Objective Assessment of Patient Portal Requirements

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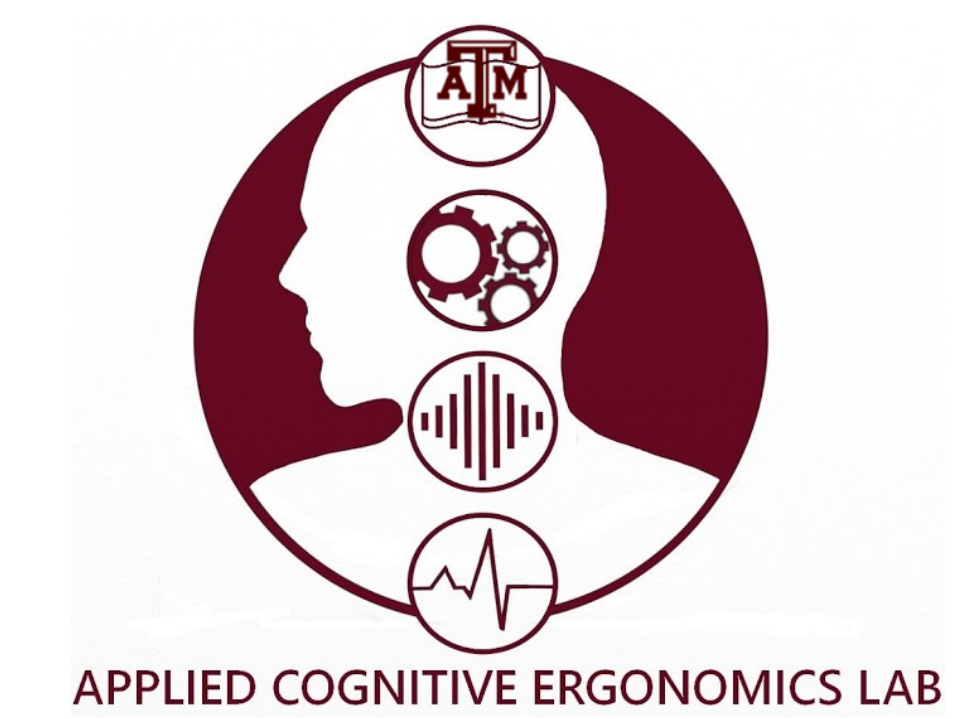
1. Background

A patient portal is a secure online interface that provides patients with convenient access to personal health information at any time. The system may incorporate lab results, prescriptions, medications and so forth. Additionally, this interface can be utilized as a way to communicate with the health care provider, schedule appointments and record health documents.

Top three vendors used by hospitals are:
1. Cerner Corp.- Cerner Patient Portal
2. MEDITECH- Patient Portal
3. Epic Systems Corp.- MyChart (Fig. below)
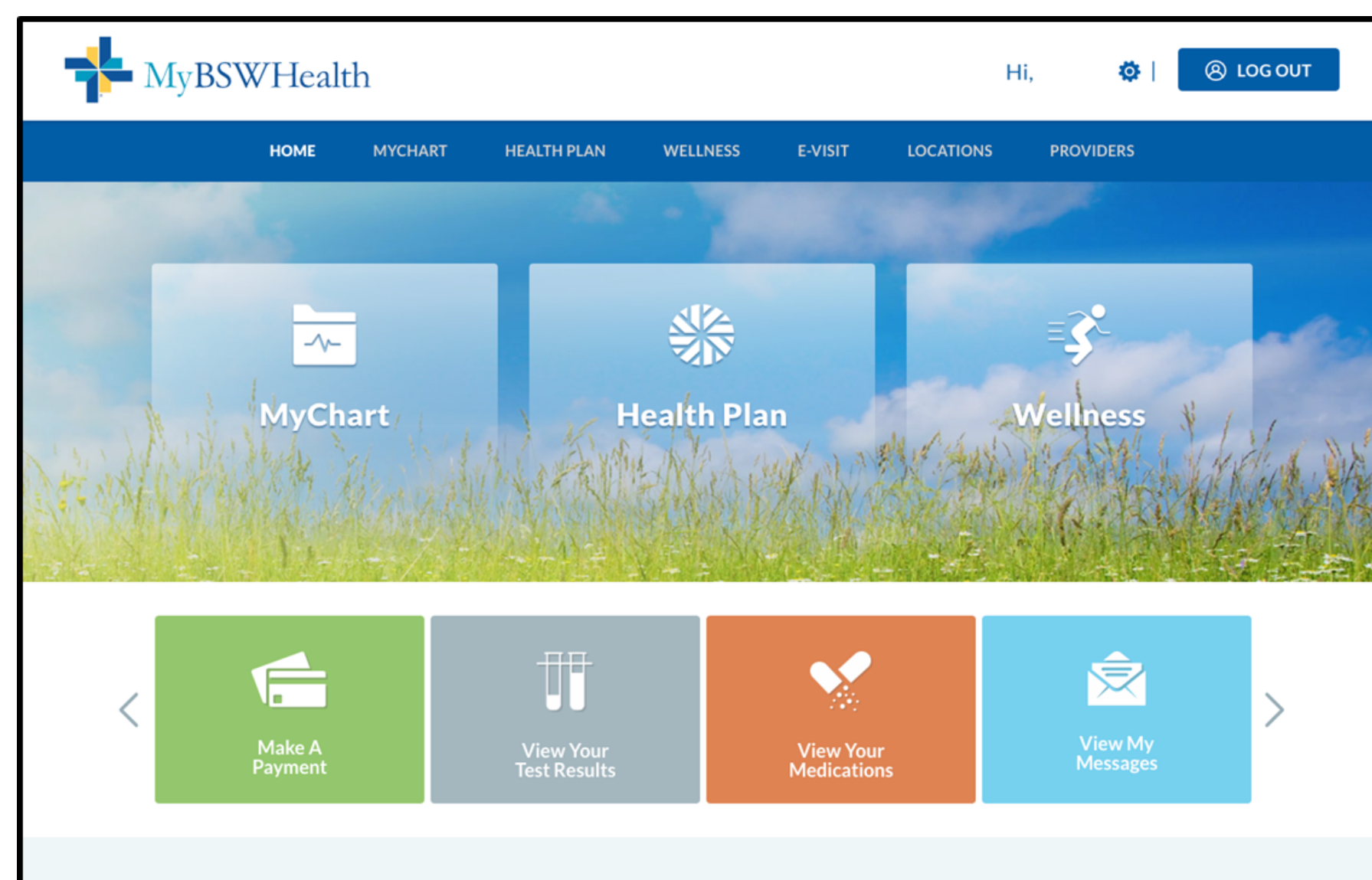
Problem: While there seems to be an increase over the last decade in patient activation of individual portal accounts, less than half of patients repeatedly utilize its functions. It is not clear if a user-centered design was utilized to design the current patient portals (Alpert, Krist, Aycock & Kreps, 2016)

❖ Texting patients can increase medication adherence for chronic disease patients from 50% to 67.8%, or a 17.8% overall increase.
❖ Patients in their 60s show no difference in their adoption rate for portal accounts when compared to patients in their 30s through 50s, and patients in their 20% and 70s have a similar portal registration rate.
❖ Patient diagnosis and medications inherently use medical terminology which is unfamiliar to the average user creating a barrier to fully utilizing this system function.
❖ One reason may be a lack in functionality that users expect from such a system.

2. Research Aims

Derive functional and information requirements to inform the design of a usable, efficient, and interactive Patient Portal

3. Methods & Results

Driving Functional Information Requirements based on Literature Reviews and Patient Interviews

Systematic Review of Literature
- A systematic literature review was conducted to investigate the factors that need to be considered in the design of a patient portal system to improve usability. OvidMedline, PubMed, Cochrane and Google Scholar were used and returned **2043** articles. After filtering, **27** articles remained related to patient's use of tethered personal electronic medical record systems. Only paper written in English were included.
- **Findings:** Three themes in literature were found: *software user interface* (usability), *comprehension of information delivered*, and thirdly, studies on the *patient participation*.

Patient Interviews
- User-centered, semi-structured and prospective interviews were conducted.
- 10 participants from Texas A&M community were asked questions about the *prevalence of the usage*, *context of the usage* and *users' expectations* in terms of functionality of patient portals. The participants mean age was 34 and the standard deviation was 14.
- **Findings:** 70% of participants did not know what patient portal is. 80% of participants wanted to be able to make appointments and see their future appointments. 70% of participants wanted to be able to see their lab results and prescriptions.

Functional Information Requirement
- FIR is a method to derive an objective set of information requirements for an interface in terms of **feedback** from the system and **input** from the user.
- High-Level functions are decomposed into lower-level functions which encompass more specific tasks. Information requirements are then derived from low-level functions and represent information as expected by users. N
- **Findings:** Nine high level functions were found, 4 of them are included in the table. The remaining 5 functions are: *Accessing information*, *uploading documents*, *making payments*, *get notifications* and *providing help*.

High Level Functions	Low Level Functions	Information Requirements
Communicate with the clinic	Texting Option	Patient's contact number
	Online messaging system-Chatting Option	Ask questions path (Emergency/Regular)
	Online messaging system-Emailing Option	Patient's Email address
	Online messaging system-Recording Audios	Audios input path
	Calls to and from Hospital	Hospital's phone numbers
	Patient-provided Feedback regarding system	Patient's feedbacks
Scheduling	Choosing healthcare provider	List of available healthcare providers
	Being able to choose health care location (if possible)	List of healthcare location
	Designating type of appointment	Type of appointment--> Test/ Doctor/Emergency/regular
	Choosing time and date	Appointment verification-Preferred time Appointment verification-Preferred Date
	Choosing doctor	List of doctors' names with their Professional degree and times and dates of their availability.
Document and Access Medical History	Accessing results	Test, lab Results/diagnostic results so far Medical Terminology Interpretation of lab results
	Appointments history/view appointments	List of new appointments Appointments so far
	Viewing medicines	Medicine taken so far Some sort of protocol to follow if the patient has medication
	Viewing records History	Surgeries so far
	Viewing treatments	Actions to take to ease symptoms Any suggestion from the physician
	Connecting to Other Patient Portals (being able to merge medical history from multiple providers)	Merge different patient portals path Patient log in information Policies
Security (provide a secure system)	Viewing confidential documents	A note from the hospital that shows the information will be confidential. Privacy Policy A consent form to sign
	Updating the website	Last update date (Website update)

4. Future Work

- The information functional requirements derived from user input are user-centered and design independent. This systematically-derived set of requirements can inform future design and improvements to existing patient portal systems. Another benefit of the FIR method is identification of information required as an input to the system and an output to the user. Each piece of information relates to a function that the system must provide.

Limitations:
The major limitation of this study was the small sample size. 10 participants were recruited for interviews. While larger sample can provide a wider range of responses and repeatable results, the results were saturated after the sixth interview and similar answers were given.

What is the next step?
- The work is in progress to compare several patient portals for large hospitals in Texas with the derived information requirements to identify opportunities for improving user interaction. Information in an actual patient portal should be compatible with these derived requirements to meet user expectations. Future studies include heuristics analysis and usability testing of existing patient portal systems to ensure user expectations are met. Heuristics analysis will evaluate features of existing systems against established principles. This evaluation can also include comparison of existing functions to those derived in this study. These results could inform design changes, which can then be evaluated by usability testing. The goal is to establish requirements of a patient portal system to meet user needs.

Functional Information Requirements Analysis — Compare — Evaluate — Redesign — Usability Testing