

Project Definition
for
The University of Colorado
Health Sciences Center

Clinical Medicine
Assessment Tool



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Introduction

Project Request

In the Student Project Proposal presented in the 2004 Design Studio class by Eric Replinger and Dan Klassen, the project is described as:

- A data collection form and database for research study in Physician Assistant (PA) students' application of published evidence.
- A structured exercise to see how well PA students are able to evaluate the quality of the evidence for a specific clinical action.

Project Schedule

Date	Description
2/03/04	Project Definition and Analysis – Initial Draft
2/10/04	Project Definition and Analysis – Final
2/17/04	High-level Design Blueprint and Project Plan – Initial Draft
2/24/04	High-level Design Blueprint and Project Plan – Final Draft
3/9/04	Detailed Design Blueprint & Prototype – Initial Draft
3/23/04	Detailed Design Blueprint – Final Draft
4/27/04	Post-project Review
5/4/04	Draft Artifact Report
5/11/04	Final Project Presentation

Project Overview

Determining A Performance Gap

Evidence-based medicine requires practicing PA students to consult written literature on their original diagnosis, which in turn, is used to aid in further diagnosis and treatment of the patient. Practicing evidence-based medicine requires clinicians to validate and authenticate the material to which they refer.

Studies have shown that PA students studying the application of principles for evidence-based medicine have a tendency to question their confidence after reading an evidence-based abstract that may contradict their original patient diagnoses. Learning to evaluate the validity of such an abstract, will lead to greater accuracy in diagnosis as well as greater student confidence in their decisions.

At the University of Colorado Health Science Center (UCHSC), PA students examine standardized patients in a simulated, problem-based learning environment. The PA students examine a patient and hypothesize a diagnosis

based on their initial assessment of the patient's condition. After their original diagnosis, the PA students consult their supervisor for further information. The supervisor offers specific evidence-based medical information to the students based on their initial assessments and preliminary diagnoses. After reviewing the evidence provided by their supervisor, the PA students are asked to make final diagnoses.

The current methodology makes it difficult to gather and assess data necessary to determine the presence of a performance gap. The need is to develop a tool that will allow the professor to accurately determine whether PA students, when presented with an evidence-based medical abstract, possess the ability to accurately validate, evaluate, and apply evidence contained within the abstract. The implementation of an assessment tool provides the professor with an opportunity to extract and evaluate data from the learning environment.

Based on such data, the professor assesses the strengths and weaknesses of the PA students' performances in the simulated learning environment. If necessary, the professor could then modify the curriculum based on the PA students' ability to apply the learned information in context.

The assessment tool also doubles as a technology-based performance support tool. If the information (evidence-based abstract) and communication are presented in an electronic format, the simulated learning environment becomes more authentic. The PA students would access, input, and retrieve information electronically, much the way they would do in a real environment. This performance support tool will emphasize, test, and eventually strengthen the PA students' abilities to evaluate, validate, and practice evidence-based medicine.

Project goals and desired outcomes

The primary outcomes and overall goals are:

- To create a reliable tool as a means to collect, assess, and evaluate data to support teaching PA students' the application of principles for evidence-based medicine. The tool will be a shell that is cross-functional and can be used with a variety of content.
- To enhance the learning experience for PA students by providing a realistic simulated learning environment.

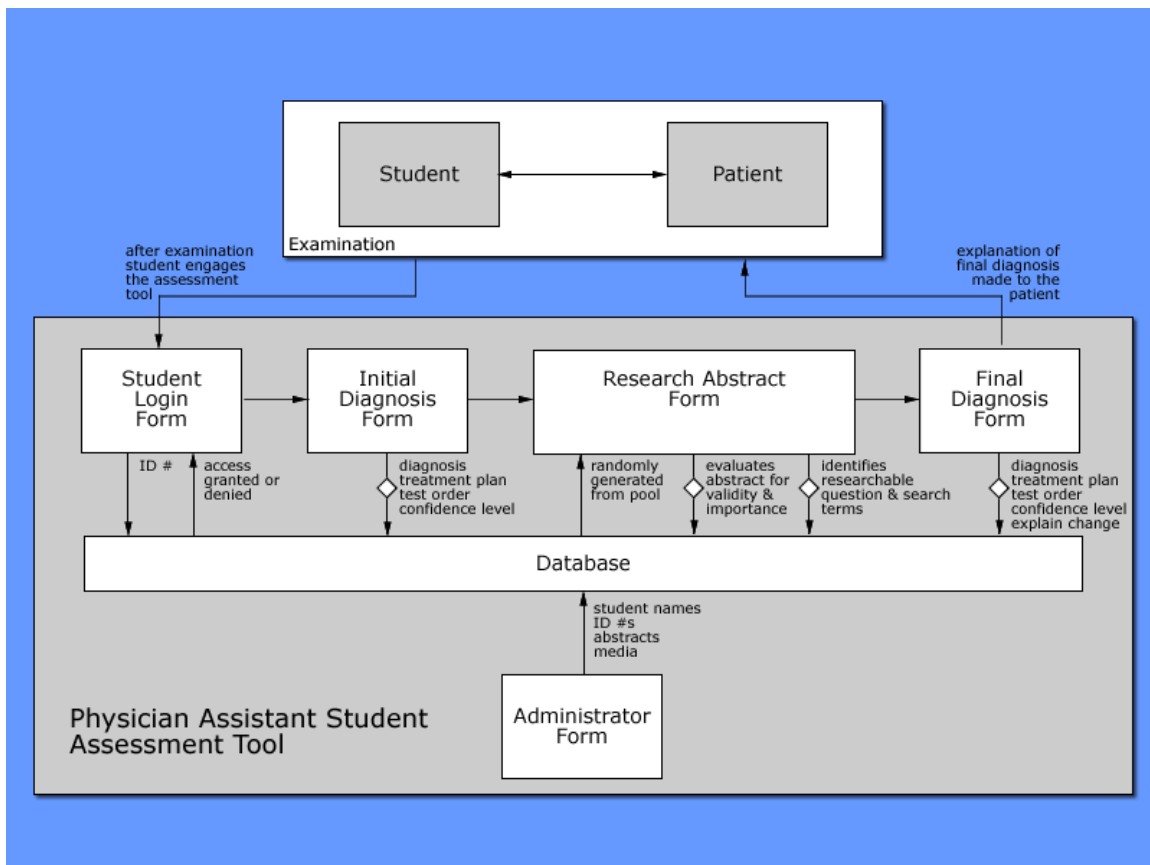
Task Analysis

Desired methodology

1. Student presented with simulated, problem-based scenario

2. Asked to develop a preliminary diagnosis based on initial patient assessment
3. Student logs-in to PA Student Assessment Tool
4. Student identifies a researchable question based on scenario
5. Student identifies search terms to be utilized
6. Student asked to complete Initial Diagnosis Form:
 - Treatment Decision: yes/no
 - Test Ordered: yes/no
 - Confidence of response - scale
7. On submission of this preliminary assessment, the student is delivered the Research Abstract Form
8. Student reads abstract
9. Student asked to complete Final Diagnosis Form:
 - Which abstract was read:
 - Treatment Decision: yes/no
 - Test Ordered: yes/no
 - Confidence of response - scale
 - Explain why it changed or did not change

A visual representation of this process is given in the diagram below:



Current methodology

PA students are asked to:

1. Go into an exam room to diagnose a standardized patient
2. Develop and hand-write the initial diagnosis and ordering of tests
3. Confer with a supervisor (professor) to get more information
4. Decide whether their initial diagnosis and/or ordering of tests is correct
5. Finish with the patient

Audience and Environmental Analysis

Description of the Learners

The primary audience for the data collection and assessment instrument will be PA students at the UCHSC. These are first and/or second year PA students. The PA students are enrolled in a 32-month Master's curriculum. Upon completion of the program graduates receive a certificate qualifying them to take a national certifying exam for practice as a Physician Assistant.

PA students are required to own a computer and most are computer literate upon entry to this graduate level program. All PA students have home access and access on campus through T-1 line.

PA students are in the first or second-year of a three-year curriculum where they learn to diagnose and treat 90% of the cases seen in a Pediatric or Internal Medicine practice.

General Characteristics

- First and second-year Master's PA students
- UCHSC PA program operates on quarters, not semesters
- Computer literate – Familiarity with Blackboard
- Communicate via email
- Other online classes
- Varied – College graduates and above
- Gender –m/f
- High-stress – Maybe easily frustrated if technology fails

Motivation to use the tool

PA students have no choice because it is part of the exam.

Learning Environment

Physical Description of the learning environment

- Final Examination setting
- Sterile
- Quiet
- Cubicles
- High-stress?
- Video camera(s)
- Exam room(s)
- Multiple people – other PA students taking the exam, patients, instructors, professors
- Loud speaker, intercoms

Possible distractions of the physical environment include

- Failure of technology
- Workstation or laptop fails and needs to be rebooted
- Application fails to connect to the database
- No Intranet connection available
- Server down
- Extraneous Noise

Technical Environment/Delivery Platform

- Online
- Possibly through Blackboard
- PA Student Assessment Tool
- T1 connections available
- Workstations (eventually laptops)

Resources for Project Development

<i>Available Resources</i>	<i>Needed Resources</i>
ColdFusion, version 5.0 or MX	Contact person from UCHSC IT area
MS Access, version 2000 or XP	
T-1 connection	
Cubicles	
MS Project, 2000 or XP	
Server	
Workstations	
Flash MX	
Dreamweaver MX	
Fireworks MX	
Illustrator 11	
Photoshop 6.0 or 7.0	
Eric Replinger	

Technological Specifications

<i>User Requirements</i>	<i>Technical Specifications</i>
Internet Access Speed	T-1
Operating Systems	Windows
Browsers	IE 5, Netscape
Screen Resolution	800x600, or 1024x768
Color Depth	256 colors
Plug-in	Macromedia Flash Player
Sound Card	No
Processor Speed	300 MHz
Processor Type	Pentium II
RAM	128M

<i>Server-Side Requirements</i>	<i>Technical Specifications</i>
Java enabled	
ColdFusion 5.0 or MX	

Project Constraints

All projects are constrained by time, cost, and quality. Again, the unique nature of this assignment makes cost not applicable to this project. The following table summarizes and prioritizes the constraints of this project.

	1st Priority	2nd Priority	3rd Priority
Time		X	
Cost			N/A
Quality	X		

Delivering a quality product is the first priority, because effective evaluation skills are vital to providing quality patient care. Time is the second priority because the short timeframe for this project could impact the quality of the deliverable. Cost is not a factor as this is a pro bono university-sponsored project.

Learning Objectives

Audience: First and second-year PA students involved in the Masters program at the UCHSC.

Behavior: Upon completion of the PA Student Assessment Tool, the learners will be able to:

- Identify a researchable question that would provide additional information about the case from the literature.
- Identify search terms they would utilize to locate relevant literature.
- Critically evaluate a research abstract for its validity and importance to a specific clinical diagnosis.
- Reassess their initial diagnosis/treatment plan based on their evaluation of the abstract.
- Explain their rationale for changing or not changing their diagnosis/treatment plan.
- Indicate their level of confidence in their diagnosis/treatment plan.

Measurability: The PA students diagnose and treat standardized patients in a clinical scenario. There is a correct diagnosis for each scenario. Over time, the PA students' improvement will be tracked by the accuracy of their diagnoses/treatment plans. The UCHSC will recognize improvement through quantitative and qualitative evaluation of student performance.

- Skills – PA students will improve their evaluation skills and techniques
- Knowledge – PA students will increase their level of knowledge by reading research abstracts
- Attitude – PA students' confidence in their abilities will increase

Condition: The PA Student Assessment Tool is an online performance support tool that will complement existing practices. The existing practices include professor-led classes, clinical diagnosis simulations with standardized patients, and debriefs with supervising physicians.

Evaluation of Clinical Medicine Assessment Tool

Level 1 Evaluation: Assessing Reaction To:

Navigation

- Ease of use
- Navigational aids are obvious, intuitive, and consistent through the site
- User's current location identified
- Mouse scrolling is limited and aided with "top" links

Screen Layout and Aesthetic

- Text: font, size, alignment adequate for the PA Student Assessment Tool
- Images support abstracts
- Color scheme contrast for legibility
- Tables used to control text and graphic layout
- Backgrounds enhance site, do not decrease legibility

Level 2 Evaluation: Assessing Learning

It is important to note here that this project is essentially a software development project, and the PA Student Assessment Tool is not designed to teach specific skills. Rather, like its name suggests, it is a tool to be used by the professor to collect data towards the assessment of learning. The items stated below are data collection points and reports to be used by the professor towards assessment.

Data collection points:

- Initial diagnosis of standardized patient
- Initial treatment plan (if any)
- Initial test orders (if any)
- Level of confidence in initial diagnosis/treatment plan
- Evaluation of research abstract
- Identification of researchable question
- Search terms for researchable question
- Final diagnosis of standardized patient
- Final treatment plan (if any)
- Final test orders (if any)
- Level of confidence in final diagnosis/treatment plan
- Explanation of change in diagnosis/treatment plan (if any)

Possible reports generated by the PA Student Assessment Tool:

- Validity/importance ratings 1- 5 of abstracts
- "By student" – one student's responses to all abstracts read
- "By abstract" – all students' responses to one abstract
- "By patient" – all students' responses to the same patient

- Summary reports
- Detail reports