

NURSETRAC: AN INTERACTIVE SYSTEM DESIGN PROJECT

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Table of Contents

1. Introduction	1
2. Situation of Concern	4
3. Initial Design	4
3.1. Data Collection: Client Meetings	5
3.2. Solution Proposed.....	6
3.3. Data Collection: Questionnaire by eMail.....	6
3.4. Changes Proposed	6
4. User Study	4
4.1. Interview #1	5
4.2. Interview #2	5
5. Analysis	5
6. Updated Solution	5
7. References	5

1. Introduction

NurseTrac is an app for nursing students in the CNL (Clinical Nurse Leader) program. To complete the certified CNL program, the students need to work on 9 modules (called Essentials) to establish all-round nursing leadership goals. They perform various clinical activities relating to these essentials and need to complete 60 hours of such clinical work. The students currently use a paper form submission method to submit their hours of work. This requires a lot of manual work to write, maintain a database, and calculate the total number of hours to keep track of the activity.

Model of Activity

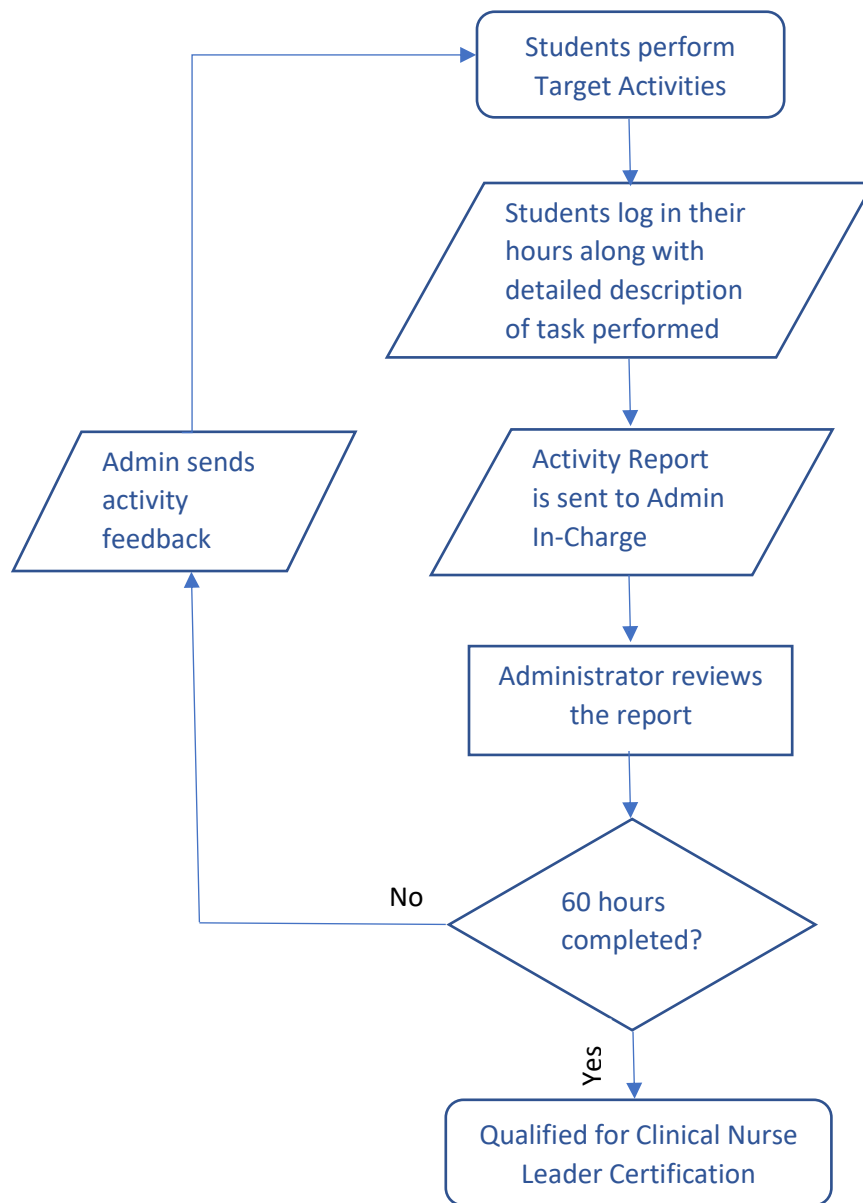


Fig.1.1

2. Situation of Concern

The process of reporting was being carried out on paper forms. The students faced the following problems:

- Paper based submissions involved lengthy writing and any mistakes made would involve rewriting the whole description on another form.
- The hours would have to be manually tracked.
- Each essential requires an average of the same number of hours to be worked on. The students would have to manually calculate the number of hours for each essential to understand which ones need more or less time to be dedicated to in the future.
- The administrator would have to keep track of all the documents separately for each student to present to the board for certification.

These problems made the whole process inefficient and hence this needed updating. The following was the problem statement that was worked on as a part of our final project:

Update the process of reporting activities performed by students in the Clinical Nurse Leader program by making it quicker and more convenient.

3. Initial Design

3.1. Data Collection: Client Meetings

We met with the clients, Barbara Frey (Instructional Designer for Teaching Support and Online Programs for the University of Pittsburgh Center for Teaching and Learning) and Dr. Rose Hoffman (Associate Professor, School of Nursing and Clinical Nurse Leader Program Coordinator). The data collection in the meetings involved data extraction through interview and observations.

In the meetings, the client showed us the entire process as it happens on paper. Fig. 1.1 shows a model of the process as per the data collected. The form that the students need to fill out includes the following:

- Number of hours logged in
- The essential worked on (Reference: Table 7.1)
- The Activity performed (Reference: Table 7.2)
- Explanation of the target activity performed.

We summed up that the app required a “Task” page where the students perform the form submission, and an “Overview” page where the student get a brief of the hours put in and the essentials that they worked on. Additionally, a “Settings” page would prove to be useful for the user to view profile information and update contact information.

3.2. Solution Proposed


The app interface consists of 3 main pages:

- Overview
- Task
- Settings

A menu bar is provided on top for easy and constant access to the pages. Table 3.1 shows the mockups for the initial solution proposed for the app.

Tool used for prototyping: Balsamiq

Table 3.1: Initial Solution Proposed

 <p>Fig. 3.1</p>	<ul style="list-style-type: none">• The Overview page helps the students access their hours per essential through a graph.• This information helps them better plan their future activities.• They can access this data for the week, the month, or the entire semester.
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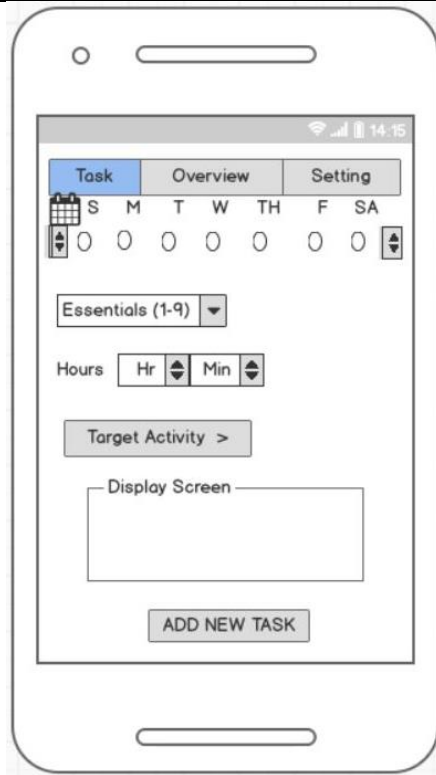


Fig. 3.2

- The Task tab is where students enter the activity details.
- The page consists of a form interface with the following components:
 - Calendar widget
 - List of essentials drop-down menu
 - Hours and Minutes drop-down menu
 - Target Activity input button (redirect to page on Fig. 3.3)
 - Text Box to display target activity data entered.
- An “Add New Task” button submits the current form and generates a new form for the same date.

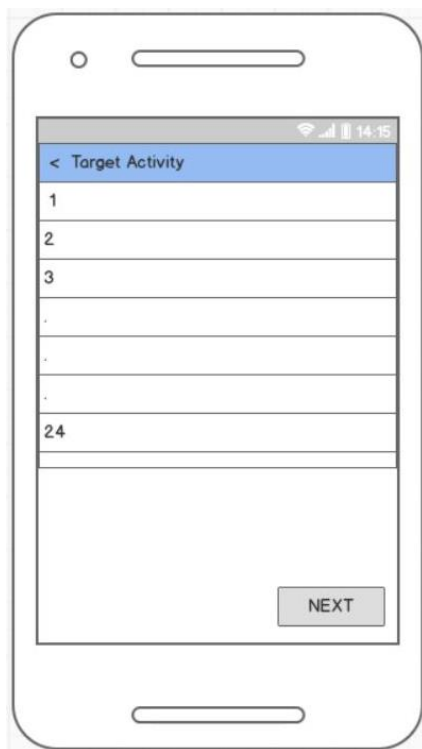


Fig. 3.3

- Clicking on the Target Activity button from the Task page redirects to the page shown in Fig. 3.3.
- This page represents the target activity selection and it consists of a list interface with options having radio buttons.
- The final option is an editable text area with the label “Other” in case the student wants to enter an activity that isn’t on the list.
- The top left corner of the page has a “Back” button to go back to the task page.
- The bottom right corner of the page has a “Next” button that redirects the user to the next part of filling out the target activity (page shown in Fig. 3.4)

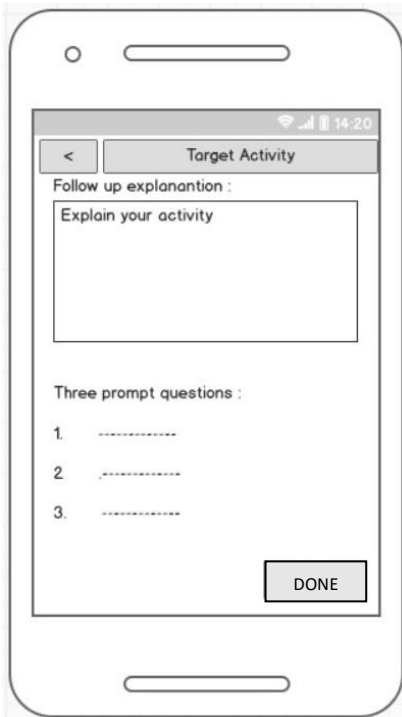


Fig. 3.4

- This is the final page from the Target Activity redirect.
- The page consists of a text box where the student can enter the details of the activity in the text box given.
- Some prompt questions are available below it to help them frame an answer.
- On clicking “Done” (bottom right), they are sent back to the “Task” tab to review the data entered before submitting.

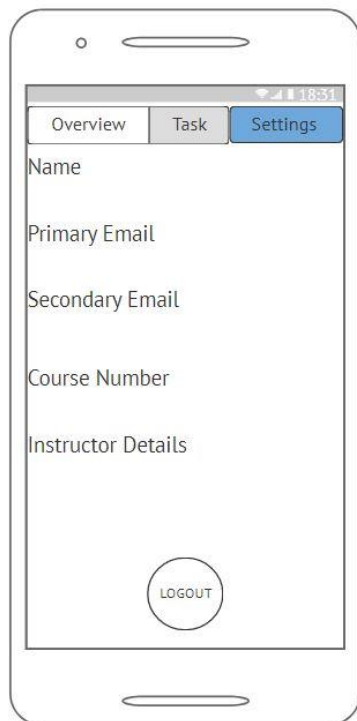


Fig. 3.5

- The Settings page consists of details about the student, out of which the “Secondary Email” is editable.
- The page also has instructor details and a logout button.

3.3. Questionnaire by eMail

As the app interface was being designed, we needed more information about some specifics of the process. But this time, we needed very specific data to update the design, hence we choose the method of questionnaire by email.

Questions	Answers Received
1. How accurately do the student's measure the time for the task done? (Hours/ Hours + Minutes)	1. The tasks can be recorded in 30-minute intervals such as .5 and 1
2. (If it is Hours + Minutes for Q1) How accurate should the time measurement be? (Minutes in interval of 5/10/15/30)	2. Same as above
3. How long does the student have to submit an entry for the task done for a particular day? (What is the deadline after which the student can't send in the activity form)	3. The deadline for all tracking hours is the end of semester. Some students submit 1 x per month, others submit 3 x per semester. and still others submit 2 x per semester (midterm and final)
4. Do the students perform more than one task a day?	4. Yes, there can be multiple tasks per day or per hour.
5. Should the overview also show a "Current semester view"?	5. Yes a current semester view is needed. Student activities often occur over several dates throughout the term.
6. Would the students want constant access to a "Logout" button or would they prefer to stay logged in and select the logout option if needed?	6. They can stay logged in and select the logout option if needed.
7. Would the administrator want to leave a comment for each student's profile or a general comment to be seen on the Overview?	7. Yes, I think this is a good idea. Dr. Hoffmann will want to leave a comment. The comment would be linked to Pitt email account, correct? If possible, I wouldn't want students to have to log into app to see the comment.

3.4. Changes Proposed

- The minute drop-down menu should consist only on "00" and "30" options.
- The Calendar widget can be shifted to a default month week (as opposed to current week view) since the students only enter their data in twice a month.
- Add an option for students to view comments from Dr. Hoffman.

4. User Study

4.1. Interview #1

The Interview was conducted with Sidney, a nursing student that would be using the app, and Dr. Hoffman.

I – Interviewer

S – Sidney

RH – Dr. Hoffman

The app was shown to the Interviewees and they were asked to go through the interface and its features. The following is the transcript of the interview conducted:

I: As you go through the app, are there any features you find are missing that would assist in the process?

S: No, the Task page covers the required features well.

I: On the Overview page, would you say the information is well understood?

S: The essentials seem to be labelled by numbers, but it's not mentioned which numbers correspond to what title, it's a little confusing.

I: Would adding initials of the essentials on the graph be more helpful?

RH: Yes, I think that would be a good idea. I could provide a list for that.

S: Also, on the Overview page, I see that there's no mention of the total number of hours covered. I would definitely like that information to be there every time I check the app to see my progress.

I: Noted. Would you say that the input is convenient and easy on the Task page of the app?

S: It is much better than the paper submission. Yes.

S: But I think if I had to enter a lot of data, I would like to do it on a computer. That would be much more convenient.

I: Would you use the laptop more or just as much to submit the activity information?

S: Yeah, if that was available, I would mostly use the computer for long submissions and the app more to check my progress and keep track of my hours. Would that be possible?

I: Yeah, I think we can consider the options. On the settings page, is the information clear to understand?

S: What is this "Contact Details" button?

I: The person's phone number.

S: Oh, this isn't too clear to understand. Could you change that title?

I: Sure.

RH: I have a question, how will I view the student reports?

I: The reports will be generated from the database and sent to you via email. Will that work?

RH: That would be fine, but is there any way I can see this Overview for the student's profile?

I: Yeah, we can include the graph in the student's progress report. But what did you have in mind?

RH: I was thinking if I could access the app like the students, I could view it on the app itself. That would be very convenient to use to view the details. I could also instantly send through a comment about the student's progress if I had it on an app.

I: Okay, we'll look into this. Any other suggestions about the app?

S: No, I think that's about it.

RH: Yes, that's all for now.

4.2. Interview #2

The second interview was conducted with Dr. Hoffman, Sidney and Johnathan Gunnell, Manager of Online Programs at University of Pittsburgh

I – Interviewer

S – Sidney

RH – Dr. Hoffman

JG – Johnathan Gunnell

I: From the input collected from our discussion in the last meeting, we have decided to add a version of our app for the administrator. So Rose will be getting a slightly different version of the app which she can log into with her credentials and she can view the student reports. We will be discussing the specifics of that along with the current NurseTrac App review today.

I: Dr. Hoffman, would you require weekly, monthly or semester reports to show to the board of certification?

RH: Only semester reports will be needed. It would be ideal if a student report was sent to me when the students finish their 60 hours.

I: Okay. On the app, however, would you still want to see the weekly and monthly progress on the Overview tab?

RH: Yes, that would be helpful. That way I can send comments to the students based on their current performance as feedback. If possible, I would also like to see a graph with average of

hours being covered for each essential, so I can understand which isn't being worked on as much as the rest.

I: Okay, since you will be creating the user account for the students, would you want an option to do this on the app?

RH: Yes, that would be helpful.

JG: I see that the "Select Week" option in the Overview page is in the bottom, could you move that above the graph? This is a little confusing otherwise.

S: Yeah, I agree, I would want better access to that option.

S: Also, here on the graph, I don't understand what the initials stand. Will I have to cross-reference it to the Task page every time?

I: No, we'll look into changing that. Any other feedback?

S: That's about it.

5. Analysis

We conducted interviews with a student of the nursing program and the Administrator (Transcript: Section 4.1), focusing on the use of the information sources from the “real” end users. The goal of the interview was to get feedback about the user interface and to note down the necessary changes to be made which would make the interface more user friendly. After the completion of the interview we understood the shortcomings of the interface and there were certain changes which were to be made.

Feedback obtained from the student:

- Add the maximum number of hours for the program
- Application should be functional on the laptop.
- Change title in the Profile section from “Contact Details” to “Phone Number” for easier understanding.

Feedback obtained from the Administrator:

- The administrator wanted a faster and a convenient way to access the reports and to see the status of the students working in the program, hence we decided to create an administrator profile in the NurseTrac application which would include each student’s profile, along with their current progress.
- Complete student report to be generated once the number of hours are complete (60 hrs).

After taking into consideration and updating some of the changes that were to be given to us by the student and the administrator, we conducted the second interview. The student and the administrator were asked to review the changes that were made. In addition, the Manager of Online Programs at University of Pittsburgh was also present. (Transcript: Section 4.2)

Feedback obtained from the student:

- On the overview page, the user wanted to know what each essential stood for.
- Other than that, the student liked the user interface and there were no further changes to be made.

Feedback obtained from the Administrator:

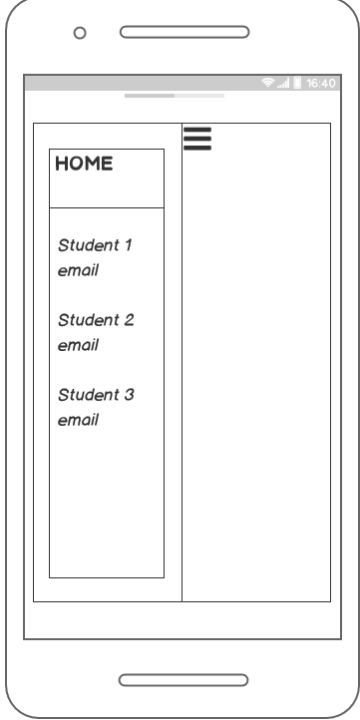
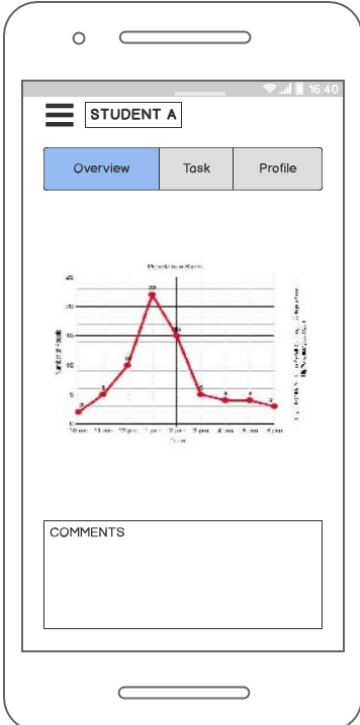
- The details about the administrator version of the app were provided by the administrator.

Feedback from the Manager of Online Programs:

- Shift in position of a component on the Overview page.

6. Updated Solution

The primary change to the entire system being created was the addition of the Administrator version of the app. This way the administrator gets frequent updates on the student's progress, and the students get fast feedback. This helps meet the situation of concern.

	<ul style="list-style-type: none">• The primary interface consists of 3 tabs, 'Overview', 'Task', and 'Profile'. In addition to this, a slider menu is present on the right side of the app.• The slider menu allows the Administrator to view different student profiles and the data that each student has uploaded.• The "Home" button shows, on the Overview page, an average graph of the essentials covered by all the students in the program.
	<ul style="list-style-type: none">• The Overview page shows the data entered for the entire semester so far by the students.• The Administrator can view this data for each student by selecting the right student profile.• She also has the option of adding a comment on their performance, which will be sent to their email on the account linked to their profile.

STUDENT A

Overview Task Profile

Date-----
EmailID:-----
T.A.:-----
Description:--

COMMENTS

- The task page shows blocks of the generated form filled out by the student with the date, email ID, number of hours, Target Activity, and its description
- The administrator can also input a comment on this section. The comment will be sent to the student via email.

STUDENT A

Overview Task Profile

ADMIN:

Contact No: (Editable)

List of Current Students

+ ADD

- The Profile page shows the Admin name and contact number that will be shown on the student apps.
- The contact number can be edited by the Administrator.
- A list of current students involved is present on this page, along with an “Add” button to allow the Administrator to create a new student profile.

In addition to this, the changes proposed to the student version of the app has been presented in a demo video: <https://www.youtube.com/watch?v=i8zmGf2OvGY&feature=youtu.be>

7. References

Table 7.1: List of Essentials Included

1	Background for Practice
2	Organizational and Systems Leadership
3	Quality Improvement and Safety
4	Translating and Integrating Scholarship into Practice
5	Informatics and Healthcare Technologies
6	Health Policy and Advocacy
7	Interprofessional Collaboration for Improving Patient and Population Health Outcomes
8	Clinical Prevention and Population Health for Improving Health
9	Master's-Level Nursing Practice

Table 7.2: List of Target Activities

1	Interview a member of quality improvement department.
2	Meet with member of risk management team.
3	Review quality reports and metrics.
4	Evaluate your competence with informatics.
5	Speak with nurse informaticist, system analyst, or IT department regarding the reports.
6	Identify types of clinical decision support (CDS).
7	Conduct a journal club to critically appraise the research evidence.
8	Meet with nursing leadership to write an EBP vision statement.
9	Meet with nursing leadership to discuss practice issues.
10	Meet with nursing administrators to identify barriers to healthy follow-up care.
11	Develop a communication plan that addresses the needs of key stakeholders in relation to the CNL role.
12	Attend a new employee orientation session with senior leadership focusing on mission, values, and expectations from staff.
13	Analyze data and infection control principles in collaboration with the with the infectious disease coordinator.

14	Review preparedness plans with the disaster management team.
15	Conduct a microsystem analysis using a quality improvement process.
16	Assess human and physical resource, perform a gap analysis, and communicate needs to stakeholders.
17	Identify a gap in care for at-risk population, compare existing to best practices, lead a practice change, and evaluate the impact.
18	Present recommendations for change to appropriate audiences.
19	Communicate ideas regarding a practice issue or proposed policy change in an informal setting.
20	Use patient information system data, assess data, design and implement a change in patient care.
21	Evaluate practices and outcomes of care for potential cost savings; Use graphics to present idea to interdisciplinary team.
22	Conduct an assessment of a patient cohort with complex health problems, identify needs, and develop plans to improve patient outcomes.
23	Conduct a health education class for a patient or staff cohort and evaluate the class.
24	OTHER (Editable Text Option)