

Meichun Li. Design and Implementation of a Database-Driven Web-Based Student Evaluation and Tracking System for the Emergency Medicine Department of University of North Carolina at Chapel Hill. A Master's Paper for the M.S. in I.S. degree. April 2003. 62 pages. Advisor: Gary Marchionini

The course, Emergency Medicine (EM401), is for Interns or the fourth year medical students at the Emergency Medicine Department, the University of North Carolina at Chapel Hill. The requirements of the course include Emergency Department shifts, workshops, attendance in Emergency Medicine conferences and all resident conferences, and a case paper and presentation of the paper. The current evaluation procedure is time-consuming and awkward. This paper describes the design and development of a new, database-driven, web-based evaluation and tracking system that allows Emergency Department attendings (physicians) to submit evaluations on-line and allows administrative users to manage and keep track of student information and evaluations.

Headings:

Database--Management--Systems

Information System--Design

Interface Design

Web databases

DESIGN AND IMPLEMENTATION
OF A DATABASE-DRIVEN WEB-BASED STUDENT EVALUATION AND
TRACKING SYSTEM
FOR
THE EMERGENCY MEDICINE DEPARTMENT OF
UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

by
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I. Introduction

The Emergency Medicine Department, the University of North Carolina at Chapel Hill (UNC-Chapel Hill) provides a course, EM401, for Interns and fourth year medical students. The requirements of the course include Emergency Department (ED) shifts, workshops, attendance in Emergency Medicine conferences and all resident conferences, and a case paper and presentation of the paper. The current process of clinical evaluations on ED shifts, which is an HTML-form-based process, is time-consuming and effort-consuming. Also, there are no mechanisms to ensure the accuracy of the evaluations and to keep track of the evaluations.

In this project, a database-driven web-based evaluation and tracking system is designed and implemented to make the evaluation process more effective, efficient and accurate. A back-end Access database is used to store student information and evaluations. Web interfaces are implemented to allow Emergency Department attendings (physicians) to submit evaluations online, and to allow the Emergency Medicine Department Student Coordinator or other administrative users to keep track of student information and evaluations. This paper describes the design and development of this database-driven web-based evaluation and tracking system.

II. Statement of Problem

Interns and fourth-year medical students (Both are named as students in this paper) are required to take a course, Emergency Medicine (EM401), in the Emergency Medicine Department, UNC-Chapel Hill. One requirement of this course is participating in Emergency Department (ED) shifts. Students are scheduled at the ED with 8 to 15 shifts for approximately 4-week blocks. Each shift lasts 8 hours starting at 7 a.m., 10 a.m., 3 p.m., or 11 p.m. Usually there is an attending and a student assigned to a shift. Students are evaluated by ED attendings after their shifts. The evaluations include twenty-two skills assessed using a 5-point scale: 1-Failure, 2-Unsatisfactory, 3-Average, 4-Excellent, or 5-Outstanding, as well as comments about the students' performance. Students are also required to attend workshops if their shifts start at 7 a.m., 10 a.m., or 3 p.m. During the workshops, students have direct interactions with residents and patients. Attendings observe students' performance and make evaluations during the workshop. In addition to clinical requirements, students are required to attend Emergency Medicine conferences and all resident conferences held on every Wednesday. Other requirements include a case paper and presentation of the paper. The final grade of the course is based on clinical evaluations (40%), workshop (20%), student attendance/participation at conferences (10%), and case paper and presentation (30%).

The current evaluation procedures for workshop, student attendance/participation at conferences, and case paper and presentation work smoothly. But there are many problems with the clinical evaluations.

The original clinical evaluations were processed via a paper-based form (Appendix 1). Attendings filled out the evaluation form after a student's shift and submitted it to the Student Coordinator of the Emergency Medicine Department. One problem with this process is that attendings often failed to fill out the form immediately after the shift, and after some time, they might not clearly remember the student's information and his/her performance. The other problem is that attendings often forgot to submit the evaluation form to the Student Coordinator after they filled it out. Since it is very time-consuming to check if all the shifts of a student had been evaluated, the Student Coordinator tended to use whatever evaluations were in hand to calculate the student's grade at the end of the course. In other words, the grading cannot be accurate if some evaluations are missing.

Currently, the clinical evaluations are processed via a HTML form. The HTML form is created before each course period. The HTML form shows a list of students with their pictures, which help attendings to recognize the students. The Student Coordinator sends email to the attendings to remind them to do the evaluation, with the HTML form as an attachment. Attendings download the HTML form, fill it out and click the submit button to submit the evaluation. The HTML form's action is "mail to". When the submit button is clicked, the form's variables and values are emailed to the Student Coordinator. The purpose of using the HTML form is to remind attendings to submit evaluations on time. But there are several problems with this process, too. First, it is hard for some attendings to configure SMTP setting to make the HTML form work. Second, sometimes the browser makes the process complicated. The HTML form works well in Internet

Explorer, but a lot of attendings are using the AOL browser or different versions of Netscape which don't support the HTML tag "mailto". Third, the HTML form doesn't have data validation functions to prevent errors such as missing skill evaluations. Finally, there is no mechanism to check if all shifts have been evaluated by only using the HTML form.

There is a common problem with the clinical evaluation process using either paper-based form or HTML form—the inefficiency in creating course reports for the students. Two reports are necessary for each student. One is the clinical evaluation report for the Emergency Medicine Department, which is the evaluation summary of all ED shifts of a student. The other is the final report for the School of Medicine (Appendix 2), which is based on the student clinical evaluations, workshop, attendance/participation at conferences, and case paper and presentation. The final report also requires the evaluations of skills but in different categories from those in the clinical evaluation report. There are 12 skills in the final report instead of 22 skills in the clinical evaluation report (Table 7). Currently, these two reports are created manually. At the end of a course period, the Student Coordinator manually calculates the average scale of each skill in all shifts of a student and creates the clinical evaluation report. Then he manually converts the skill scales in the clinical evaluation report to skill scales in the final report. This procedure is very time-consuming and effort-consuming.

To meet these challenges it would be helpful for the Emergency Medicine Department to develop an efficient evaluation system to save time for the attendings and the Student

Coordinator, improve the quality of the evaluation process, and keep track of student information and evaluations.

III. Project Scope

The goal of this project is to design and develop a student evaluation and tracking system to improve the student evaluation process, keep track of student information and evaluations, as well automate of the creation of reports. The components of the project include:

1. To develop a database that collects and stores student information and the evaluations.
2. To develop a set of database-driven web interfaces for ED attendings to submit student clinical evaluations.
3. To develop a set of database-driven web interfaces as the administrative module for the Student Coordinator and other administrative users to manage student information, keep track of evaluations, get clinical evaluation reports, and prepare the final reports for the School of Medicine.

During the development of the system, the author frequently met with the target users, got feedback from users, and changed the system according to users' feedbacks.

VI. System Analysis

4.1 User description

The target user group includes attendings in ED and administrative users in the Emergency Medicine Department. Currently only the Student Coordinator, Gail Holzmacher, is in the administrative user group.

Attendings

- Attitude

Attendings have had unpleasant experience with the HTML form, so they expect and welcome a new system that is easy to use.

- Computer literacy

Attendings have basic knowledge about computers and the Internet.

- Physical Environment

Attendings may use the system in the ED or at home.

- Browsers

Attendings may use a variety of browsers, including different versions of Internet Explorer, Netscape, and AOL browser.

Administrative users

- Attitude

The old evaluation procedures are heavy burdens for the administrator, and she welcomes a new system that can save her time and energy.

- Computer literacy

She is familiar with the windows operating system, the Internet, and MS office software.

- Physical Environment

She only uses the system in her office in the Emergency Medicine Department.

- Browsers

She uses the newest version of Internet Explore only.

4.2 User task analysis

The followings are user tasks. These user tasks will serve as guidelines in the design of system features and functionalities.

Attendings' task

Attendings have only one task. They use the system to make clinical evaluations for students.

Administrative users' tasks

1. Add student information:

Add students' data such as name, email address, class code to the database.

2. Delete student information:

Delete students' data from the database as needed.

3. Update student information:

Update students' data in the database if there are any changes or errors.

4. Assign shifts to students:

Shift information includes date, time, attending, and whether the student in this shift should attend a workshop. Before the course period, the Student Coordinator assigns all shifts to a student at once. Sometimes, more shifts might be assigned to the students during the course period.

5. Send shift schedule to students:

Send email to students to inform them their shift schedules.

6. Change shifts:

Students might have time conflicts with the shifts scheduled for them, then the Student Coordinator needs to change some shifts for them.

7. Delete shifts:

Remove shifts for students if needed.

8. View evaluations:

View clinical evaluations made by the attendings. Each evaluation includes evaluations of 22 skills and comments on the student's performance during a shift.

9. Create clinical evaluation reports of the students for Emergency Medicine Department:

A clinical evaluation report of a student is required by the Emergency Medicine Department. The report includes evaluations of 22 skills, final grade, and comments. Skill scales in this report are the average of skill scales in all shift evaluations of a student. The final grade is the average of skill scales in the report. This final grade counts 40% in the final course grade. Comments are the

summary of all comments made by attendings in all clinical evaluations for a student. No repeated comments appear in the report.

10. Create final course report for the School of Medicine

A final course report for a student must be submitted to the School of Medicine. The final report includes scores on 12 skills scales, final grades (clinical evaluations (40%), workshop (20%), student attendance/participation at conferences (10%), case paper and presentation (30%)), and comments which are the summary of comments from clinic reports, workshop evaluation, case paper and presentation evaluation.

11. Create student lists in workshop

There is a workshop every afternoon. Students in the shifts starting at some time (currently 7:00am, 10:00am and 3:00pm) are required to attend the workshop. The Student Coordinator creates a list of students who should attend the workshops and gives the list to attendings. The attendings will use this list to check the students' participation.

4.3 Risk Assessments and Management

The followings are the possible risks and the corresponding actions to prevent them from happening:

1. Files might be corrupted, accidentally deleted, or overwritten by old files and thus result in the loss of data. So all the files should be backed up regularly.

2. Server might be down, or there might be too much traffic. Both cases will make the system inaccessible. So the system administrator in the Emergency Medicine Department should maintain the server to keep it stable.
3. There might be unauthorized access to the system. So files and data should be stored in a secure place, and a login mechanism should be used to prevent unauthorized web access to the data.
4. Incorrect data might be entered by users. So data validation functions should be provided in the web interface.

4.4 Requirements and Rules

The requirements for the new evaluation and tracking system are described as follows:

1. The system must store students' information and the evaluations for them.
2. Access security must be implemented. Users must have correct username and password to access the web interface.
3. Users must be able to complete their tasks listed in the "User Task Analysis".
4. Rather than being calculated by the users manually, the skill scales in reports must be calculated on the fly using Active Server Pages (ASP) and must be stored in the database.
5. The interface must employ data validation to prevent error.

4.5 Technology Decision / Justifications

4.5.1 Microsoft Access Database

The Access Database is used as the database system in this project for the reasons as below:

1. MS Access fits the scope of the project.

There are 12 course periods each year. Usually, each course period has 10 students. In the summer course period, there are more students, but no more than 40 students.

2. MS Access is portable.

The author does not have the privilege to access the server of the Emergency Medicine Department. So the system will first be implemented using the server of the School of Information and Library Science, then will be migrated to the server of the Emergency Medicine Department. The portability of Access databases makes the migration easier.

3. MS Access is easy to use.

This project is the pilot phase of the system. By using Access, the system can be implemented quickly and it can be tested quickly to see whether the new evaluation process is as effective as expected.

4. MS Access is easily converted to MS SQL server.

When the scope of the project becomes larger, the Access database has to be upgraded to a more powerful database management system. The Emergency Medicine Department already has MS SQL server databases for other projects. It is very possible that this database will be migrated to SQL server. Since both Access and SQL server are Microsoft products, the migration should not be problematic.

4.5.2 Active Server Pages (ASP)

The web interfaces of the system are database-driven, dynamic, and interactive web pages. Currently, there are several technologies that can be used to create dynamic and interactive web pages. These technologies include Java Server Page (JSP), Personal Home Pages (PHP), and ColdFusion. ASP is used in this project for several reasons:

1. ASP is a powerful technology and easy to use.
2. The database is designed in MS Access or might be changed to MS SQL Server in the long run. Both Access and SQL Server are products of Microsoft. ASP is the product developed and promoted by Microsoft and works seamlessly with Access and SQL Server databases.
3. The Emergency Medicine Department already has the web server—Internet Information Server (IIS) that supports ASP. The web server will be used by this project so that the department doesn't have to buy new web servers.

4.5.3 JavaScript

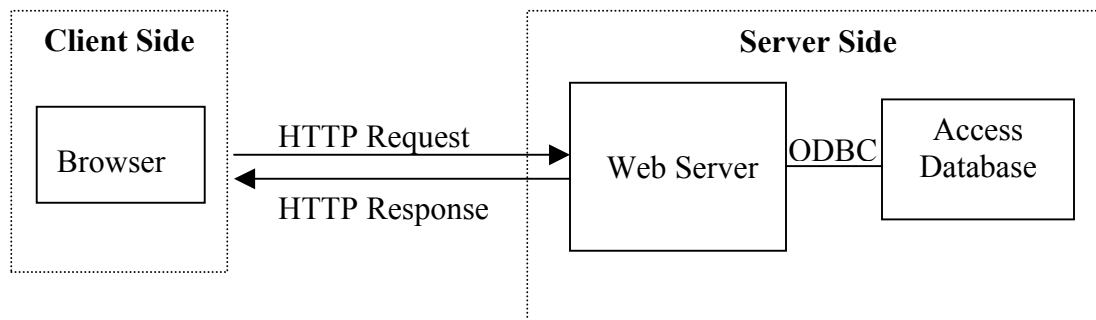
JavaScript is a powerful client side scripting language. It shortens the response time and alleviates the load on the server. But JavaScript is browser-specific. Some browsers don't support some functions of JavaScript or even don't support JavaScript at all. For the ASP pages of web interfaces for attendings, JavaScript won't be used since attendings use diversified browsers. It will be used in the ASP Pages of the web interfaces for administrative users, since IE will be the only browser used by the administrative users.

V. System Design Decision and Implementation

5.1 Architecture Design

The architecture (Fig.1.) is a three-tier architecture which includes the client layer, server layer, and database layer. The database layer stores the student information and evaluation data. The client layer sends requests to the server layer. The server layer processes client requests, executes ASP pages, builds ODBC connection with the Access Database, gets contents from the database, creates HTML pages, and gives responses to the client.

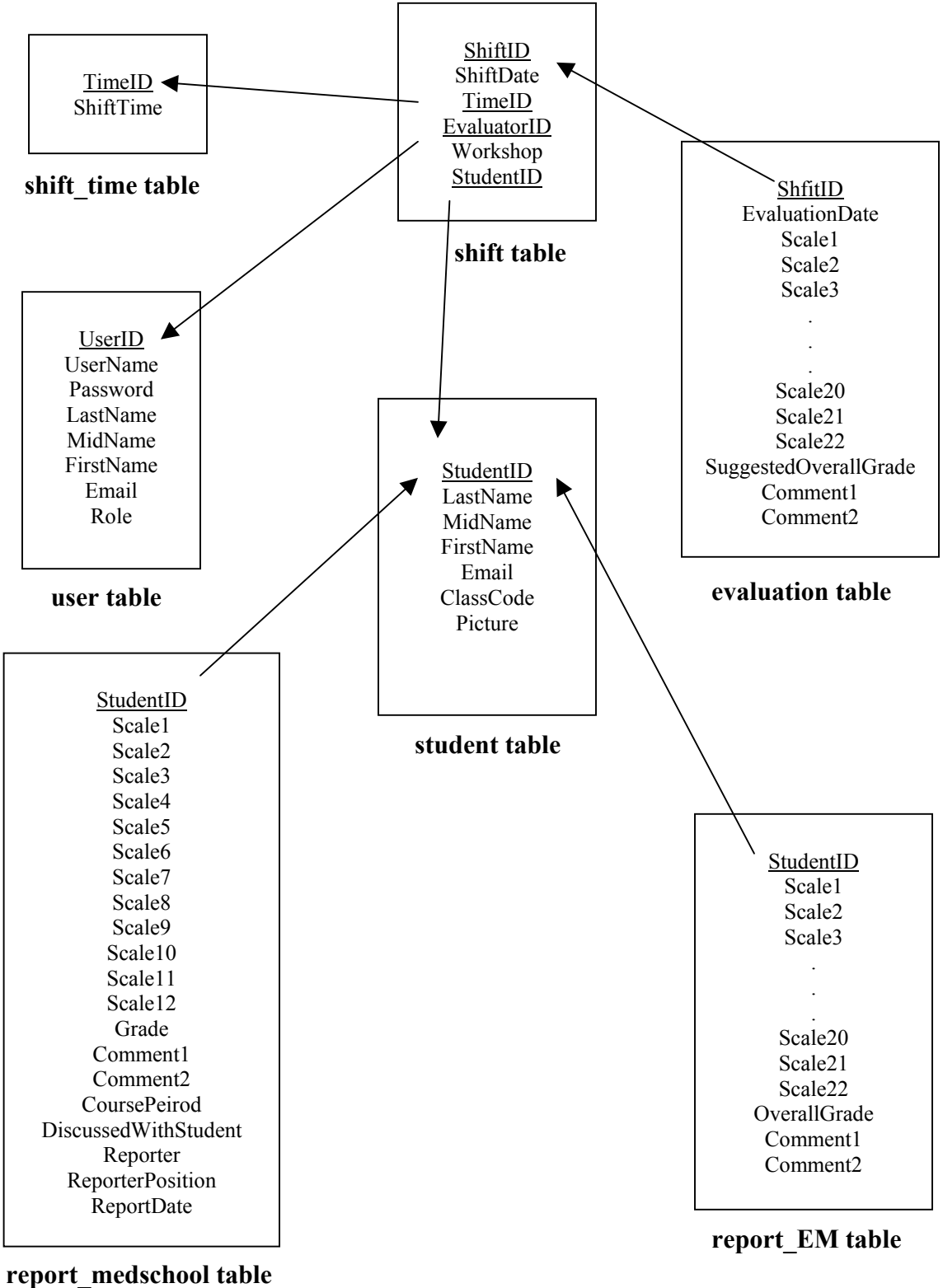
Fig. 1. Three-Tier Architecture



5.2 Database Design and Implementation

Database schemas should be normalized. Based on this rule, seven tables are designed to store information. The database schema diagram is shown in Fig.2.

Fig. 2. Database Schema Diagram



The table "user" stores users' account information such as user name, password, name, email, and role (attending/administrator). Each attending or administrative user has his/her own user name and password. The use of user name/password can prevent unauthorized access to the web interface.

The table "student" stores students' information. The students' information includes name, email, and class code. Student pictures are helpful for attendings to recognize the students. So the field "Picture" is created to store students' image information. The Access Database can store image files, but storing images will make the database size too big. So the pictures will not be stored in the database, but in separate space on the server instead. The "student" table only stores the picture name.

The table "shift" stores shift information such as date, time, attending, and student. There is a workshop every afternoon. Students in shifts starting at some time (currently 7:00am, 10:00am and 3:00pm) are required to attend the workshop. So the field "workshop?" is created. With this field, it is easy to query for the students that need to attend a workshop. This helps to check the students' participation in the workshop. The attending in the shift is also the evaluator of this shift. The field StudentID is created as the foreign key that references the student information stored in the "student" table. Each shift has a corresponding evaluation. The attending in the shift is the evaluator. The field EvaluatorID is created as the foreign key that references the attending information stored in the "user" table. Since an evaluation includes the evaluations of 22 skills in scales, a suggested final grade, and two comments, the evaluation will be stored in a separate

table—"evaluation". Considering there are only four shift times starting at 7:00am, 10:00am, 3:00pm, and 11:00pm, a separate table—"shift_time" is created to store the shift time and make the shift time reusable.

There are two reports for each student. One is the clinical evaluation report for the Emergency Medicine Department and the other is the final report for the School of Medicine. The table "report_EM" stores the clinical evaluation report information including the evaluations of 22 skills in scales, final grade, and two comments. The table "report_medschool" stores the final report information including the evaluations of 12 skills in scales, final grade, reporter, and report date, etc.

This database schema is implemented in MS Access. Referential integrity is enforced by obeying restricted deletion. For example, if a student has corresponding reports, the student can't be deleted until all the related reports have been deleted. For another example, if a shift has a corresponding evaluation, it can't be deleted until the evaluation has been deleted.

The data dictionary of the database schema is shown Table1 to Table 7.

Table 1
Description of Table—User

Field Name	Description	Type	Required?
User ID	The user identifier number Primary key	Auto Number	Yes
UserName	The user's account name	Text (50)	Yes
Password	The user's account password	Text (10)	Yes

Field Name	Description	Type	Required?
LastName	The user's last name	Text (50)	Yes
MidName	The user's middle name	Text (50)	No
FirstName	The user's first name	Text (50)	Yes
Email	The user's email address	Text (50)	No
Role	The user's role (attending or admin)	Text (10)	Yes

Table 2
Description of Table—Student

Field Name	Description	Type	Required?
Student ID	The student identifier number Primary key	Auto Number	Yes
LastName	The student's last name	Text (50)	Yes
MidName	The student's middle name	Text (50)	No
FirstName	The student's first name	Text (50)	Yes
Email	The student 's email address	Text (50)	No
ClassCode	The student's class code	Text (7)	Yes
Picture	The name of the student's picture	Text (50)	No

Table 3
Description of Table—Shift

Field Name	Description	Type	Required?
ShiftID	The shift identifier number Primary key	Auto Number	Yes
ShiftDate	The shift date such as 02/01/2003	Date/time	Yes
TimeID	Foreign key references the table shift time	Number	Yes
StudentID	Foreign key references table student	Number	Yes
EvaluatorID	Foreign key references table user	Number	Yes
Workshop	Whether the student in this shift should attend a workshop	Yes/No	Yes

Table 4
Description of Table—Shift_time

Field Name	Description	Type	Required?
TimeID	The shift time identifier number Primary key	Auto Number	Yes
ShiftTime	The shift time, such as 7:00am-3:00pm	Text (15)	Yes

Table 5
Description of Table— Evaluation

Field Name	Description	Type	Required?
ShiftID	Primary key Foreign key references the table shift	Number	Yes
Evaluation Date	The shift's evaluation date	Date/Time	Yes
Scale1	Scale of skill: Communication with Patients & Colleagues	Number	Yes
Scale2	Scale of skill: Documentation Skills	Number	Yes
Scale3	Scale of skill: Case Presentation	Number	Yes
Scale4	Scale of skill: Collaboration with Faculty, Nursing, & Staff	Number	Yes
Scale5	Scale of skill: Patient HX & PE Assessment	Number	Yes
Scale6	Scale of skill: Differential Diagnosis Development	Number	Yes
Scale7	Scale of skill: Diagnostic & Therapeutic Skills	Number	Yes
Scale8	Scale of skill: Procedural Skills	Number	Yes
Scale9	Scale of skill: Appropriate Treatment Selection	Number	Yes
Scale10	Scale of skill: ECG Analysis	Number	Yes
Scale11	Scale of skill: ECG Ancillary Test Interpretation	Number	Yes
Scale12	Scale of skill: Clinical Judgment	Number	Yes
Scale13	Scale of skill: Independent Learning	Number	Yes
Scale14	Scale of skill: Ability to Adapt	Number	Yes
Scale15	Scale of skill: Use of Evidence Based Principles & Practices	Number	Yes
Scale16	Scale of skill: Follows Attendings' Directions	Number	Yes
Scale17	Scale of skill: Arranges Appropriate Disposition	Number	Yes
Scale18	Scale of skill: Appropriate Use of Consultations	Number	Yes
Scale19	Scale of skill: Promptness	Number	Yes
Scale20	Scale of skill: Relationship with Colleagues	Number	Yes
Scale21	Scale of skill: Academic Preparation	Number	Yes
Scale22	Scale of skill: Motivation & Effort	Number	Yes
Suggested OverallGrade	Suggested overall grade of the shift	Number	Yes

Field Name	Description	Type	Required?
Comment1	Comments to be used in Student's Summary Evaluation	Text (255)	No
Comment2	Comments not for inclusion in Student's Summary Evaluation	Text (255)	No

Table 6
Description of Table—Report_EM

Field Name	Description	Type	Required?
StudentID	Primary key Foreign key references the table student	Number	Yes
Scale1	Average scale of skill: Communication with Patients & Colleagues	Number	Yes
Scale2	Average scale of skill: Documentation Skills	Number	Yes
Scale3	Average scale of skill: Case Presentation	Number	Yes
Scale4	Average scale of skill: Collaboration with Faculty, Nursing, & Staff	Number	Yes
Scale5	Average scale of skill: Patient HX & PE Assessment	Number	Yes
Scale6	Scale of skill: Differential Diagnosis Development	Number	Yes
Scale7	Average scale of skill: Diagnostic & Therapeutic Skills	Number	Yes
Scale8	Average scale of skill: Procedural Skills	Number	Yes
Scale9	Average scale of skill: Appropriate Treatment Selection	Number	Yes
Scale10	Average scale of skill: ECG Analysis	Number	Yes
Scale11	Average scale of skill: ECG Ancillary Test Interpretation	Number	Yes
Scale12	Average scale of skill: Clinical Judgment	Number	Yes
Scale13	Average scale of skill: Independent Learning	Number	Yes
Scale14	Average scale of skill: Ability to Adapt (0-5)	Number	Yes
Scale15	Average scale of skill: Use of Evidence Based Principles & Practices	Number	Yes
Scale16	Average scale of skill: Follows Attendings' Directions	Number	Yes
Scale17	Average scale of skill: Arranges Appropriate Disposition	Number	Yes

Field Name	Description	Type	Required?
Scale18	Average scale of skill: Appropriate Use of Consultations	Number	Yes
Scale19	Average scale of skill: Promptness	Number	Yes
Scale20	Average scale of skill: Relationship with Colleagues	Number	Yes
Scale21	Average scale of skill: Academic Preparation	Number	Yes
Scale22	Average scale of skill: Motivation & Effort	Number	Yes
OverallGrade	Average of Scale1 to Scale22	Number	Yes
Comment1	Average Comments to be used in Student's Summary Evaluation	Text (255)	No
Comment2	Average Comments not for inclusion in Student's Summary Evaluation	Text (255)	No

Table 7
Description of Table—Report_medschool

Field Name	Description	Type	Required?
StudentID	Primary key Foreign key references the table student	Number	Yes
Scale1	Scale of skill: fundamental of knowledge, equals to the average of scale6, scale 7 in the table report_EM	Number	Yes
Scale2	Scale of skill: data gathering, equals to the scale5 in the table report_EM	Number	Yes
Scale3	Scale of skill: data assessment, equals to the average of scale10, scale11 in the table report_EM.	Number	Yes
Scale4	Scale of skill: ability to learn independently, equals to the scale13 in the table report_EM	Number	Yes
Scale5	Scale of skill: diagnostic & therapeutic skills-clinical judgment, equals to the scale7 in the table report_EM	Number	Yes
Scale6	Scale of skill: procedure skills, equals to the scale8 in the table report_EM	Number	Yes
Scale7	Scale of skill: perserverance in patient care, equals to the average of scale16, scale17 in the table report_EM	Number	Yes

Field Name	Description	Type	Required?
Scale8	Scale of skill: collaboration with other health professionals, equals to the scale4 in the table report EM	Number	Yes
Scale9	Scale of skill: relationship with patient, equals to the scale1 in the table report EM	Number	Yes
Scale10	Scale of skill: response to stressful situation, equals to the scale14 in the table report EM	Number	Yes
Scale11	Scale of skill: communication, equals to the scale3 in the table report EM	Number	Yes
Scale12	Scale of skill: motivation and efforts, equals to the scale22 in the table report EM	Number	Yes
Comment1	Narrative Comments	Text (255)	No
Comment2	Comments that summarize student performance in the rotation (to be used in the Dean's letter of recommendation)	Text (255)	No
Grade	Final grade of the course: clinical evaluations (40%), workshop (20%), student attendance/participation at conferences (10%), case paper and presentation (30%); The grade is fail, pass, high pass or honors	Number	No
CoursePeriod	The course period	Text (50)	No
Discussed WithStudent	If the course evaluation has been discussed with student	Yes/No	No
Reporter	The reporter's name, usually the reporter is the course director	Text (100)	No
Reporter Position	The reporter's position	Text (50)	No
ReportDate	The report date	Date/Time	No

5.3 Interface Design and Implementation

The target users interact with the system through web interfaces. It is important that the interfaces are simple, user-friendly, and easy to use. All interfaces should follow the general guidelines and principles as below:

- The interfaces should be consistent with the existing evaluation forms.

- All interface contents should be consistent and standardized. Clear instructions should be provided.
- The interfaces should allow freedom of control and navigation.
- The interfaces should prevent a problem from happening in the first place rather than showing error message.

A login page (Appendix 3) is created to prevent unauthorized access to the system. Based on users' tasks, different interfaces are provided to attendings and administrative users, respectively.

5.3.1 Interface Design and Implementation for Attendings

The attendings have only one task—submit evaluations. The interfaces for attendings are very simple. The submit-evaluation-task will be completed through four pages: students/shift page, evaluation form page, submit evaluation confirmation page, and submit evaluation result page.

1. Select Student/Shift Page (Appendix 4)

The "select student/shift" page is the first page that appears after attendings log in. Each attending has his/her own account, so whenever he/she log in, only the corresponding students and shifts that haven't been evaluated will appear in this page. A student might have multiple shifts that need to be evaluated by the attending. A table is used in this page to show students' pictures in left and their names and shifts in the right. This makes it easy for the attending to select a right shift.

2. Evaluation Form Page (Appendix 5)

The next page is the evaluation form page. The structure of the evaluation form is similar to the old HTML form. This makes it easy for attendings to accept the new system. A new option—"Not Observed" is added to the evaluation form because there exists the fact that some skills are not observed by the attendings during a shift. After discussion with the users, the "Not Observed" is not set as the default option in order to prevent any possible misleading. All the 22 skills need to be evaluated by the attendings. When the evaluation form is submitted, ASP scripts will check whether all skills have been evaluated. If evaluations of some skills are missing, the ASP scripts will redirect the web page to the evaluation form page, with the warning message about which skills are missing, thus help attendings to find missing skills easily. This mechanism makes the evaluation more accurate (no missing part among the skill evaluations).

3. Submit Evaluation Confirmation Page (Appendix 6)

The submit confirmation page is created to prevent the submission of an evaluation by accidentally clicking on the submit button. It also allows the attendings to check or change their evaluations before submitting them.

4. Submit Evaluation Result Page (Appendix 7)

The submit evaluation result page shows the submission result. If the submission of an evaluation is not successful, the error message will be displayed, otherwise a success message will appear as well as a new button "Do Another Evaluation". Clicking on the new button will lead the users back to the "Select Students/shift" page. This allows the attendings to make another evaluation conveniently.

5.3.2 Interface Design and Implementation for Administrative Users

The administrative users have more tasks than the attendings. A key problem is how to make the system easy for them to use. After interactive discussions with the current Student Coordinator, Gail Holzmacher, it was decided that the tasks are categorized into three groups of operations: (1) Add new students and assign shifts for them, (2) Student management including editing student personal data and their shifts, getting evaluations and reports, (3) Get lists of students who should attend workshops. After the administrative users log in, the first page is a menu page (Appendix 8) that provides these three groups of operations.

1. Add new students and assign shifts

- Add student

In the add new student page (Appendix 9), student information like first name, middle name, last name, email, class code, and picture name will be entered. The file names of the students' pictures, instead of the real picture files, are entered by administrative users. For server security reason, only the system administrator of the Emergency Medicine Department has the full access to the server. The Student Coordinator doesn't have the privilege to upload files to the server. The student picture files are uploaded to the server by the system administrator of the department. The picture files are named by the following nomenclature: first letter of the first name followed by full last name and ".gif". After the student information has been successfully added into the database, a result page (Appendix 10) is displayed to notify the user. In

the result page, there is a button "Assign Shifts". This button allows the user to assign shifts to the student right after he/she is added into the system. This design is based on the working procedure of the Student Coordinator.

- Assign shifts

A student might have multiple shifts (8 to 15 shifts). To make it easier to assign shifts to students, the interface is designed as follows: In the assign shifts page (Appendix 11), there are two columns. The left column includes a shifts submission form. The right column displays the list of shifts for the student (It will be empty if the student has no shift). After the shift is assigned, it will come back to the same page, and the new shift will appear in the right column. This interface helps users to assign shifts to a student continually. JavaScript is applied for data validation as below:

- a. Check if the month is selected.
- b. Check if the day is selected.
- c. Check if the shift date is valid. For example, the shift date Feb. 30 is not valid.
- d. Check if the shift time is selected.
- e. Check if the attending is selected.
- f. Check if the workshop option is selected.

2. Student Management

Students are divided by class. After search by a class (Appendix 12), all students in the class are displayed in a table with three columns (Appendix 13). The middle column displays students' personal data and pictures, the right column displays the

students' shifts information, and the left column provides the options of actions: edit student, edit shift, make evaluations, view evaluations, and get reports. There are email links for students which allow the Student Coordinator to send email to students conveniently.

- Edit Student

This option includes updating and deleting student information (Appendix 14, 15, 16). The Access database enforces referential integrity, for example, when a student has shifts or reports, this student's information can't be deleted; otherwise there will be errors. To prevent errors from happening, ASP scripts check whether the student has shifts or reports first. It will not do the delete operation if the student still has shifts and/or reports and will return warning messages to inform the user (Appendix 17).

- Edit Shift

This option includes adding new shifts for the student, updating an existing shift, or deleting an existing shift (Appendix 18, 19, 20). When a shift has corresponding evaluation, this shift can't be deleted; otherwise, there will be errors. ASP scripts handle error checking and return warning messages to notify the user.

- Make Evaluation

Although not very likely, it is still possible that some attendings refuse to use this new system to submit evaluations. They might prefer using the old HTML form or even

the paper-based form. In order to put all evaluations into the system, an evaluation interface was designed for administrative users so that they can do the job for those attendings. Administrative users don't actually make evaluations for the students; instead, they just fill in evaluations based on the HTML-form-based or paper-based evaluations submitted by those attendings. There is a page showing all shift information of a student including shift date, time, and attending (evaluator) (Appendix 21). If a shift has not been evaluated, a link "Make Evaluation" is active beside the shift. This link leads the administrative users to the evaluation pages that are the same as those for attendings (Appendix 5, 6, 7).

- View Evaluation and Get reports

There is a page showing a list of all shifts of a student (Appendix 22). If a shift has been evaluated, a link "View Evaluation" is active beside the shift. This link leads users to the evaluation of the shift. A printable version of the evaluation is provided. When all shifts of a student have been evaluated, a button "Get Reports" will appear below the shift list. This ensures that the clinical evaluation reports are based on the evaluations of all shifts of the student.

Clicking on the button "Get Reports" triggers ASP scripts. The scripts first calculate the average scales of skill 1 to skill 22, then sum the 22 average values, and divide the sum by 22 to get the final grade. Then the scripts check whether the student has already had a clinical evaluation report. If there is no report for the student, a clinical evaluation report will be created. Otherwise, the report will be updated. Finally the

scripts convert the scales of skills (22 skills) in clinical evaluation report to the scales of skills (12 skills) in the final report for the School of Medicine, and then insert or update the report for the School of Medicine. After all these operations have been finished, the get report page appears, where there are two buttons, one is for getting the clinical evaluation report and the other is for getting the final report of the course for the School of Medicine (Appendix 23).

Except scales of skills, a clinical evaluation report (Appendix 24) might include comments. The comments are the summary of the comments of all shifts of a student. No repeated comments appear in the report. An edit report page (Appendix 25) is provided to allow users to enter or edit the summary of the comments. A printable version report is provided for convenient printing.

Similarly, a final report (Appendix 26) includes comments (summary of all performances of a student during the course) and the final grade. An edit report page (Appendix 27) is also provided to allow users to enter or update the information. Again, a printable version is provided to help the users print out the final report easily. The printable version report (Appendix 28) is similar to the previously used paper-based one (Appendix 2).

3. Get workshop list

This allows users to search by month and to get a list of students who should attend the workshop in the month (Appendix 29).

VI. Future Implementation

This system is implemented with the essential features and functionalities to improve the quality of the student evaluation process. In the future, more features and functionalities can be added to the system. Some recommendations are listed below:

1. The Student Coordinator needs to send email to students to inform them about the schedules of their shifts. Now only the email links are available. A new function such as a form with default value as the shift schedules of the student should be added to make it more convenient.
2. Although a login page is implemented to prevent unauthorized access to the system, the security of the system needs to be enhanced. A log out function should be added to every page of the interface. Encryption techniques and Secure Socket Layer (SSL) should be applied in the future.
3. In the ED, the resident rotation program has a similar evaluation system. This new system can be extended to the resident rotation evaluations.
4. When the scope of the evaluation system becomes larger, considering the limitation of Access database, it should be converted into SQL server.

VII. Lessons Learned

The most important thing that the author learned from this project is that an effective system can't be developed successfully unless users' needs and their usage scenarios are fully understood by the developer. During the development of this project, some difficult

issues, such as the functions of creating reports, were encountered. However, after interactive discussions with the users, those functions were created successfully, which makes the system more effective.

This database-driven web-based student evaluation and tracking system is very effective, efficient, and greatly improves the quality of evaluation process. Some similar systems can be developed in other departments in UNC-Chapel Hill. For example, in the Chemistry Department, there is a General Chemistry Lab program (CHEM11L and CHEM21L). Every semester there are about 2000 students registering for the program, who are divided into 80 lab sections. Teaching Assistants are the instructor of the labs. A laboratory manager is in charge of this program. Each semester, the laboratory manager gives a lot of forms such as grading forms to the teaching assistants. After filling out the forms, the teaching assistants return them to the lab manager. Then the lab manger handles the data manually. This management system is very time- and energy-consuming, and there might be mistakes. A new management system similar with this student evaluation and tracking system developed for the Emergency Medicine Department can be developed for teaching assistants and laboratory manager in the Chemistry Department.

Appendices

Appendix 1. Paper-Based Clinical Evaluation Form

**UNC School of Medicine
Department of Emergency Medicine
EM 401 Student Evaluation**

Student Name: _____ **Evaluator:** _____

Date: _____ **Signature:** _____

Scale: 1–Failure 2–Unsatisfactory 3–Average 4–Excellent 5–Outstanding

Interpersonal & Communication Skills					
Communication with Patient & Colleagues	1	2	3	4	5
Documentation Skills	1	2	3	4	5
Case Presentation	1	2	3	4	5
Collaboration with Faculty, Nursing, & Staff	1	2	3	4	5
Patient Care & Medical Knowledge					
Patient HX & PE Assessment	1	2	3	4	5
Differential Diagnosis Development	1	2	3	4	5
Diagnostic & Therapeutic Skills	1	2	3	4	5
Procedural Skills	1	2	3	4	5
Appropriate Treatment Selection	1	2	3	4	5
Practice-Based Learning & Improvement					
ECG Analysis	1	2	3	4	5
Ancillary Test Interpretation	1	2	3	4	5
Clinical Judgment	1	2	3	4	5
Independent Learning	1	2	3	4	5
Ability to Adapt	1	2	3	4	5
Use of Evidence Based Principles & Practices					
Systems-Based Practice					
Follows Attendings' Direction	1	2	3	4	5
Arranges Appropriate Disposition	1	2	3	4	5
Appropriate Use of Consultations	1	2	3	4	5
Professionalism					
Promptness	1	2	3	4	5
Relationship w Colleagues	1	2	3	4	5
Academic Preparation	1	2	3	4	5
Motivation & Effort	1	2	3	4	5

Comments to be used in Students Summary Evaluation: _____

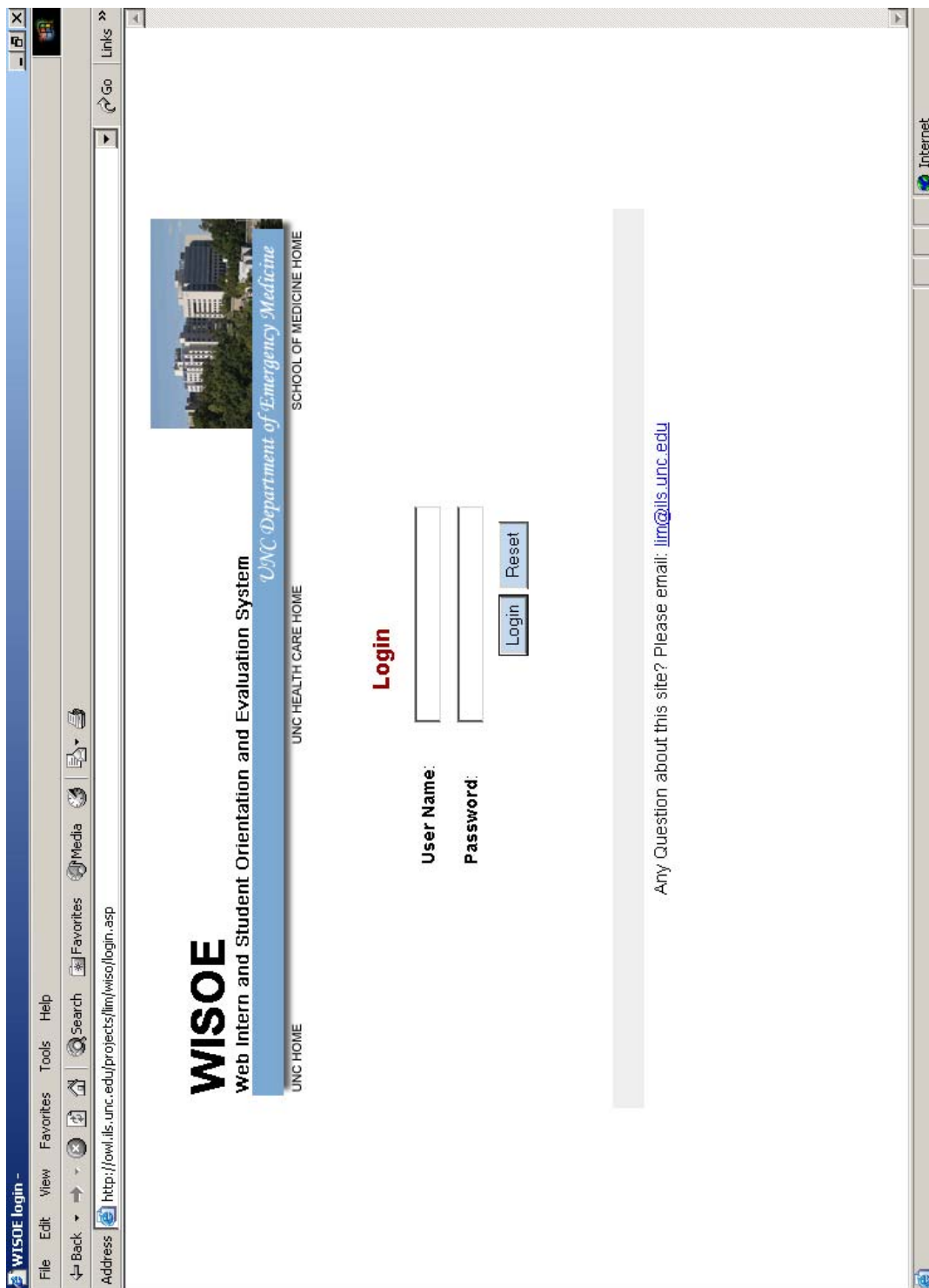
Comments NOT for inclusion in Student's Summary Evaluation: _____

Suggested Overall Grade: Failure Unsatisfactory Average Excellent Outstanding

Appendix 2. Paper-Based Final Report for the School of Medicine

STUDENT NAME & I.D. NUMBER	CLERKSHIP OR ELECTIVE SITE	DATES OF ASSIGNMENT
FUND OF KNOWLEDGE		
<input type="checkbox"/> Not Observed	<input type="checkbox"/> Medical knowledge is clearly below acceptable standard. Lacks the knowledge necessary to deal with common clinical problems.	<input type="checkbox"/> Medical knowledge is marginal. Information base is adequate in some areas, but deficits exist regarding some important clinical problems.
<input type="checkbox"/> Observed	<input type="checkbox"/> Medical knowledge is broad and deep. Displays unusual insight into common and uncommon clinical problems.	<input type="checkbox"/> Medical knowledge is satisfactory and adequate to deal with common clinical problems.
DATA GATHERING:		
<input type="checkbox"/> Not Observed	<input type="checkbox"/> History and physical examination are incomplete or inaccurate. Important data are frequently not obtained.	<input type="checkbox"/> History and physical examination are usually complete and accurate. Occasionally, important data are not obtained.
<input type="checkbox"/> Observed	<input type="checkbox"/> History and physical examination are usually complete and accurate.	<input type="checkbox"/> History and physical examination are complete and accurate. Important data are obtained.
DATA ASSESSMENT:		
<input type="checkbox"/> Not Observed	<input type="checkbox"/> Frequently has difficulty integrating and interpreting history and physical examination data when developing problem list.	<input type="checkbox"/> Occasionally integrates and interprets history and physical examination data when developing problem list. Accurately judges his/her own competence to perform various components of the plan.
<input type="checkbox"/> Observed	<input type="checkbox"/> Accurately integrates and interprets history and physical examination data when developing problem list.	<input type="checkbox"/> Accurately and efficiently integrates and interprets history and physical examination data. Symmetrized information to a concise, accurate problem list.
ABILITY TO LEARN INDEPENDENTLY:		
<input type="checkbox"/> Not Observed	<input type="checkbox"/> Shows little evidence of outside reading about patient problems. Relies exclusively on ward experience to increase fund of knowledge. Has difficulty researching assigned topics.	<input type="checkbox"/> Assumes responsibility for reading standard literature pertinent to patient problems. Satisfactorily reviews topics in standard textbooks and in selected articles.
<input type="checkbox"/> Observed	<input type="checkbox"/> Requires considerable direction or encouragement to read the standard literature pertinent to patient problems. Reviews assigned topics in standard textbooks but has difficulty using other sources of information.	<input type="checkbox"/> Always reads extensively (scope and depth) in the literature pertinent to patient problems. Actively seeks educational rounds and conferences. Has superior ability to research clinical topics.
DIAGNOSTIC & THERAPEUTIC SKILLS - CLINICAL JUDGEMENT		
<input type="checkbox"/> Not Observed	<input type="checkbox"/> Plans for diagnostic tests, consultation (if needed), and therapeutic program are clearly deficient. Frequently overlooks key aspects of diagnosis and management. Clinical judgment is poor.	<input type="checkbox"/> Plans for diagnostic tests, consultation (if needed), and therapeutic program are complete and accurate. Clinical judgment is good.
<input type="checkbox"/> Observed	<input type="checkbox"/> Plans for diagnostic tests, consultation (if needed), and therapeutic program are complete and accurate. Clinical judgment is weak.	<input type="checkbox"/> Plans for diagnostic tests, consultation (if needed), and therapeutic program are usually complete. Occasional deficiencies are noted. Clinical judgment is superior.
PROCEDURAL SKILLS		
<input type="checkbox"/> Not Observed	<input type="checkbox"/> Has difficulty using proper technique (e.g., awkward equipment before procedure and has difficulty with timing or coordination).	<input type="checkbox"/> Occasionally has difficulty using proper technique (e.g., awkward with equipment, bypass steps). Sometimes fails to prepare equipment before procedure and has difficulty with timing and coordination.
<input type="checkbox"/> Observed	<input type="checkbox"/> Uses proper procedural technique. Organizes equipment prior to procedure; timing is smooth and coordinated.	<input type="checkbox"/> Exhibits great facility with clinical technique. Actively uses equipment and conforms completely with accepted procedural steps.
PERFORMANCE IN PATIENT CARE		
<input type="checkbox"/> Not Observed	<input type="checkbox"/> Fails to monitor patient response to treatment and make indicated adjustments after initial work-up. Medical record entries frequent late, illegible or omitted.	<input type="checkbox"/> Monitors patient response to treatment and adjusts as indicated after initial work-up. Maintains neat and accurate medical records at appropriate intervals.
<input type="checkbox"/> Observed	<input type="checkbox"/> Closely monitors patient response to treatment after initial work-up and makes astute adjustments if indicated. Maintains unusually clear and comprehensive medical records.	<input type="checkbox"/> Closely monitors patient response to treatment after initial work-up and makes astute adjustments if indicated. Maintains unusually clear and comprehensive medical records.
COLLABORATION WITH OTHER HEALTH PROFESSIONALS		
<input type="checkbox"/> Not Observed	<input type="checkbox"/> Generally does not cooperate with other health professionals, e.g., nurses, ward clerks, laboratory technicians, residents, attendings, and fellow students or does not respect their professional roles.	<input type="checkbox"/> Works cooperatively with other health professionals and respects their professional roles, e.g., seeks their involvement in team discussions and planning, requests help from other members of the health care team.
<input type="checkbox"/> Observed	<input type="checkbox"/> Elicits and combines to full cooperation among health professionals. Treats other health professionals as colleagues, e.g., seen as contributing to morale of other members.	<input type="checkbox"/> Elicits and combines to full cooperation among health professionals. Treats other health professionals as colleagues, e.g., seen as contributing to morale of other members.

Appendix 3. Login Page



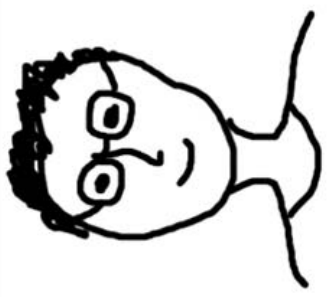

Appendix 4. Select Student/Shift Page

WISOE
Web Intern and Student Orientation and Evaluation System

UNC HOME UNC HEALTH CARE HOME SCHOOL OF MEDICINE HOME

Welcome, Doctor Jane Brice!


Instructions: Select a student's shift, then CLICK THE NEXT BUTTON at the end of the form.

	LXXXX, MXXXX; 2003-05 Shifts to be evaluated: <input type="radio"/> 1/1/2003 , 7:00AM-3:00PM
	LXXXX, SXXX; 2002-05 Shifts to be evaluated: <input type="radio"/> 1/1/2003 , 7:00AM-3:00PM

Appendix 5. Evaluation Form Page

WISOE - Student Orientation Evaluation - UNC HEALTH CARE HOME

UNC HOME UNC HEALTH CARE HOME *UNC Department of Emergency Medicine* SCHOOL OF MEDICINE HOME



WISOE
Web Intern and Student Orientation and Evaluation System

Instructions: Please select the appropriate level for each skill. After filling out the form, CLICK THE NEXT BUTTON at the end of the form.

EM401 UNC Medical Student Evaluation - Emergency Department

Student: SXXXX LXXXX Shift: 1/1/2003, 7:00AM-3:00PM
 Evaluator: Jane Brice Evaluation Date: 4/2/2003

Scale: 1-Failure 2-Unsatisfactory 3-Average 4-Excellent 5-Outstanding

Interpersonal & Communication Skills	1	2	3	4	5	Not Observed
Communication with Patients & Colleagues	C	C	C	C	C	C
Documentation Skills	C	C	C	C	C	C
Case Presentation	C	C	C	C	C	C
Collaboration with Faculty, Nursing, & Staff	C	C	C	C	C	C
Patient Care and Knowledge	1	2	3	4	5	Not Observed
Patient HX & PE Assessment	C	C	C	C	C	C

Done Internet

Appendix 6. Submit Evaluation Confirmation Page

The screenshot shows a web browser window with the following elements:

- Browser Title Bar:** WISOE-Student Orientation Evaluation -
- Browser Menu Bar:** File, Edit, View, Favorites, Tools, Help
- Browser Address Bar:** http://owl.ils.unc.edu/projects/llim/wiso/attending/submitEvaluationForm.asp
- Page Header:**
 - WISOE** Web Intern and Student Orientation and Evaluation System
 - UNC HEALTH CARE HOME
 - UNC Department of Emergency Medicine
 - SCHOOL OF MEDICINE HOME
- Main Content:**
 - Submit Evaluation Confirmation Page**
 - You just filled out the evaluation for:
 - Student:** SXXX LXXXX
 - Class:** 2002-05
 - Shift:** 1/1/2003, 7:00AM-3:00PM
 - If you want to submit the evaluation now, Please select **SUBMIT** BUTTON.
 - If you want to check the evaluation before submitting it, [check the evaluation form](#) below in this page.
 - If you want to cancel the evaluation, please select the **CANCEL** BUTTON.
- Page Footer:** Internet

Appendix 7. Submit Evaluation Result Page

WISOE
web Intern and Student Orientation and Evaluation System

UNC HOME UNC HEALTH CARE HOME UNC Department of Emergency Medicine SCHOOL OF MEDICINE HOME

Thank you for your evaluation!

Please click the button to do another evaluation.

[Do Another Evaluation](#)

Any Question about this site? Please email: lim@ils.unc.edu

Appendix 8. Menu Page for Administrative Users

The screenshot shows a web browser window with the following elements:

- Browser Title Bar:** WISOE Admin Menu -
- Browser Menu:** File, Edit, View, Favorites, Tools, Help
- Browser Address Bar:** http://owl.iis.unc.edu/projects/lim/wiso/admin/menu-admin.asp
- Page Header:** UNC HOME, UNC HEALTH CARE HOME, UNC Department of Emergency Medicine, SCHOOL OF MEDICINE HOME
- Main Content:**
 - WISOE** (Large bold text)
 - Web Intern and Student Orientation and Evaluation System** (Text)
 - Menu for Administrator** (Section header)
 - You Login as Admin** (Text)
 - [Add New Students](#)
 - [Student Management](#)
 - View/Edit Students
 - View/Edit Shifts
 - Make Evaluations
 - View Evaluations/Reports
 - [Workshop Lists](#)
- Footer:** Any Question about this site? Please email: lim@iis.unc.edu

Appendix 9. Add New Student Page

WISOE-Add New Student -

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Media

Address <http://owl.iis.unc.edu/projects/lim/wiso/admin/addStudent.asp>

UNC HOME UNC HEALTH CARE HOME UNC Department of Emergency Medicine SCHOOL OF MEDICINE HOME

WISOE

Web Intern and Student Orientation and Evaluation System

[Add New Student](#)

Instruction:

- (1) The field names with * are required.
- (2) Class code is in the format of "YYYY-MM", for example, the rotation period is from 05/15/2002 to 06/14/2002, then the class code is 2002-05.
- (3) Picture name is the first letter of First Name and the Last Name, and ends with ".gif", for example, Sarah Smith's picture name is ssmith.gif.

*First Name:

*Middle Name:

*Last Name:

Email:

*Class Code:

Picture Name:

[Back to Menu](#)

Done Internet

Appendix 10. Add Student Follow Up Page

The screenshot shows a web browser window with the following content:

- Browser Address Bar:** <http://owl.iis.unc.edu/projects/lim/admin/doAddStudent.asp>
- Page Header:** WISOE Web Intern and Student Orientation and Evaluation System. Navigation links: UNC HOME, UNC HEALTH CARE HOME, UNC Department of Emergency Medicine, SCHOOL OF MEDICINE HOME.
- Main Content:**
 - Add Student Follow Up Page**
 - You have successfully added the student as below. Please click the button "Assign Shifts" to assign shifts to the student.**
 - Assign Shifts** (button)
 - Form Fields:**
 - First Name: PXXX
 - Mid Name: S
 - Last Name: BXXXXXX
 - Email:
 - Class Code: 2003-04
 - Picture Name: psxxxxx.gif
 - Links:**
 - [Edit the student](#)
 - [Add another new student](#)
 - [Back to Menu](#)
 - Footer:** Any Question about this site? Please email: lim@iis.unc.edu

Appendix 11. Assign Shifts Page

WISOE
web Intern and Student Orientation and Evaluation System
UNC-Department of Emergency Medicine
UNC HEALTH CARE HOME SCHOOL OF MEDICINE HOME

Instruction:
 (1) The student has shifts in the right column, if there is no shift, the column is empty.
 (2) To add a new shift, please select a shift date, time, attending, workshop in the left column, then click the button "Add Shift" to add the shift, this new shift will appear in the right column

Assign Shifts to BXXXXXX , PXXX

Month: January
 February
 March
 April
 May
 June
 July
 August
 September
 October
 November
 December

Day: 17
 18
 19
 20
 21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31

Time: 1. 7:00AM-3:00PM
 2. 10:00AM-6:00PM
 3. 3:00PM-11:00PM
 4. 11:00PM-7:00AM

Attending:
 1. Brice
 2. Broder
 3. Eberst
 4. Greenberg
 5. Harrigan

WorkShop?
 Yes No

Shifts List:
 1. 1/4/2003, 11:00PM-7:00AM, Greenberg

Microsoft Internet Explorer
 Please Select a ValidDate!
 OK

Add Shift

Done Internet

Appendix 12. Search Student Page

The screenshot displays a web browser window with the following elements:



- Browser Interface:** The address bar shows the URL `http://owl.ils.unc.edu/projects/lim/wiso/admin/searchStudent.asp`. The menu bar includes File, Edit, View, Favorites, Tools, and Help. The toolbar contains Back, Forward, Home, Search, Favorites, Media, and Links.
- Page Header:** A blue navigation bar contains the text "UNC HOME" and "UNC HEALTH CARE HOME".
- WISOE Logo:** The logo "WISOE" is prominently displayed in large, bold, black letters.
- Page Content:**
 - The text "Web Intern and Student Orientation and Evaluation System" is centered below the logo.
 - A red heading "Search Students" is centered on the page.
 - A search form is centered, featuring a dropdown menu labeled "Class:" with the value "2002-05" selected, and a "Search" button.
 - A link labeled "Back to Menu" is positioned below the search form.
 - A footer area contains the text: "Any Question about this site? Please email: lim@ils.unc.edu".
- Image:** A small photograph of a building is located in the top right corner of the page content area.
- Page Footer:** The text "SCHOOL OF MEDICINE HOME" is visible in the bottom right corner of the page content area.

Appendix 13. Students List in A Class Page

WISOE
 Web Intern and Student Orientation and Evaluation System
 UNC Department of Emergency Medicine
 UNC HEALTH CARE HOME SCHOOL OF MEDICINE HOME

Address: <http://owl.ils.unc.edu/projects/llm/wiso/admin/do5search5student.asp?ClassCode=2002-05>

Students in Class 2002-05

Actions	Student Data	Student Rotation Shifts
<ul style="list-style-type: none"> Edit Student Add/Edit Shifts View Evaluations & Get Reports Make Evaluations 	KXXXX, KXXXX kk@email.unc.edu 	1. 1/4/2003, 10:00AM-6:00PM 2. 1/4/2003, 10:00AM-6:00PM 3. 2/2/2003, 10:00AM-6:00PM 4. 2/2/2003, 10:00AM-6:00PM 5. 2/2/2003, 11:00PM-7:00AM 6. 2/3/2003, 11:00PM-7:00AM 7. 3/4/2003, 3:00PM-11:00PM 8. 3/4/2003, 7:00AM-3:00PM 9. 4/4/2003, 11:00PM-7:00AM 10. 12/22/2003, 10:00AM-6:00PM
<ul style="list-style-type: none"> Edit Student Add/Edit Shifts View Evaluations & Get Reports Make Evaluations 	LXXXX, SXXXX sr@email.unc.edu 	1. 1/1/2003, 7:00AM-3:00PM

Appendix 14. Edit Student Options Page

lim@lis.unc.edu'. The browser's address bar shows the URL: http://owl.lis.unc.edu/projects/lim/admin/editStudent.asp?StudentID=1."/>

WISOE
Web Intern and Student Orientation and Evaluation System

UNC HOME UNC HEALTH CARE HOME UNC Department of Emergency Medicine

Edit Student KXXXX, KXXXX

You could delete the student by clicking the button "Delete Student":

Delete Student

You could update the student by clicking the button "Update Student":

Update Student

- [To Students List in Class 2002-05](#)
- [Back to Menu](#)

Any Question about this site? Please email: lim@lis.unc.edu

Appendix 15. Update Student Page

WISOE-Update Student -

File Edit View Favorites Tools Help

Back Forward Search Favorites Media

Address <http://owl.ihs.unc.edu/projects/lim/wiso/admin/updateStudent.asp?StudentID=1>

UNC HOME UNC HEALTH CARE HOME UNC Department of Emergency Medicine SCHOOL OF MEDICINE HOME

WISOE

Web Intern and Student Orientation and Evaluation System

Update Student

First Name *:

Middle Name:

Last Name *:

Email:

Class Code *:

Picture Name:

- [To Students List in Class 2002-05](#)
- [Back to Menu](#)

Any Question about this site? Please email: lim@ihs.unc.edu

Done Internet

Appendix 16. Delete Student Page

The screenshot shows a web browser window with the following content:

- Browser Title:** WISOE-Delete Student -
- Address Bar:** http://owl.ils.unc.edu/projects/lim/wiso/admin/deleteStudent.asp?StudentID=1
- Header:**
 - UNC HOME
 - UNC HEALTH CARE HOME
 - UNC Department of Emergency Medicine
 - SCHOOL OF MEDICINE HOME
- Main Content:**
 - WISOE**
 - Web Intern and Student Orientation and Evaluation System**
 - Delete Student**
 - Are you sure you want to delete the student?**
 - First Name: KXXXX
 - Middle Name: KXXXX
 - Last Name: KXXXX
 - Email: kk@email.unc.edu
 - Class Code: 2002-05
 - Picture Name: cartoon1.gif
 -
- Footer:**
 - [To Students List in Class 2002-05](#)
 - [Back to Menu](#)
 - Any Question about this site? Please email: lim@ils.unc.edu

Appendix 17. Delete Student Follow Up Page

The screenshot shows a web browser window with the following elements:

- Browser Title Bar:** WISOE-Delete Student Follow Up -
- Browser Menu:** File, Edit, View, Favorites, Tools, Help
- Browser Address Bar:** http://owl.iis.unc.edu/projects/lim/admin/doDeleteStudent.asp
- Page Header:** UNC HOME, UNC HEALTH CARE HOME, UNC Department of Emergency Medicine, SCHOOL OF MEDICINE HOME
- Main Content:**
 - WISOE** (Large bold text)
 - Web Intern and Student Orientation and Evaluation System**
 - Delete Student Follow Up Page** (Section header)
 - Three bullet points:
 - You can't delete the student KXXXX, KXXXX, KXXXX, Since KXXXX has shifts.
 - You can't delete the student KXXXX, KXXXX, KXXXX, Since KXXXX has clinical evaluation report.
 - You can't delete the student KXXXX, KXXXX, KXXXX, Since KXXXX has report for the School of Medicine.
 - Two links:
 - [To Students List in Class 2002-05](#)
 - [Back to Menu](#)
 - A horizontal separator line.
 - Text: Any Question about this site? Please email: lim@iis.unc.edu
- Browser Status Bar:** Internet

Appendix 18. Edit Shift Option Page

UNC HEALTH CARE HOME  SCHOOL OF MEDICINE HOME

WISOE

Web Intern and Student Orientation and Evaluation System

UNC HOME

Rotation Shifts for KXXXX , KXXXX

You could add new shifts by clicking the " Assign New Shifts " Button.

Assign New Shifts

Action	Order	Date	Time	Attending	Workshop?
[Update] [Delete]	1	1/4/2003	10:00AM-6:00PM	Brice	
[Update] [Delete]	2	1/4/2003	10:00AM-6:00PM	Brice	
[Update] [Delete]	3	2/2/2003	11:00PM-7:00AM	Harrigan	
[Update] [Delete]	4	2/2/2003	11:00PM-7:00AM	Harrigan	
[Update] [Delete]	5	2/2/2003	10:00AM-6:00PM	Brice	Yes
[Update] [Delete]	6	2/2/2003	10:00AM-6:00PM	Greenberg	Yes
[Update] [Delete]	7	2/8/2003	11:00PM-7:00AM	Brice	Yes
[Update] [Delete]	8	3/4/2003	3:00PM-11:00PM	Brice	Yes
[Update] [Delete]	9	3/4/2003	7:00AM-3:00PM	Brice	Yes
[Update] [Delete]	10	4/4/2003	11:00PM-7:00AM	Greenberg	Yes
[Update] [Delete]	11	12/22/2003	10:00AM-6:00PM	Brice	Yes

- [To Students List of Class 2002-05](#)
- [Back to Menu](#)

Appendix 19. Update Shift Page

WISOE
Web Intern and Student Orientation and Evaluation System
UNC Department of Emergency Medicine
SCHOOL OF MEDICINE HOME

UNC HEALTH CARE HOME

Update A Shift for KXXXX, KXXXX

Instruction:
Please change the month, day, time, attending or workshop then click the "Update" Button to update the shift.

Month:	Day:	Time:	Attending:	WorkShop?
January	04	1. 7:00AM-3:00PM	1. Brice	<input type="radio"/> Yes <input checked="" type="radio"/> No
February	05	2. 10:00AM-6:00PM	2. Broder	
March	06	3. 3:00PM-11:00PM	3. Eberst	
April	07	4. 11:00PM-7:00AM	4. Greenberg	
May	08		5. Harrigan	

[Update](#) [Cancel](#)

- [Back to Shift List](#)
- [To Students List of Class 2002-05](#)
- [Back to Menu](#)

Any Question about this site? Please email: lim@iis.unc.edu

Appendix 20. Delete Shift Page

lim@lis.unc.edu'."/>

WISOE
Web Intern and Student Orientation and Evaluation System

UNC HOME UNC HEALTH CARE HOME UNC Department of Emergency Medicine

Are you sure you want to delete the shift?

Shift Date: 1/4/2003
Shift Time: 10:00AM-6:00PM

- [To Students List of Class 2002-05](#)
- [Back to Menu](#)

Any Question about this site? Please email: lim@lis.unc.edu

Appendix 21. Shifts List to Evaluate Page

The screenshot shows a web browser window with the following content:

Shifts to Evaluate

UNC HOME UNC HEALTH CARE HOME *UNC Department of Emergency Medicine* SCHOOL OF MEDICINE HOME

WISOE
Web Intern and Student Orientation and Evaluation System

Instruction:
If the student's shifts have NOT been evaluated, the link "Make Evaluation" will be active. Please click the link to make the evaluation for the shift.

Order	Rotation Shift	Evaluator
1	3/4/2003, 7:00AM-3:00PM	Brice, Jane [Make Evaluation]
2	1/4/2003, 10:00AM-6:00PM	Brice, Jane [Make Evaluation]
3	2/2/2003, 10:00AM-6:00PM	Greenberg, Myles [Make Evaluation]
4	2/2/2003, 10:00AM-6:00PM	Brice, Jane [Make Evaluation]
5	1/4/2003, 10:00AM-6:00PM	Brice, Jane [Make Evaluation]
6	12/22/2003, 10:00AM-6:00PM	Brice, Jane [Make Evaluation]
7	3/4/2003, 3:00PM-11:00PM	Brice, Jane [Make Evaluation]
8	4/4/2003, 11:00PM-7:00AM	Greenberg, Myles [Make Evaluation]
9	2/2/2003, 11:00PM-7:00AM	Harrigan, Michael [Make Evaluation]
10	2/2/2003, 11:00PM-7:00AM	Harrigan, Michael [Make Evaluation]
11	2/3/2003, 11:00PM-7:00AM	Brice, Jane [Make Evaluation]

Done Internet

- [To Students List of Class 2002-05](#)

Appendix 22. Evaluations List Page

UNC HOME UNC HEALTH CARE HOME *UNC Department of Emergency Medicine* SCHOOL OF MEDICINE HOME

WISOE

Web Intern and Student Orientation and Evaluation System

Evaluations List for SXXXX, RXXXX

Instruction:

- If the student's shifts have been evaluated, the link "view evaluation" will be active. Please click the link to view the evaluation for the shift.
- If all shifts of the student have been evaluated, the button "Get Reports" will appear in the bottom of the page. Please click the button to get reports.

Order	Rotation Shift	Evaluator	
1	1/1/2003, 11:00PM-7:00AM	Brice, Jane	[View Evaluation]
2	1/3/2003, 10:00AM-6:00PM	Broder, Josh	[View Evaluation]

[Get Reports](#)

- [To Students List of Class 2002-05](#)
- [Back to Menu](#)

Any Question about this site? Please email: lim@lis.unc.edu

Appendix 23. Get Reports Options Page

WISOE
Web Intern and Student Orientation and Evaluation System

UNC HEALTH CARE HOME UNC Department of Emergency Medicine SCHOOL OF MEDICINE HOME

Get Reports For SXXXX, RXXXX

Instruction: Please click the appropriate button to get the reports:

Get Report for Emergency Medicine Department

Get Report for School of Medicine

- [To Students List of Class 2002-05](#)
- [Back to Menu](#)

Any Question about this site? Please email: lim@ils.unt.edu

Appendix 24. Clinical Evaluation Report for the Emergency Medicine Department Page

WISOE
 Web Intern and Student Orientation and Evaluation System
 UNC HOME UNC HEALTH CARE HOME UNC Department of Emergency Medicine

Instruction:
 If you want to edit the report, please click the button "EDIT REPORT" in the bottom of the report;
 if you want to print the report, please Click the link "Get Printable Version of the Report" in the bottom of the page.

EM401 Evaluation Report For Emergency Medicine Department
 Student Name: RXXXX SXXXX Class: 2002-05

Scale: 1-Failure 2-Unsatisfactory 3-Average 4-Excellent 5-Outstanding

Interpersonal & Communication Skills		
Communication with Patients & Colleagues	4	Excellent
Documentation Skills	4	Excellent
Case Presentation	4	Excellent
Collaboration with Faculty, Nursing, & Staff	4	Excellent
Patient Care and Knowledge		
Patient HX & PE Assessment	4	Excellent
Differential Diagnosis Development	4	Excellent
Diagnostic & Therapeutic Skills	4	Excellent
Procedural Skills	4	Excellent

Appendix 25. Edit Clinical Evaluation Report Page

Medical Student Coordinator Menu - File Edit View Favorites Tools Help

Address <http://owl.lils.unc.edu/projects/lily/wiso/admin/editReportEM.asp?StudentID=3>

WISOE
Web Intern and Student Orientation and Evaluation System
UNC HOME UNC HEALTH CARE HOME UNC Department of Emergency Medicine SCHOOL OF MEDICINE HOME

Instruction:
Please edit comments of the report, then click the button "UPDATE REPORT" to update the report.

Edit EM401 Evaluation Report For Emergency Medicine Department
Student Name: FXXXX SXXXX Class: 2002-05

Comments to be used in Student's Summary Evaluation:
Excellent

Comments NOT for inclusion in Student's Summary Evaluation:
good

UPDATE REPORT

Done Internet

Appendix 26. Final Report for the School of Medicine Page

Medical Student Coordinator Menu - File Edit View Favorites Tools Help

Address <http://owl.ihs.unc.edu/projects/lim/admin/viewReportMed.asp?StudentID=3>

UNC HOME **UNC HEALTH CARE HOME** **SCHOOL OF MEDICINE HOME**

WISOE
Web Intern and Student Orientation and Evaluation System
UNC Department of Emergency Medicine

Instruction:
 If you want to edit the report, please click the button "EDIT REPORT" in the bottom of the report;
 If you want to print the report, please Click the link "Get Printable Version of the Report" in the bottom of the page.

EM401 Evaluation Report For the School of Medicine

Student Name: RXXXX SXXXX
Course Period:

FUND OF KNOWLEDGE:

<input type="checkbox"/> Not Observed below acceptable standard. Lacks the knowledge necessary to deal with common clinical problems.	<input type="checkbox"/> Medical knowledge is marginal. Information base is adequate in some areas, but deficits exist regarding some important clinical problems.	<input checked="" type="checkbox"/> Medical knowledge is satisfactory and adequate to deal with common clinical problems.	<input type="checkbox"/> Medical knowledge is broad and deep. Displays unusual insight into common and uncommon clinical problems.
---	--	---	--

DATA GATHERING:

<input type="checkbox"/> Not Observed examination are inaccurate. Important data are frequently not obtained.	<input type="checkbox"/> History and physical examination are usually complete and accurate. Occasionally, important data are not obtained.	<input checked="" type="checkbox"/> History and physical examination are complete and accurate. Important data are obtained.	<input type="checkbox"/> History and physical examinations are usually comprehensive, thorough and precise.
---	---	--	---

DATA ASSESSMENT:

Done Internet

Appendix 27. Edit Final Report Page

Medical Student Coordinator Menu -

File Edit View Favorites Tools Help

Back Forward Search Favorites Media

Address <http://owl.iis.unc.edu/projects/llm/wiso/admin/edreportMed.asp?StudentID=3>

WISOE
Web Intern and Student Orientation and Evaluation System
UNC Department of Emergency Medicine
UNC HEALTH CARE HOME SCHOOL OF MEDICINE HOME

Instruction:
Please edit the report, then click the button "UPDATE REPORT" to update the report.

Edit EM401 Evaluation Report For the School of Medicine

Student Name: RXXX SXXX

Course Period:

NARRATIVE COMMENTS: Additional comments that have been or should be communicated directly to the student for use in his/her self-evaluation, e.g., praise of unique contribution and/or constructive comments on deficiencies.

hhh

Comments that summarize student performance in the rotation (to be used in the Dean's letter of recommendation).

GRADE: FALL PASS HIGH PASS HONORS

Has this evaluation been discussed with the student Yes No

Done Internet

Appendix 28. Final Report Printable Version Page

Not Observed
 Medical knowledge is clearly below acceptable standard. Lacks the knowledge necessary to deal with common clinical problems.

Medical knowledge is marginal. Information base is adequate in some areas, but deficits exist regarding some important clinical problems.

Medical knowledge is satisfactory and adequate to deal with common clinical problems.

Medical knowledge is broad and deep. Displays unusual insight into common and uncommon clinical problems.

FUND OF KNOWLEDGE:

History and physical examination are incomplete or inaccurate. Important data are frequently not obtained.

History and physical examination are usually complete and accurate. Occasionally, important data are not obtained.

History and physical examination are complete and accurate. Important data are obtained.

History and physical examinations are usually comprehensive, thorough and precise.

DATA GATHERING:

Frequently has difficulty integrating and interpreting history and physical examination data when developing problem list.

Occasionally has difficulty integrating history and interpreting history and physical examination data when developing problem list.

Accurately integrates and interprets history and physical examination data when developing problem list. Accurately judges his/her own competence to perform various components of the plan.

Accurately and efficiently integrates and interprets history and physical examination data. Synthesized information to arrive at a concise, accurate problem list.

ABILITY TO LEARN INDEPENDENTLY:

Shows little evidence of outside reading about patient problems. Relies exclusively on ward experience to increase fund of knowledge. Has difficulty researching assigned topics.

Requires considerable direction or encouragement to read the standard literature pertinent to patient problems. Reviews assigned topics in standard textbooks but has difficulty using other sources of information.

Assumes responsibility for reading standard literature pertinent to patient problems. Satisfactorily reviews topics in standard textbooks and in selected conferences. Has superior ability to research clinical topics.

UNC SCHOOL OF MEDICINE - Medical Student Clinical Progress Report
 XXXXX XXXXX
 ERMID 401 EMERGENCY MEDICINE UNC/WAKE

Done

Internet

Appendix 29. Workshop Students List Page

The screenshot shows a web browser window with the following elements:

- Browser Interface:** Includes a menu bar (File, Edit, View, Favorites, Tools, Help), a toolbar with navigation buttons (Back, Forward, Home, Stop, Reload, Search, Favorites, Media), and an address bar containing the URL: `http://owl.iis.unc.edu/projects/lim/wiso/admin/doSearchWorkshop.asp`.
- Page Header:** Features the text "UNC HOME" and "UNC HEALTH CARE HOME" on the left, and "UNC Department of Emergency Medicine" and "SCHOOL OF MEDICINE HOME" on the right, with a small image of a building.
- Main Content:**
 - WISOE** (Web Intern and Student Orientation and Evaluation System)
 - Workshop List** (Month: 1, Year: 2003)
 - Table:** A table with three columns: Date, Student, and an empty column. The data rows are:

Date	Student	
1/1/2003	LXXXX, MXXXX	
	LXXXX, SXXX	
	ZXXXX, AXXXX	
1/2/2003	ZXXXX, AXXXX	
1/3/2003	SXXXX, RXXXX	
 - [Back to Menu](#)
- Footer:** A horizontal bar with the text: "Any Question about this site? Please email: lim@iis.unc.edu"