Design Project: Patient Portal Evaluation

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Preamble

Engelbert Humperdinck Community Hospital (EHCH) is seeking to modify its patient portal based on feedback from patients. The idea of a patient portal has been around for some time, however, in the United States, it has yet to reach full adoption from the patient side. There are a variety of factors that can explain such a phenomenon. Thus, we are pitching this evaluation study to investigate what aspect of the patient portal should be modified.

Research Questions:

1. To what extent does health literacy affect completing certain tasks on the patient portal platform?
2. Are there any differences in perceived improvement needed of YourView before low literacy users receive an educational module and after they receive it?
3. Does YourView provide reasonable accommodations to patients with certain conditions or disabilities?

Overall Study Architecture For Study Question 1:

For this study design, we are asking patients, residents, and physicians to come in person to complete a YourView Task Assessment. The YourView Task Assessment will be a computer simulation built by a combination of research team members, clinical staff, and YourView developers. This will entail each participant to complete a specific task on the YourView patient portal. Participants will login into a fake patient portal account with fake information. The study participants will be asked to complete the following tasks successfully:

1. Check for allergies

2. Check Test results (examples: blood tests, X-rays)

3. Check Immunization records (a record of vaccines you have received)

4. Check Medications List

5. Check list of doctors visited the past year

6. Check family history for a specified health problem

7. Check for current Medical problems

8. Check for Medical visits, surgeries, and medical procedures the patient had in the past year

9. Check for a specific lifestyle choice (example: exercise, smoking history)

10. Request medical appointments,

11. Request referrals to other doctors,

12. Request prescription refills

Specification of Independent Variable and Dependent for Study Question 1:

The 4 discrete-independent variables are high literacy patients, low literacy patients, residents, and licensed practitioners. The 2 continuous-dependent variables are the time and number of clicks it took for each group to complete the YourView Task Assessment.

Assignments of Subjects to Groups For Study Question 1:

Once the patient population has been identified, we plan to send out an interest form and health literacy self-screening survey. This well-established screening tool will divide up the study population into a high literacy group and a low literacy group. A secondary recruitment approach can include using the

EHR system to alert the clinical staff of eligible patients in their next appointment. An interest form will be sent out to residents and doctors of EHCH but no health literacy screening will be collected from them. We will enroll EHCH into 4 groups into the first part of the evaluation study that includes task completion assessment of the current YourView version. Group A consists of patients who were screened as high literacy. Group B will consist of residents in EHCH and Group C will consist of Licensed Practitioners. Lastly Group D will include patients who screened as low literacy. Proper sampling size would be discussed with a statistician.

Control Strategies For Study Question 1

A potential bias to consider for is recruitment bias. More specifically, the patients, residents, and doctors we would recruit for could come from only certain departments in the hospital system which can represent a systematic unmeasured difference that can influence participants prior experience of YourView Patient portal. For that reason, we would want to employ a method of random sampling so that we can have a representative sample of the many different departments of the hospital system.

Methodology For Study Question 1:

The brief health literacy screen (BHLS), a subjective health literacy screening measure includes 3 Likert-scale questions addressing one's confidence completing medical forms, reading hospital materials, and understanding written health information (Irizary, etal., 2017). We are measuring experience navigating the YourView portal by the number of clicks and time it takes to complete a task. We do not feel that any measurement for this study question does not need validity planning.

Selection of Subjects For Study Question 1:

At the beginning we will collect information through the Electronic Health Record (EHR) that EHCH has for their patients. However, there will be some minimum eligibility requirements that will be scoped out on the EHR system.

1. Has an active account of YourView.
2. Patients over the age of 18
3. Has had at least 2 appointments in the past year with EHCH
4. Speaks English

Patients that would be excluded from this portion of the study would be any patients with severe chronic illness or disabilities that require special accommodations or assistance with the patient portal.

As a secondary recruitment, an approach can include using the EHR system to alert the clinical staff of eligible patients in their next appointment.

Data Collection For Study Question 1:

The data collection will be automated through the computer simulation program where it will record both time and number of clicks it takes to complete each task. Data on performance will be linked to a de-identified participation code. Additionally, through the electronic health record, we would collect demographic information to control for variables in our data analysis.

Data Analysis For Study Question 1:

Since our independent variable is discrete and our dependent variable is continuous, we would be interested in conducting ANOVA statistical analysis. Specifically, we would want to check if there is a statistically significant difference between mean clicks and mean time it takes to complete the tasks on the YourView Task Assessment. Because we would have collected demographics data on the participants, we would control for sex, age, race, and other factors. Depending on the results, we can attribute in part some of the patient's complaints with YourView portal to heal literacy. For example, we can potentially see that Doctors have better performance than patients and it can be since doctors typically have more experience with health technology and have a higher level of health literacy. Should there be no significant difference between the 4 groups, that will also be informative because it may suggest how to modify the YourView patient portal. Regardless of results, we are hoping to establish a health literacy baseline of the patient population.

Overall Study Architecture For Study Question 2:

We will be employing an objectivist comparative study to answer study question 2. Once low literacy users complete the first YourView Task Assessment, they will be asked to complete a survey that will inform researchers which YourView features need improvement. These same users will be asked to go through an educational module informing them how to navigate the patient portal. Next, the study participants will be asked to complete the YourView Task Assessment again and fill out the same survey again.

Specification of Independent Variable and Dependent for Study Question 2:

In this proposed study design, we are identifying the independent variable (or predictor variable) to be whether or not (time) that low literacy users have taken the educational module of YourView or not.

The dependent variable are the responses they made on surveys on which patient portal features need improvement.

Assignments of Subjects to Groups For Study Question 2:

There is an assignment to groups only for the purpose of data analysis. Specifically, the study population will be divided by the group before being exposed to educational modules and then after the educational modules. Proper sampling size would be discussed with a statistician.

Control Strategies For Study Question 2:

A bias to control for is the second look bias. This arises because low literacy participants will take the patient portal task assessment twice. For that reason, we would assure the timeline between the two assessments will be at least 3 months and different scenarios will be used to complete each specific task. Additionally, we will be asking every participant to complete the educational module a week before their second YourView Task Assessment appointment so we can limit the variability of the timeframe of exposure from the educational module and the second assessment. Lastly, we would want to control for YourView patient portal activity outside the study. Thus, for the purpose of data analysis we want to consult a statistician how to consider that factor.

Methodology For Study Question 2:

The dominant facet here in this measurement process are items which specifically include the different questions on the questionnaires that are trying to assess which patient portal features need to improve. We plan to use a well-established questionnaire that originally was used on a Flemish population (Van den Bulck, et al., 2018.) Since the patient portal survey was used on a considerably different patient population and we plan to use a subset of the survey, we are hoping to conduct a validation process. Specifically, we are interested in pursuing a criteria-related validation. This would include the research team to get involved using a representative sample similar to the medical practice of interest. Once we have used this instrument on the representative sample, we would want to compare results to other studies that used the same questionnaire. Should we need to adjust the question, we can cater the questions to the specific functionalities that the patient portal has as opposed to the conceptual framework of what a patient portal can have as the researchers explored in the previously mentioned study. To measure our dependent variable we will be using responses the following survey:

Please indicate how strongly you agree or disagree with the following statement for the following items: This feature of YourView Needs Improvement

O Strongly agree   O Agree   O Neutral

              O Disagree   O Strongly disagree   O N/A

O My allergies

O Test results (examples: blood tests, X-rays)

O Immunization records (a record of vaccines you have received)

O Medications I have taken or am currently taking

O List of doctors and healthcare providers I have seen

O Family history of health problems

O Medical problems

O Medical visits, surgeries, and medical procedures that I have had

O Lifestyle choices (example: exercise, smoking history)

O Information from devices that help me monitor my health (example: glucose from a diabetes meter)

O Request medical appointments,

O Request referrals to other doctors,

O Request prescription refills

Selection of Subjects For Study Question 2 :

There are two criteria to be enrolled in this part of the study. The first is to have completed the YourView Task Assessment once. The second one is to be coded as a low literacy patient.

Details on the Educational Module:

The educational module will be another computer simulation that has a follow along component. Users will be guided by a prerecorded tutor that will demonstrate how to accomplish a certain task. Afterwards the users will be asked to complete the same task but another a different scenario. Users can only move forward once they completed each task successfully. Once the education module is completed the research team will be automatically notified.

Data Collection For Study Question 2 :

For the purpose of research question 2, sample size has yet to be determined but will require the most when compared to the other aims. However, we would want our study population to be as representative of the patient population as possible. Thus, the sample size would be in relation to the total amount of patients that go to EHCH. We will consult with a statistician to estimate the number of participants we would need to perform this study. We only plan for the recruitment of this survey to be about 5 months and leave the rest the evaluation period to data analysis. Once patients have expressed interest to join the study, they can choose to fill the survey online or fill a paper survey. Data collection on completed web surveys will be automated while paper surveys will be manually entered in a database. Lastly, we want to collect YourView patient portal activity through the EHR system to check any requests or communications that participants may have done outside of the study.

Data Analysis For Study Question 2 :

For the purpose of data analysis, we would run a combination of descriptive statistics and statistical models. For descriptive statistics we will show how patients are represented across sex, employment status, education, income, internet use, medication history, and self-reported health. As mentioned previously, we would be interested in conducting statistical modules. We will consult with a statistician on how to tune the models for best accuracies, how to address missing data in the data set, and discuss any assumptions that go into the models. The statistical models most likely we will use are chi-squares analyses that will determine any differences before and after when the low literacy patients have been exposed to the educational modules. The results of this analysis will help us answer our second question. Specifically, if the responses are similar before and after the educational modules, we can assume that a change in the patient portal might be needed to change. In contrast, if we notice less YourView's features needs to be improved on, the second survey may suggest the educational modules were effective and less suggestive that the patient portal interface needs to change.

Overall Study Architecture For Study Question 3:

The rationale for a qualitative study is to capture information that may be missed from a standardized quantitative instrument for a niche patient population. We will be employing the principle of qualitative objectivity that is central to subjectivist work and knowledge to answer question 3. The selected patients will be asked a number of questions regarding their experience with YourView portal and thereby identifying the potential barriers of the portal.

Specification of Independent Variable and Dependent for Study Question 3:

Considering the fact that a qualitative study has no specific independent and dependent variables we would mainly rely on the genuineness of the information given by the patient himself/herself and would validate it with the work experience and understanding of the Specialist practitioner in the field of medicine and informatics.

Control Strategies For Study Question 3:

Given the aim we plan to choose the patients with special needs. We plan to identify these patients from the EHR records mentioning disabilities such as neural disorders (parkinson's disease, partial paralysis, etc) and compromised vision (color blindness, partial blindness etc). The patients will be chosen at random and an important prerequisite is that the patients need to be using the patient portal for a satisfactory amount of time and are moderately knowledgeable about technology. The potential bias for this area is confirmation bias stemming from question design.

Methodology For Study Question 3:

All participants will be informed about the purpose of the study, and participation will be voluntary. Verbal consent for audio recording the interviews will be obtained for every participant. A week prior to the interview, each participant received a confirmation email suggesting a scheduled date and time. A document was attached describing the objectives of the study and a topic list for the interview along with the written consent forms which are to be signed and brought with themselves at the time of interview. The design of the interview is in the appendix. In addition to the interviews, we are interested in completing an observation of the patient navigating through the patient portal. This part of the interview will be led mainly by what the patients want to inform us about. We would be interested in collecting screen shots of the patient portal web page.

Selection of Subjects For Study Question 3:

The sample size of the study is decided upon the potential participant pool obtained after the patients with special needs are filtered out from the interest and health literacy screening.. We plan to filter out the patient population that specifically suffers from neural disorders like partial/near complete paralysis, parkinson's disease, color blindness, partial/near complete blindness etc. Once this patient population is chosen the next filtration criteria would be to filter out the ones using the patient portal for at least 6 months or more. We will then choose 5 practitioners at EHCH who have sufficient understanding of the study and sufficient experience with special patients and therefore can collect information efficiently and accurately. Agreement of the practitioners to be a part of the study is imperative.

After highlighting the regularly visiting special needs patients each of the chosen practitioners will choose 5 patients with special needs who have been regularly visiting them. With the idea of a doctor-patient relationship, these doctors would understand their chosen patient's needs and behavior better. We feel having the doctors perform the interviews would be helpful in gathering reliable information. We like to point out that qualitative studies usually take an iterative approach. For that reason, our plans are subject to change in response to observations and information gathered.

Data Collection For Study Question 3:

The interviews will be recorded by the interviewer with the consent of the interviewee. The interview transcripts will then be transcribed into written documents using transcribing softwares like AmberScript. Any specific issues pointed out by the interviewee on the portal during the interview would be screenshot and tagged with the interviewee id. These documents will then be stored in the Mbox platform with each interviewee having their own folder of interview transcript, voice recording of the interview and the screenshots from the YourView portal displaying particular barriers.

Data Analysis For Study Question 3:

We used a semistructured interview that was structured by applying the comprehensive model of Grol and Wensing that summarizes the barriers to and facilitators of change in health care practice (Grol and Wensing, 2004)This model describes 6 levels at which barriers and facilitators can occur: (1) innovation: patient portal; (2) individual professional; (3) patient; (4) social context; (5) organizational context; and (6) economic and political context. From these 6 levels, we chose to synthesize the interview questions around the first two levels.

The interviews will then be coded into different themes by the 5 practitioners themselves in Excel that reflected a barrier to or facilitator of portal implementation according to the model of Grol and Wensing. If quotes did not fit into the Grol and Wensing model (Grol and Wensing, 2004) we looked for categories from the McGinn model (McGinn, etal., 2011). After the interviews have been coded the analysis will be carried out by a specialist practitioner who is not related to the study and has sound understanding and knowledge of both the clinical practice and consumer health informatics. By this principle of qualitative objectivity that is central to subjectivist work and knowledge we have our reliability variable for the measurement.

Additionally, we would be interested in using some of the screen shots collected on the patient portal as part of our artifact analysis. Any personal health information will be redacted for the privacy of the patients.

One observer is not to be trusted. By contrast, the principle of *qualitative objectivity* is central to subjectivist work. It holds that an experienced, unbiased observer is capable of making fundamentally truthful observations that may, in fact, be superior to those of a panel of observers who agree but are all wrong because of some bias they share. In this light, subjectivist approaches can be seen to be as objective (i.e., truthful) as objectivist studies. They rely, however, on a different definition of objectivity (Friedman and Wyat, 2006).

Challenges to Consider

When it comes to evaluation studies, it is important to highlight the challenges we can anticipate and how we plan to address them. For the purpose of aim 3, there can be concern of absence of patients that fit the selection criteria. In such scenarios, we would try to ease the selection criteria. We will allow selecting patients who show low technological literacy. Also, upon coding and analysis one might find that some of the text fragments might not fall under the Grol and Wensing mode (Grol and Wensing, 2004) or the McGinn model (McGinn, etal., 2011). In this case we would like to have a theme/code for the "outside the box" text fragments and have them analyzed accordingly.

For the purposes of study question 2 there is a concern of missing data when it comes to some of our intended statistical models that we want to produce. Since we would have the option of a paper version of the survey, there might be a bias towards participants who completed the web version. Thus, under the advice of the statistician, we will consult best methods on how to deal with missing data to minimize bias. Telemedicine access has increased during the coronavirus pandemic as federal and state governments and private insurers relax restrictions, yet issues surrounding virtual care continue to restrict its use for some (Institute of Medicne, 2014). We see this as a potential challenge for participation and data collection, however lack of broadband services in certain regions of the city can be a factor. Significant gaps in access to broadband remain, particularly among rural and underserved populations. Access to broadband is necessary for communities and individuals who require education and training from our studies. As most of the major health care providers move into a national system, licensure is becoming a bigger barrier. Practice regulations may be an even larger barrier than licensure, as many state medical boards require an in-person consultation before initiation of any telemedicine services. Finally, applications of telehealth training have a lot of potential, but may not be embraced by traditional

health care providers or patients in this study. We plan to address these concerns by screening for qualifying participants who agree they have access to broadband internet and applicable computer systems for the duration of the study.

Assumptions

In study architecture we make a bold assumption that we have established communication with the various ongoing initiatives throughout EHCH's department of research. We assume this entity 1) exists geographically and 2) will produce participants for the study. An alternative approach to subject location would be necessary otherwise. We also assume patients are more likely to return to EHCH for follow-ups and well-being visits since their pre-paid plan covers the nominal fee required for EHCH office visits. 3) We assumed the list of patient portal features actually exist on YourView. 4) Timeline allows for development of a survey and an educational module. 5) We would have permission to use the EHR system. 6) A substantial amount of low literacy users would not drop out of the study when being assessed a second time. 7) EHR system collects patient portal activity 8)Patients will be comfortable to take screenshots 9) Doctors recruited for study question 3 will have the type of relationship with patients we discussed before. 10) The conceptual model we presented to collect barrier and facilitators information is the optimal approach. It can turn out that a different theoretical framework is needed.

Appendix

The design of the semi-structured interview for study question 3 is as follows:

Topic list

Setting/context	Interviewer	- Introduces herself/himself. - Explains the purpose of the interview. - Ask patient introduction.
	Patient	- Introduces himself/herself.
	Interviewer	- When did you first use the patient portal? Reasons for use? Extent of use?
	Patient	- Brief description on when the timeframe of use of the portal. - Reasons and extent of use: Constraints/lack of knowledge/comfort?
General Question	Interviewer	- How would you describe your experience with the patient portal? - Negative/Neutral/Positive?
	Patient	- Negative Experience: Reasons? - Neutral Experience: Reasons? - Positive Experience: Reasons?

Focused questions based on experience	Interviewer	- **<u>Negative Experiences:</u>** What kind of barriers did you face? - **<u>Neutral Experiences:</u>** Did you happen to face any kind of barriers? - **<u>Positive Experiences:</u>** Did you happen to face/overcome any kind of barriers?
	Patient	- Navigation barriers - Accessibility barriers - Connectivity barriers - Privacy barriers
	Interviewer	- Any changes/updates/features that you would like to suggest for the patient portal?
	Patient	- Yes/No/Don't Know
	Interviewer	- Would you recommend keeping the tool(patient portal) or eliminate it? Why?
	Patient	- Yes/No - Reason?
End	Interviewer	- Is there anything you would like to add about your experience with the patient portal?
	Patient	- Description

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