Challenge:
### Enhancing Diabetes patients' medication adherence.

This project is focusing on enhancing patients' medication adherence by Web-based, Integrated Patient Education System.

Because Pharmaceutical treatment plays an essential role in Diabetes. If patients don't understand the medicines and dosages they take, their blood glucose control may be affected.
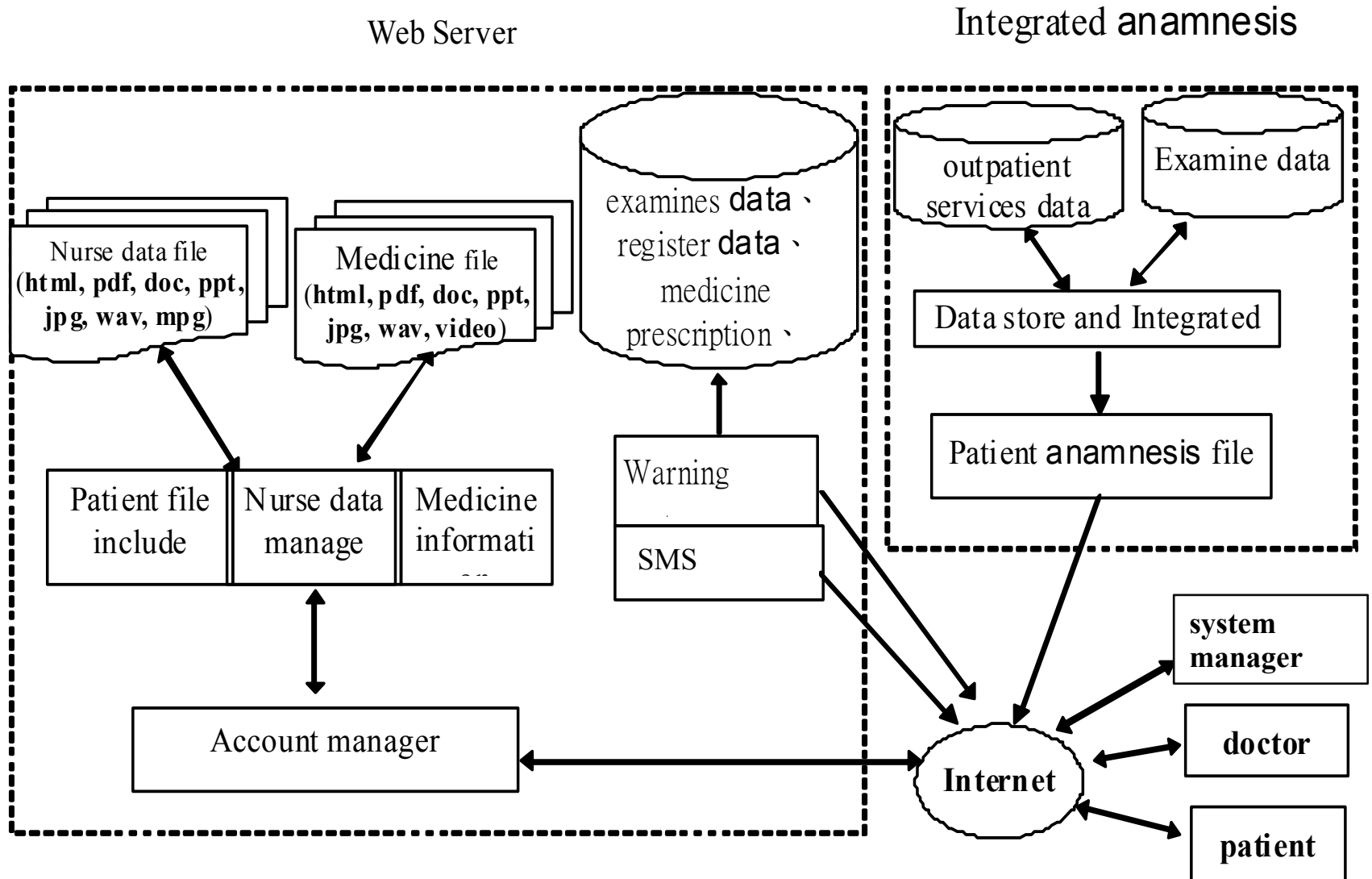
Action:

1. I ran a series of interviews with the staff and physicians at Department of Metabolism & Endocrinology to understand the treatment process and collect all medication information for what we need to built the knowledge database .

2. On-site observation for the patient's treatment ,reaction for medication information and complaint.

3. Design and draw the flowchart. Design the post- and pre-medication knowledge assessment and survey questionnaire.

4. Based on the requirements to choose the participates then randomly assigned them into experiment and control groups.
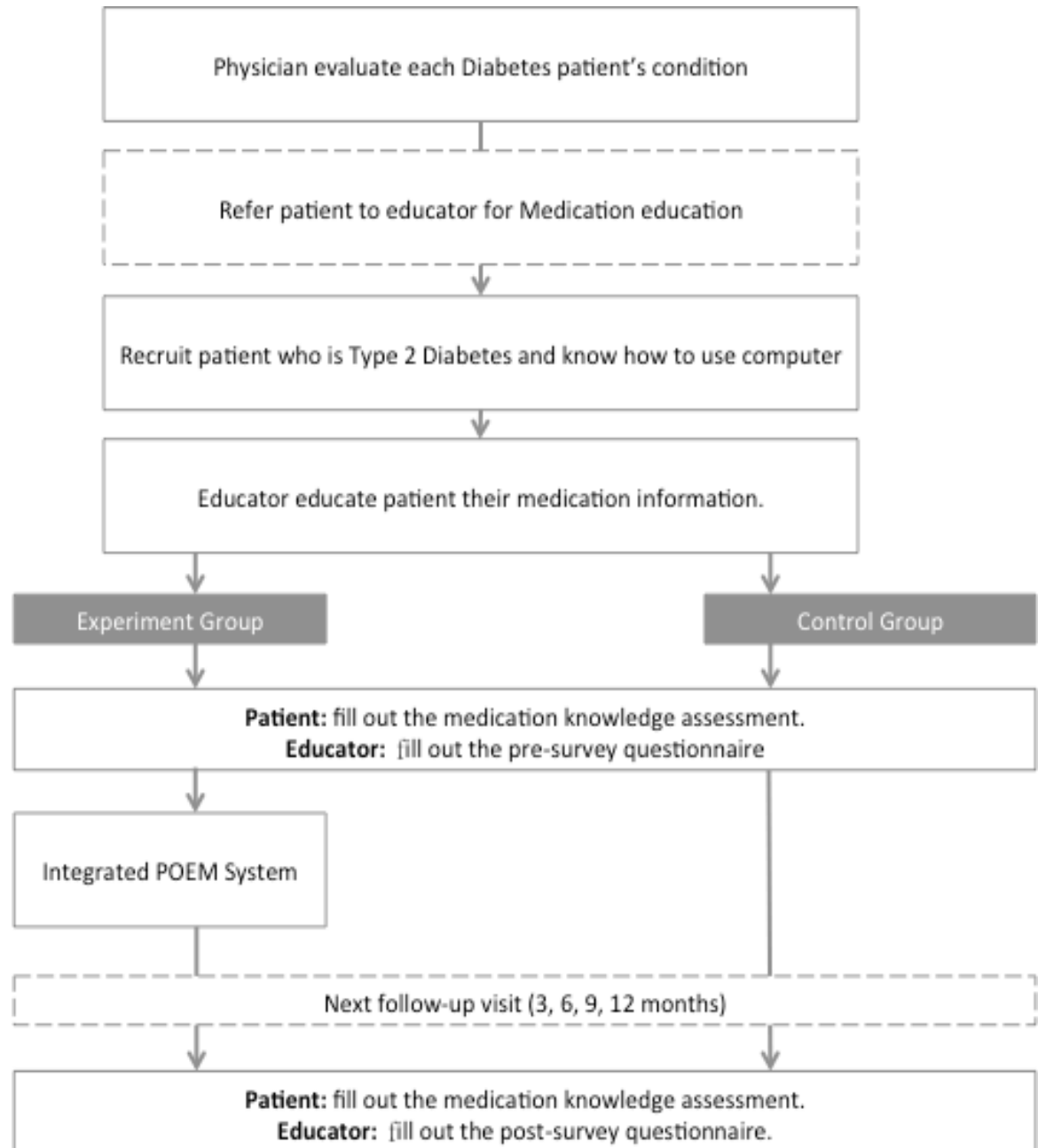
5. Develop and design integrated patient-oriented education management system. It contains a patient's demographical data, prescribed medicine, treatment, laboratory test results of fasting blood glucose and HbA1c, the required education list, the date of visit, and the date of next follow-up.

Web Server

Integrated anamnesis

Nurse data file
(html, pdf, doc, ppt, jpg, wav, mpg)

Medicine file
(html, pdf, doc, ppt, jpg, wav, video)

examines data、
register data、
medicine
prescription、

outpatient services data

Examine data

Data store and Integrated

Patient anamnesis file

Patient file include

Nurse data manage

Medicine informati

Warning

SMS

Account manager

Internet

system manager

doctor

patient

6. I created prototype and conducted iterative usability tests to fine-tune the system design and process flow.

Personalized on-line pharmaceutical education system

Lab result

7. Implement the application to let groups to use the system ,conduct the interview for each candidate face to face and answer the survey.

8. Follow up at 3, 6, and 12 months to observe user behavior. Collect the survey results and analyze the data from lab result and survey.

Statistics each page for login
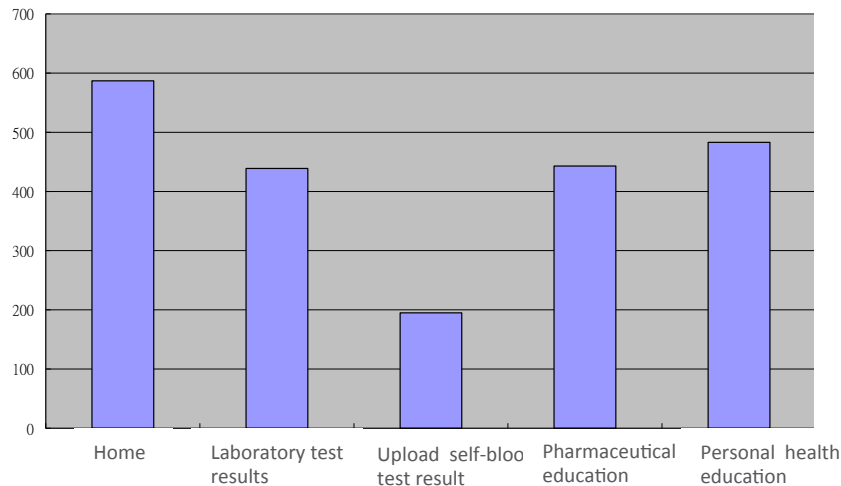
	Home	Laboratory test results	Upload self-blood test result	Pharmaceutical education	Personal health education

Survey

Result：
Data Analysis

Recruited 274 patients, 134 (57% males and 43% females) in the experiment group and 140 (46% males and 54% females) in the control group. Their characteristics are shown in Table 1.

I compared their laboratory test results including fasting blood glucose, HbA1c and total cholesterol level between the two groups from the pre-intervention to post-intervention periods, as shown in Table 2.

Table 1. The characteristics of the experiment and control groups

Characteristics	Experiment group	Control group	P
n	134	140	
Gender (M/F)	76/58 (57/43%)	64/76 (46/54 %)	
Age (years) average	65.97±8.51	61.15±12.67	0.01*
29 or below	10 (7.4 %)	3 (2.1%)	
30-39	10 (7.5 %)	3 (2.1 %)	
40-49	21 (15.7 %)	13 (9.3 %)	
50-59	46 (34.2 %)	41 (29.4 %)	
60-69	24 (18 %)	39 (27.9 %)	
70-79	19 (14.2 %)	37 (26.4 %)	
80 or above	4 (3 %)	4 (2.8 %)	
Diabetes Duration (years)	5.28 ± 4.70	7.01 ± 5.44	0.004*
Education			0.82
Illiterate	13 (9.8 %)	17 (12.1 %)	
Elementary school	43 (32 %)	38 (27.2 %)	
/Junior high school			
Senior high school	21 (15.7 %)	28 (20 %)	
College or University	52 (38.8 %)	54 (38.6 %)	
Master or PhD	5 (3.7 %)	3 (2.1 %)	
Fasting Blood Glucose (mg/dl)	187.54±77.10	189.99±73.49	0.81
HbA1C (%)	9.03±2.79	8.95±2.23	0.82
Total cholesterol(mg/dl)	193.29±47.93	202.52±58.45	0.21

There were no significant differences in education background and the results of the first laboratory test between the experiment and control group.

Table 2. The means of fellow-up laboratory Tests

Laboratory test	Group	N	Mean ± SD
Fasting Blood Glucose (mg/dl)	Experiment group	108	114.87± 46.98
	Control group	108	130.29 ± 42.31
HbA1C(%)	Experiment group	102	7.38±1.37
	Control group	108	8.03 ± 1.55
Total cholesterol level (mg/dl)	Experiment group	102	169.18±29.46
	Control group	108	180.50±38.95

Outcome：

The evaluation results showed that the results of both tests reflected that the patients in the experiment group had better control than those in the control group. The patient-oriented education management(POEM) system was able to help patients to better control their glucose levels and better manage their diabetes conditions. More importantly, the POEM system supports a routine hospital patient education service, and provides the service in an easy and inexpensive fashion to patients after they have left the hospital.

Upload self-blood test result

Medication information

Personal information

Lab result

History of office visit