

## K.I.S.S. Extending a Teacher's Career by Reducing the Mundane.

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Keeping attendance for very large classes can be a difficult & mundane chore. Reducing this mundane chore was enough to encourage a faculty member to push aside thoughts of retirement. Creating a simple system to record attendance that is speedy, was just what this faculty member wanted and needed. It wasn't however, what the computer science students originally programmed. The computer science students learned a valuable lesson on creating the system the way the user wants. In this case study, the solution was a computer system that would "Keep It Simple & Speedy".

## K.I.S.S. Extending a Teacher's Career by Reducing the Mundane

Keeping attendance for very large classes can be a difficult & mundane chore. Reducing this mundane chore was enough to encourage a faculty member to push aside thoughts of retirement. Creating a simple system to record attendance that is speedy, was just what this faculty member wanted and needed. It wasn't however, what the computer science students originally programmed. The computer science students learned a valuable lesson on creating the system the way the user wants. In this case study, the solution was a computer system that would "Keep It Simple & Speedy".

### The Problem:

The faculty member has classes with 150-250 students. It is an "exit" class that requires attendance and the completion of certain projects (ie. Resume and career file creation). The projects are either completed or not, with no grading or ranking of quality.

The previous hand system has a student TA taking attendance cards, alphabetizing them and recording into a ledger. A seating chart is created and attendance is manually recorded. Each

class meeting takes about 2 hours for the 150-250 students. Each assignment is manually collected, dated, alphabetized, recorded and placed on file for later use. Each project assignment takes about 2-5 minutes per student or 5-10 hours total. The student worker, staff and faculty member take 20-30 hours per semester on course management.

With the retirement of the previous faculty member that was teaching this class, the new faculty member wants to automate and streamline the process. Dr. Swanson hopes to save considerable man-hours, and the mundane work of taking and maintaining attendance records.

**Problem Statement:**

Create a system that will record student attendance and class assignments very quickly, lessen the workload, while not impeding upon class time.

**The Solution:**

Use POS Scanners and computer to record student attendance. A simple database was discussed, whether to use a spreadsheet or Microsoft Access. Access was selected because of the student programmer's experience with it and for the belief that it could simplify the input and output. A spreadsheet would also be able to complete the task, but would require more faculty intervention.

As the students come to class, they will display their student ID card, called "MavCard" for our Minnesota State University, Mankato Mavericks sports teams. Their student ID card has a barcode for a unique Library ID. This barcode will be scanned, recording into the database the date that they attended class. When the student turns in an assignment, their MavCard will again be scanned, with the assignment number and the date recorded.

At grading time, an Access report is generated that gives the count of attendances and assignments. If a student questions the validity of grades, Access reports produce the detail of exact dates of attendance or assignments.

## Data Base:

Three tables were designed in Access:

Students – contains limited pertinent student information.

Library ID entered by POS scanning at first class meeting.

Student Name, Student number, Tech ID.

Entered by student assistant from MavCard during first class meeting.

Attendance – contains the student ID and dates that the student attended class.

Entered by POS scanning as student enters the classroom. This process should go pretty quickly once students get used to swiping their MavCard in front of the POS scanner.

Assignments – contains the student ID, assignment number and date the

assignment was completed. Entered by POS scanning of MavCard as student turns in assignment.

## Equipment:

POS Scanner Symbol LS400i series – purchased through faculty travel monies

IBM Thinkpad A20m – provided by the College

Software: Microsoft Access 2000, Windows 2000

## Programming

Two Computer Information Sciences student employees of MSU's Academic Computer Center spent approximately 80 hours programming and testing the Access 2000 system. This also includes two demonstration meetings with the faculty member.

These students also attended the first 4 class sessions as observers and technical support.

## K.I.S.S.

Keep It Simple for Swanson ☺

The first demonstration meeting:

In the first meeting with Dr. Swanson the students demonstrated their all-encompassing system based upon their Computer Science training. Dr. Swanson helped the students to quickly realize that their system would take too long, and had too many "bells and whistles". With this realization, the students, Dr. Swanson and myself came together with a redesign that would place speed and simplicity at the top of the list of design criteria.

The students programming efforts have evolved to the following K.I.S.S system.

The Access system K.I.S.S. boots to a main menu with 7 items to select from. This is minimized to maintain the simplicity for the faculty member.

The screenshot shows a window titled "MainMenu : Form" with a close button in the top right corner. The main content area is titled "The Swanson Attendance System". It is divided into three columns: "Data Entry", "Quick Data Entry", and "Reports".

- Data Entry**: Contains two buttons: "Add Assignment" and "Add Student".
- Quick Data Entry**: Contains two buttons: "Attendance" and "Assignments".
- Reports**: Contains three buttons: "View Student Assignments", "View Student Attendance", and "View Attendance and Assignments".

At the bottom left, it says "Developed by the MSU Academic Computer Center ©2001". At the bottom right, there is an "Exit Application" button.

#### Data Entry and Quick Data Entry

Student data for the class is Downloaded from the Integrated Student Records System and imported manually into the Access Database. There may be late registering students that need to be manually entered.

To add students to the system, the student will scan their MavCard Library ID number into the Barcode field and then type in their Tech ID and name.

The screenshot shows a window titled "Add Students" with a close button in the top right corner. The main content area is titled "Add Student".

Fill in the required information and click save to add a student to the database. If you want to view previous students, click previous or next to navigate. If you alter any previously stored students, click save to update the information.

If an error is recieved, press ECAPE and either try again or close the form.

Barcode:

Tech ID:

First Name:

Last Name:

Buttons: "Previous Student", "Next Student", "Save", "Close Form".

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Data editing techniques will not allow a student to be ADDED multiple times. However, a student misspelling their name will make it to the database.

An attendance screen was designed to quickly register the students as they come to class.

**Add Attendance**

### Record Attendance

Scan the student's barcode and click submit. If an error is received, press ESCAPE and either try again or close the form.

Student Barcode:

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Notice the simplicity of this input screen. The only data input is the Student Barcode (Library ID), which comes from scanning the student's MavCard. Clicking Submit enters the ID and day/time from the CPU into the student's record.

To record assignment completion required a preliminary setup screen, where the assignment number is entered, and a student screen.

Assignments must be created in the Database before they can be used. The Add Assignment screen allows the faculty member to enter an Assignment Number and Description. This can be done at the beginning of the semester when time allows.

**Add Assignment**

### Add Assignment

Fill in the required information and click save to add an assignment to the database. If you want to view previous assignments, click previous or next to navigate. If you alter any previously stored assignments, click save to update the information.

If an error is received, press ESCAPE and either try again or close the form.

Assignment Number

Assignment Description

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The Record Assignment screen allows the faculty member to identify the assignment that is to be turned in by the students.

**Assignment**

## Record Assignment

Assignment List      This form is used for preparation of the Quick Add Assignments feature. Select the assignment number that you want to work with and click begin accepting assignments.

1  
2  
3

Begin Accepting Assignments      Close Form

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When the Begin Accepting Assignments button is clicked, a screen to input student barcodes is brought up. This screen can be placed along side the Attendance Screen to allow a student to be scanned for both attendance and submitting an assignment.

**Record Student Assignment**

## Record Assignment

Scan the student's barcode and click submit. If and error is received, press ESCAPE and either try again or close the form.

Barcode #     

Submit      Close Form

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©2001*

To increase speed, only the student Barcode is scanned from their MavCard, while the assignment number, date/time turned in and the barcode are entered automatically onto the student's record.

## Reporting:

The reporting functions are completed through selection of three reports. If the faculty member needs specific detail on attendance or assignments, they may select the appropriate report. If they are completing a grade report, they can use a report that summarizes the attendance and assignment detail.

The Student Attendance report provides the detailed dates of when a student attended class. The report is in Alphabetic order by name.

Last Name	First Name	TechID
Fryuhl		data
		+012001
		+012001
		+012001
Sharp	Wesley	data
		+012001
Schnak	Ryan	data
		+012001
		+012001
		+012001

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The Student Assignment report provides the detail of which assignments were turned in on which date. This report is sorted in Alphabetic order by name.

Student Assignments		
Last Name	First Name	Tech ID
Frydahl	Ullevad	10002
Assignment:	Lab# 1 returned	
5	15/10/1 1:21:05 PM	
1	15/10/1 8:58:44 AM	
1	15/10/1 9:15:09 AM	
1	15/10/1 10:13:51 AM	
Ward-A	Jeff	10003
Assignment:	Lab# 1 returned	
1	15/10/1 9:28:31 AM	
Sharp	Wagner	10007
Assignment:	Lab# 1 returned	
5	15/10/1 1:11:19 PM	
1	15/10/1 9:18:51 AM	
1	15/10/1 9:28:39 AM	
Denmark	Lyman	10012
Assignment:	Lab# 1 returned	
5	15/10/1 1:21:14 PM	
1	15/10/1 9:01:36 AM	
1	15/10/1 8:59:36 AM	
1	15/10/1 9:15:18 AM	
1	15/10/1 10:13:51 AM	

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To complete a grade report, the faculty member would use the summarization of the Assignments and Attendance Report. This lists in alphabetic order, the students name, tech ID (to aid in entering on the Grading Roster) and total number of attendance and assignments.

The screenshot shows a window titled "Assignments and Attendance Review" with a table containing student information. The table has five columns: Last Name, First Name, techID, Attendance, and Assignment. The data is as follows:

Last Name	First Name	techID	Attendance	Assignment
Pruch	David	11583	1	1
Sharp	Wayne	1667	1	1
Streck	Ryan	11912	1	1

At the bottom of the window, there is a footer area with the following text: "Developed by the ASU Academic Computer Center ©2007". To the left of this text is the date "Thursday, April 05, 2007" and to the right is "Page 1 of 1". Below the footer area is a navigation bar with the text "Page:" followed by navigation icons and the number "1".

### Time Savings:

The system saved a great deal of time from the previous manual system. There were times when the entering of data extended into class time, but as the students get used to the process of scanning their MavCards, this time will be greatly reduced. The time to record assignments should greatly be reduced from the manual system.

### Actual System time, first semester:

First Class meeting took 1.5 hours to scan barcode and type student data from MavCards.

Second Class meeting took 1 hour to scan student attendance.

Third Class meeting took 1.5 hours to scan student attendance and assignments.

Fourth Class meeting took 30 minutes to scan student attendance.

Grading for the class took 2.5 hours to record grades from the K.I.S.S. system to the grade roster.

### Second Semester, Partial Success:

Student demographic information was downloaded from the Integrated Student Information System (ISRS), eliminating the requirement to ADD student data by hand.

All class meetings took 30 minutes or less to scan student attendance. This time delay was because of laptop hardware problems, ie. The laptop would lockup/freeze and need to be rebooted as many as 6 times.

The fastest time recorded, when everything worked perfectly, resulted in 225 students being scanned in 12 minutes while they entered the room.

### Third Semester, Success:

Student demographic information was downloaded from the ISRS. A new laptop was purchased for the faculty member. The scanning of student attendance took less than 10 minutes, and thereby didn't interrupt any of the class time.

The less than 1 ½ hours total time it took for the third semester was an outstanding time savings over the 7 total hours it took for the K.I.S.S system during the first semester. Which was a great improvement over the 20+ man-hours with the previous manual system.

### Unexpected Results:

There were several unexpected, significant results from the K.I.S.S. system.

1. Accuracy. The system was viewed as completely accurate. Manual errors were eliminated. There was no questioning about attendance or assignments being missed, which existed in the old manual system.
2. Student Confrontation. Since the students viewed the system as completely accurate, no students confronted the teacher with complaints of missed assignments or attendance.
3. Teacher Satisfaction. The teacher was much more satisfied with the class because he was not having to deal with student confrontation about grades. This is encouraging the teacher to continue working and not look to retirement to avoid the hassles of answering tedious, mundane questions about missing attendance and assignments.

This system eliminates the bookwork and attendance management of large symposium type classes. This allows the faculty member to move to larger class sizes without the strain of course management, seating charts and attendance rosters.

4. Motivating Factors. The old system required seating charts and rosters for attendance. This was very tedious work for student TA's, with a high amount of boredom and therefore, errors. It was hard to retain TA's and keep them interested in mundane labor. Working with the new

system, TA's will be more willing to do the work and be happier with a more interesting duty, by eliminating bookwork and attendance management.

#### Equipment Problems:

During the first two semesters, the faculty's laptop was used for attendance. This was an older laptop with not much memory. It would lock up often, necessitating reboots & taking substantial time. A replacement laptop was purchased for the faculty and all lockup issues disappeared.

Scanner Details: Symbol LS4000i Series, Cost \$575 + \$6 shipping.

Barcode Systems Inc.

15665 Medina Road,

Plymouth, Minnesota, 55447,

Phone 1-800-757-2405.

P/N LS4004-1000 Hand Held Barcode Scanner

P/N 25-16458-20 Cable Assembly: SYNAPSE

P/N ST180-0264 Synapse for Laptop PS/2

The LS 4000i Scanner had to be programmed to read MSU barcodes:

The LS 4000i Reference guide provided the instructions for programming.

#### In Conclusion:

This system development was a learning process for the Computer Science student programmers, as well as the faculty member. The students learned that a system does not always have to involve every conceivable option to be effective. This system and faculty member required simplicity and speed to fulfill the requirements of the task. The acronym K.I.S.S became both the motto of the system, and the design requirements.

The faculty member learned that the incorporation of technology - scanners, laptop and database - could greatly reduce manual workload for a simple and mundane task, covering a large number of students. The faculty member was much more satisfied with the course, pleased that there was significantly less student confrontation and improved accuracy in course management.

The results of the K.I.S.S. system according to Dr. Swanson "Conflict of attendance between faculty and students was absolutely eliminated. I was able to address issues within subject material and only deal with a few exceptions (making them manageable). This system probably extended my teaching career."

#### Authors:

Professor Wayne Sharp, MBA, Director Academic Computer Center. With 24 years of experience in the computer field, starting off in the mainframe programming area and the last 14 years in the academic area, Wayne has developed many systems designed to meet the needs of the user in the simplest format. Within the Academic Computer Center there is a great learning environment for Computer Science students and technology based systems development.

Professor Richard Swanson, EDD, Finance, Insurance, Real Estate. Dr. Swanson has been a MSU faculty member for 31 Years, including teaching, student counseling and internship coordinator.

TA:

Josh Beer, Sr. Finance & Accounting Major. Josh did the physical work of entering data and scanning MavCards.

Student Programmers:

Ryan Sonnek Computer Information Sciences Major, Graduating Spring 2001. Ryan has accepted a position with Brown Printing in Waseca MN.

David Proehl, Computer Information Sciences Major, Expected Graduation, Spring 2002. David has accepted a Cooperative Internship with IBM, Rochester MN.

David Pagel, Computer Information Sciences Major, Expected Graduation Spring 2003. Dave is the Academic Computer Center student hardware manager, and assisted with the class meetings as technical support, after Dave and Ryan graduated.