports were created and deemed to be very beneficial to management of the company. The only problem with the reports was that if the database were to be altered later, then the reports would have to be altered as well to reflect the changes. The two are

not automatically synchronized. Also, someone in the company had to learn CRXI in the event additional reports need to be created or existing ones require modification.

Discussion of project variables and their impact on the project

The communication between the stakeholder and project manager could have had a negative impact on the success of the project if it had been ignored. The communication gap was partly due to the time difference between locations. The project manager made herself available to meet with the stakeholder in the evening times, which worked very well.

The addition of a new partnership influenced the changing of scope which could have forced the project not to be completed on-time. However, the project manager was able to maintain the integrity of the system and convey why the requirements were no longer able to be changed.

Summary of results

The development of the Student Business Application system for ONYX ONE was a major accomplishment. The success of the project was due to everyone working together as a team; the life cycle methodology used, and project management style. The project was completed on-time and within budget which pleased ONYX ONE after implementation. There were issues that arose in the beginning of the project that could have had a negative impact, but were soon resolved. ONYX ONE was very excited with

the benefits the Student Business Application will bring to the companies business processes.

Chapter Five: Lessons Learned and Next Evolution of the Project

What was learned from the project experience

The SBA project was a learning experience from the very beginning. A valuable skill the developer learned to become proficient in was the ability to communicate with various levels of management. This knowledge was continuously perfected during the life of the project in status meetings, user reviews, requirements gathering, and daily interaction. Moreover, the maturity of one's listening competence was crucial in effective communication with the user. Quite often in projects, what is being portrayed - and what the developer interprets – are, not what the stakeholder wants.

Second, the developer gained significant education in project management. The ability to effectively manage a project is a skill that is employed in everyday life. Having the talent to manage incorporates many skills; communication, organization, financial analysis, and productive execution.

Data conversion is sometimes a requirement during system implementation. Usually a direct conversion is performed or middleware software is used to transfer the data over. However, neither of these options was available because ONYX ONE's data was stored in different locations without any conforming format. Therefore, the developer manually entered the data. Although; time-consuming, it allowed the developer to ensure the data had a standard format. Since this is a relational database, it also forced normalization and integrity by entering the data.

Conducting helpful requirement meetings and user reviews was a skill enhanced during this project. Conversing via an interview is important in obtaining the proper answers to questions. Having proper documentation allowed the developer to recall certain facts.

Problem-solving is a skill that is necessary in any industry which always needs improvement. The developer gained the expertise of solving crucial problems. This technique increased the developers' confidence tremendously in minimizing issues that arose. The project has proved to have been a remarkable experience that has enlightened the developer's talents.

What might have been done differently in the project

The project had some minor issues that were quickly resolved. One task that could have been improved was data conversion. The developer manually entered the data. However, because the original information had no standard formats, much of it was missing. The developer should have created a spreadsheet with the columns of required information to be completed. This would have expedited the entering process and reduced rework.

Did project meet initial project expectations

The main objective of the project was to meet the user requirements outlined by the stakeholder in order to develop a productive database solution on-time and within budget. The Student Business Application database exceeded expectations. ONYX ONE's staff was very impressed with the design and conformity of their data. The pleasure of going to a single location to retrieve information reduced response time of data retrieval. This database system offered ONYX ONE the ability to audit company growth more easily

and be more productive in their business process. With the proper tracking of income the company can focus on achieving other business goals.

The data can now be displayed on reports that look professional, instead of haphazardly written. Crystal Reports allowed the developer to be creative in producing reports for the user. The developer created some standardized reports to be generated, but the user also has the flexibility to create more. These reports assisted stakeholders in the market analysis and company growth.

The database proved to be an excellent data storage mechanism which CRXI manipulated to export the data for business purposes. Overall, the Student Business Application database system has improved ONYX ONE business process, which extends the company's ability to be competitive in the industry.

The next stage of evolution for the project would be if it continued

Due to limited funds, no further development will likely take place in the near future. Eventually, ONYX ONE would like to have a website created that would have a secure extranet that allows access to the database remotely. The company would also like to create a calendar on the website and database to display classes with descriptions, instructor teaching the class, location and time per month. The feature was not created on the SBA because it was a want that was discovered later in the implementation phase and was past the requirements cut-off date. It was mentioned by the ONYX ONE stakeholder that the company would eventually like to offer online courses and video web courses.

Summary

The implementation of the Student Business Application system integrated with Crystal Reports XI has proved to be a success at ONYX ONE. It has surpassed all expectations and enhanced business collection of data and response time tremendously. Since, the data is now housed in one centralized location marketing analysis can be performed monthly. This allows the company the opportunity to audit transactions to see potential company growth or areas of improvement. Crystal Reports XI has displayed data in different formats to assist with market analysis, auditing, and normal company reports.

Appendix A: Business Case

BUSINESS CASE	*Project Name*	*Project No.*	*Project Manager*	*Date*
	Student Business Application	**SBA.001**	**De'Tishaa Johnson**	**10/21/2005**

Introduction/ Background

ONYX ONE is a nonprofit organization that provides under-privileged youth under the age of 18 and underserved communities exposure to computer and technology training that would otherwise not have the ability to gain such knowledge. In addition to class based learning, other resources are available to the students, such as, computer lab time.

Goal

It is the goal of this project to deliver a state-of-the-art fully functioning Student Business Application Database. The system must effectively integrate with Crystal Reports XI utilizing the enterprise schema to obtain essential data for the Student Business Application.

Current Situation and Problem/Opportunity Statement

Currently, the company tracks much of their business transactions through Excel spreadsheets and Word documents. Excel has a limitation on the number of records that can be stored in a worksheet, thereby increasing the number of worksheets created, the location of storage, and minimizing business productivity. Due to these limitations there is a need to store data in one central location.

The company requires the creation of standard reports to reflect; invoice and billing, student accounts, class management, sponsorship company information, potential students' inquiry, and income verification to increase the organization's success.

Critical Assumption and Constraints

1. Budgetary constraint will limit the selection of solutions.
2. Time constraint, there is minimal resources available to the project.
3. Geographical location of project personnel will affect communication.

Student Business Application Database

BUSINESS CASE	*Project Name*	*Project No.*	*Project Manager*	*Date*
	Student Business Application	**SBA.001**	**De'Tishaa Johnson**	**10/21/2005**

Analysis of Options and Recommendation

Microsoft Access 2003 and MySQL are potential relational database solutions for this project.

Preliminary Project Requirements

The Student Business Application must allow a user to:

1. Store student data (i.e., name, address, phone, etc.)
2. Track invoices and billing data
3. Monitor classes and workshops offered (i.e., workshop/class name, category, description, etc.)
4. Store instructor data
5. Generate a report in Crystal Reports XI while retrieving the data from the application
    - 5.1 Payment Report
    - 5.2 Student Management Report
    - 5.3 Class Management Report
    - 5.4 Fund Management Report
    - 5.5 Income Tracking Report

Schedule Estimate

The project is to be completed in three months.

Potential Risks

There are many risks involved with the completion of this project. The lack of participation from the stakeholders. User inputs are crucial for populating information into this system and realizing the potential benefits from using the system. The project duration takes longer than three months due to the lack of resources and skill set to complete the project.

Appendix B: Event List

STUDENT BUSINESS APPLICATION SYSTEM EVENT TABLE					
Event	**Trigger**	**Source**	**Activity/Use Case**	**Response**	**Destination**
1. Student request class information	class inquiry	Student Potential student	Look up class availability	class available detail	Student Potential Student
2. Student registers for class	New Student or Existing Student	Student	Create new student or update student	Student information class information	Student
3. Student updates account information	Student update notice	Student	Update student account		
4. Time to create invoice	" 5th of the month"		Create invoice	Fee due	Student
5. Student request fee waiver	New enrollment	Student	Create fee waiver	fee waiver	Student Income verification
6. Payment Arrives	Payment	Student	Record payment	Deposit	Bank
7. Time to create past due report	"30th of the month"		Create report	Past due report	Student
8. Instructor updates information	instructor update notice	Instructor	Update Instructor account		
9. Marketing wants to send promotional materials to students	promotion package details	Marketing	Distribute promotional package	Promotional package	Student Potential student
10. Time to request donation	"End of June"		Create donation proposal letter	Donation proposal letter	Sponsorship company
11. Management	New class	Management	Create class	Class information	Student

STUDENT BUSINESS APPLICATION SYSTEM EVENT TABLE					
Event	**Trigger**	**Source**	**Activity/Use Case**	**Response**	**Destination**
creates new class	details				Potential Student Class
12. Management creates new Instructor	Instructor details	Management	Create new instructor	Instructor information	Instructor
13. Time to produce funds allocation report	“End of quarter and year”		Create Fund allocation report	Fund allocation report	Management
14. Time to produce class tracking report	“End of month”		Create class tracking report	Class tracking report	Management

Appendix C: Sample Test Plan

Student Business Application			
Software Action Request **Test Plan**			
FUNCTION: Create Student Account and Update Student Account	**AUTHOR**: Analyst X	**SAR**: 100	
TITLE: Student Account Management	**STATUS**: under development	**Approved By:**	**DATE:**
Test Participants: Developer: Developer 1 End User 1: User 1 End User 2: User 1			

Step No.	Instructions	Expected Results	Actual Results/Comments	Pass /Fail
1.0	Open application	prompt for username and password		
1.1	Click Student Management	Student Information form opens		
1.2	Enter student number and press enter	Student information displays on the form if current student otherwise nothing		
1.3	Complete student fields and press enter	the next record should show and new account updated in database		
1.4	Enter student number that was just created and press enter	Student information displays on the form		
1.5	Update students home phone	new number should display on the form and database updated		

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