Study on the Level of Acceptance of an Electronic Patient Record System in the Dialysis Unit of EHCC, Jaipur

By

Amisha Jain

Dissertation submitted in partial fulfillment of the requirements of the degree

MBA Hospital and Health Management

Academic year, 2018-2020

The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Sanganer, Airport
Jaipur 302029, Rajasthan
Ph: 0141 3924700, Fax: 3924738
Website: **www.iihmr.edu.in**

Study on the Level of Acceptance of an Electronic Patient Record System in the Dialysis Unit of EHCC, Jaipur

By

Amisha Jain

Dissertation submitted in partial fulfillment of award of

MBA Hospital and Health Management

Academic year, 2018-2020

Eternal Heart Care Centre (EHCC), Jaipur

The IIHMR University, Jaipur

1, Prabhu Dayal Marg, Sanganer, Airport
Jaipur 302029, Rajasthan
Ph: 0141 3924700, Fax: 3924738
Website: **www.iihmr.edu.in**

ETERNAL HOSPITAL

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Amisha Jain** has completed her internship at **"Eternal Hospital, Jaipur"** from **18th February 2020 to 12th March 2020** in the hospital premises and **13th March 2020 to 18th May 2020** work from home. .

During this period, Amisha came across as a willing, sincere and intelligent person with a strong drive and zeal for learning. She has successfully completed her project on **"Optimization of Dialysis Unit"** under the guidance of **Dr. Prerna Jain** in the **Department of Operations.**

During the period we found her obedient and hard working.

We wish her all the best for future endeavours.

For **ETERNAL HEART CARE CENTRE AND RESEARCH INSTITUTE, JAIPUR**

Ashok K Jeenwal
Head – HR & Training

ACKNOWLEDGEMENT

This report has been prepared for the dissertation internship that has been done in the Eternal Heart Care and Research Centre Jaipur, Rajasthan to fulfil the requirements of the course of MBA in Health and Hospital Management.

I would like to express my sincere gratitude to my internship coordinator

Dr Vikram Singh Chauhan (COO) has given his valuable time and given me a chance to learn something despite having a hectic schedule.

I am also thankful to **Mrs Prerna Jain** (Operations Department) and the staff members of the Dialysis Unit for their co-operative support, and for allowing me to have practical experience in this organization.

Thus, I have gained valuable work experience in EHCC, Hospital which will help me in my future career goals.

Most importantly, I would like to express my sincere gratitude to my guide, Dr Daya Krishan Mangal, Professor of Public Health, IIHMR University, Jaipur, without his support this could not have been possible.

Sincerely,

Amisha Jain

Place- Eternal Heart Care Research Centre, Jaipur.

TABLE OF CONTENTS

LIST OF TABLES/FIGURES

LIST OF ABBREVIATIONS

EHCC	Eternal Heart Care and Research Centre
EPRS	Electronic Patient Record System
PRS	Patient Record System
EMR	Electronic Medical Record
PU	Perceived Usefulness
PEOU	Perceived Ease Of Use
AT	Attitude

A Study on the level of acceptance of an Electronic Patient record system in the Dialysis unit of EHCC, Jaipur

STUDY BACKGROUND:

An important aspect of the care of renal patients is the regular monitoring and record keeping for proper scheduling. In the dialysis unit, technicians spend much time— perhaps as much as 30% of their time—recording information that could have been tracked effectively by machine, as well as organizing patient data to satisfy legitimate needs of patient care, of other healthcare providers, of continuous quality improvement, and of regulators. In EHCC hospital, the dialysis technicians maintain the records manually. In this scenario, manual records with its disadvantages like storage, lack of backup and security, time consuming and error prone, no clear audit trails and version history, resulted into improper scheduling, decrease patient satisfaction due to long waiting hours and less effective administrative management of the dialysis unit based on timely, complete knowledge of relevant information and decisions for optimization of dialysis unit. Keeping in view the benefits of the computerized patient record system the hospital has recently introduced into haemodialysis unit an Excel patient record system. The development of the Excel patient record system is supposed to provide Immediate access to the entire patient record in the dialysis. However, the introduction of an information system does not guarantee the better management of healthcare; they should be used willingly and effectively. Therefore, the present study examines the end-user's acceptance of the Electronic patient record (EPRS).

Electronic Patient Record System Acceptance Changing patient records from paper to an electronic system is not such a simple task. It not only involves important technological changes but also involves changes in work practices and behaviour of people associated with health care. The users of EPRS comprise patients and health care professionals including physicians and nurses. Several studies have investigated the behaviour and perceptions of these users toward EPRS, the findings of which can be used to analyse the level of acceptance of these systems.

LITERATURE REVIEW:

Authors	Title	Research Methodology	Result
Basiony Mohamed Basiony, Mahasen Ismael Abdel-Megid, Fatma Ahmed Abed (2018)	"Designing an Administrative System for Haemodialysis Unit at Beni-Suef University Hospital"	The study was conducted at haemodialysis unit in Beni-Suef university hospital. A descriptive methodological research design was utilized. Sample population- staff of haemodialysis unit; convenient sampling was used.	The study concluded that, there was no written administrative system for the haemodialysis unit at Beni-Suef university hospital. Majority of the participants reported absence of components of the administrative system and confirmed by auditing of the available documents in the unit. The study recommended that the proposed administrative system should be used in the haemodialysis unit at Beni-Suef university hospital.
Pi-Jung Hsieh (2015)	"Physicians' acceptance of electronic medical records exchange: An extension of the decomposed Theory of planned behavior (TPB) model with institutional trust and perceived risk."	191 respondents were involved in a field survey in Taiwan to gather information from doctors who had experience utilizing the EMR exchange systems.	The study findings show that the following five factors have a significant influence on the physicians' intentions to use EMR exchange systems: (a) attitude; (b) subjective norm; (c) perceived behavior control; (d) institutional trust; and (e) perceived risk. These five factors are predictable by perceived usefulness, perceived ease of use, and compatibility, interpersonal and governmental influence, facilitating conditions and self-efficacy, situational normality and structural assurance, and institutional trust, respectively.
Marie-Pierre Gagnon', El	"Electronic health record acceptance	The study was conducted among	A total of 157 questionnaires were

Kebir Ghandour[7], Pascaline Kengne Talla[7], David Simonyan[7], Gaston Godin[7], Michel Labrecque[7], Mathieu Ouimet[7], Michel Rousseau (2014)	by physicians: Testing an integrated theoretical model"	physician members of the Quebec Medical Association using Electronic questionnaire as data collection tool. Four theoretical models were tested (Psychosocial Model, Technology acceptance model (TAM), Extended TAM, and Integrated Model) to find the major factors of intent to use the EHR by physicians.	returned. The four models performed well and explained between 44% and 55% of the variance in physicians' intention to use the EHR. The Integrated model performed the best and showed that perceived ease of use, professional norm, social norm, and demonstrability of the results are the strongest predictors of physicians' intention to use the EHR.
Sheila M. H. Luk, Richard L.Holder, Zen a Rodrigues, Faisal Ahmed & Ian Murdoch (2019)	"How do paper and electronic records compare for completeness? A three-centre study"	Utilizing standards from the April 2009 National Institute for Health and Care Excellence (NICE) guidelines completeness of information was compared among EPR and paper notes in three units. Bedford Hospital (Moorfields Eye Center) and Western Eye Hospital utilize the Medisoft EPR. Moorfields Eye Hospital (City Road) utilizes the Openeyes EPR. The standard was set at 100% consistence for foreordained boundaries.	The results show that paper records are significantly more complete than EPR. This is the case for two different EPRs and three separate sites. The paper proposes additional training to aid data-collection; improving the design of EPRs by investigating factors such as layout and use of forced choice fields.

STUDY RATIONALE:

Recent developments in health informatics have elevated the significance of examining the implications of newly introduced information systems into the field of healthcare. Researchers have demonstrated an expanded enthusiasm for reviewing the utilization and impact of EPRS. The importance of examining the acceptance of EPRS among its end users has also been established. Keeping in view the importance of this subject, the study adds to the growing body of literature on the importance of training for the acceptance of EPRS by comparing the acceptance of the EPRS before and after necessary training provided to the staff member of the haemodialysis units. The Excel patient record maintenance system is a recently incorporated EPRS for haemodialysis patients records and it is important to determine whether the staff members of the haemodialysis have accepted and are ready to use it before its full implementation. The study is, therefore, a timely investigation into the acceptance of this system. The study, by reporting the bottlenecks in manual patient record system and difficulty in its management, establishes the importance of developing an electronic patient record maintenance system for recording and sharing data for complete knowledge of relevant information and decisions for optimization of a dialysis unit. The EPRS can be very helpful in this regard and findings from the study contribute to the evidence, which will determine if it is worth implementing full system.

RESEARCH QUESTIONS:

- What are the bottlenecks in the manual patient record system of the dialysis unit?
- Does proper training on usage of EPRS will increase the acceptability of it among the technicians and nurses of the dialysis unit?

OBJECTIVES:

- To find out the problem areas in the manual patient record-keeping system of the dialysis unit.
- To find out the effect of training on the level of acceptance of EPRS by the technicians and nurses of the dialysis unit.

RESEARCH METHODOLOGY:

- **Study design**- Non-Experimental, before and after study
- **Study type**- Qualitative type
- **Study location**- Dialysis unit of EHCC, Jaipur
- **Study duration**- 21 days
- **Study population**- Technicians and Nurses of the dialysis unit
- **Sampling**- 13
- **Sampling technique-** 100% sampling
- **Tool**- Questionnaire
- **Data collection**- Primary data through a survey
- **Inclusion criteria**- Dialysis technicians, nurses, supervisor
  Exclusion criteria- patients

Process flow of study:

OBJECTIVES:

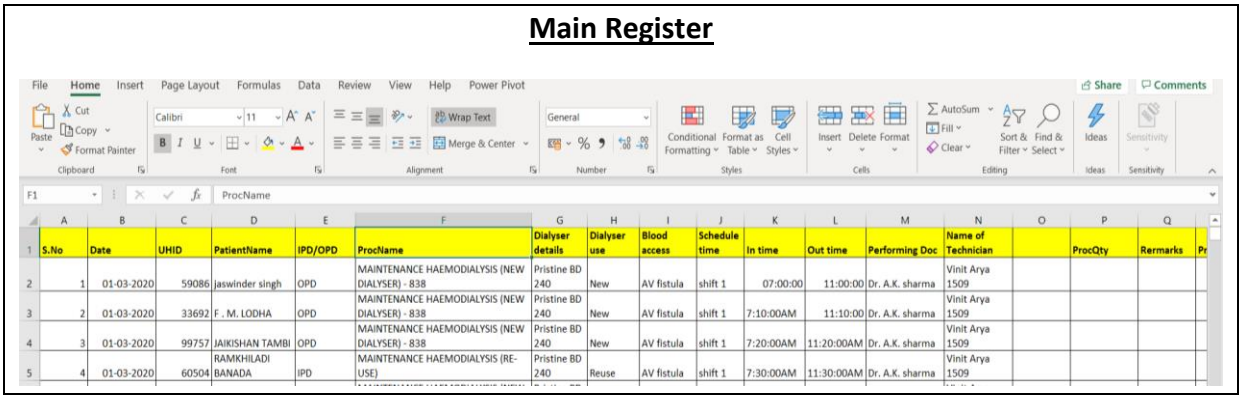
Electronic patient record system was prepared using MS EXCEL. A survey was conducted to find the perception of the staff towards EPRS before actual incorporation of EPRS. (3 days)

The incorporation of the system (Excel sheets) with proper training and simultaneous persuasion by putting forward the problem areas in the manual patient record system which were identified earlier. (INTERVENTION)

Post- Intervention, a survey was conducted using the same questionnaire after ten days of intervention to find the level of acceptance of EPRS by the staff of the dialysis unit.

Analysis of the collected data and then conclusion the study

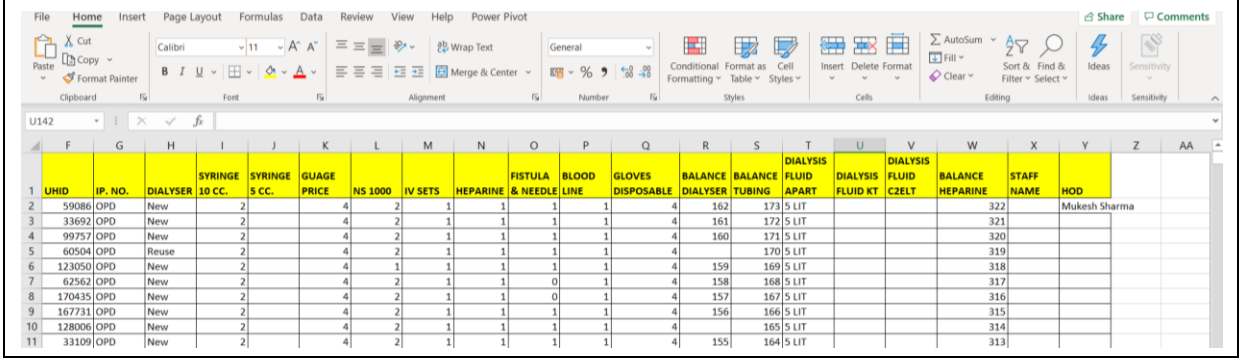
Main Register



S.No	Date	UHID	PatientName	IPD/OPD	ProcName	Dialyser details	Dialyser use	Blood access	Schedule time	In time	Out time	Performing Doc	Name of Technician	ProcQty	Remarks
1	01-03-2020	59086	jaswinder singh	OPD	MAINTENANCE HAEMODIALYSIS (NEW DIALYSER) - 838	Pristine BD 240	New	AV fistula	shift 1	07:00:00	11:00:00	Dr. A.K. sharma	Vinit Arya 1509		
2	01-03-2020	33692	F . M. LODHA	OPD	MAINTENANCE HAEMODIALYSIS (NEW DIALYSER) - 838	Pristine BD 240	New	AV fistula	shift 1	7:10:00AM	11:10:00	Dr. A.K. sharma	Vinit Arya 1509		
3	01-03-2020	99757	JAIKISHAN TAMBI	OPD	MAINTENANCE HAEMODIALYSIS (NEW DIALYSER) - 838	Pristine BD 240	New	AV fistula	shift 1	7:20:00AM	11:20:00AM	Dr. A.K. sharma	Vinit Arya 1509		
4	01-03-2020	60504	RAMKHILADI BANADA	IPD	MAINTENANCE HAEMODIALYSIS (RE-USE)	Pristine BD 240	Reuse	AV fistula	shift 1	7:30:00AM	11:30:00AM	Dr. A.K. sharma	Vinit Arya 1509		

Fig. 1: Screenshot of Excel sheet of Main Register

Stock Register



UHID	IP. NO.	DIALYSER	SYRINGE 10 CC.	SYRINGE 5 CC.	GUAGE PRICE	NS 1000	IV SETS	HEPARINE	FISTULA & NEEDLE	BLOOD LINE	GLOVES DISPOSABLE	BALANCE DIALYSER	BALANCE TUBING	DIALYSIS FLUID APART	DIALYSIS FLUID KT	DIALYSIS FLUID CZELT	BALANCE HEPARINE	STAFF NAME	HOD
59086	OPD	New	2		4	2	1	1	1	1	4	162	173	5 LIT			322		Mukesh Sharma
33692	OPD	New	2		4	2	1	1	1	1	4	161	172	5 LIT			321		
99757	OPD	New	2		4	2	1	1	1	1	4	160	171	5 LIT			320		
60504	OPD	Reuse	2		4	2	1	1	1	1	4		170	5 LIT			319		
123050	OPD	New	2		4	1	1	1	1	1	4	159	169	5 LIT			318		
62562	OPD	New	2		4	2	1	1	0	1	4	158	168	5 LIT			317		
170435	OPD	New	2		4	2	1	1	0	1	4	157	167	5 LIT			316		
167731	OPD	New	2		4	2	1	1	1	1	4	156	166	5 LIT			315		
128006	OPD	New	2		4	2	1	1	1	1	4		165	5 LIT			314		
33109	OPD	New	2		4	2	1	1	1	1	4	155	164	5 LIT			313		

Fig. 2: Screenshot of Excel sheet of Stock Register

DATA COLLECTION-

The data to identify problem areas in manual patient record system was collected through direct observation and unstructured interviews with the management team and doctor (Nephrologist). This process took one week.

Data for acceptance of EPRS-

To measure the level of acceptance of EPRS a questionnaire with different items have been used to measure three factors-

- **Perceived Usefulness (PU)-** It considered the study population perception towards EPRS usefulness in terms of improvement in job performance, ease in the job, productivity, effectiveness on job and accomplishment of task more quickly.

- **Perceived Ease of Use (PEOU)**- It considered clear and understandable interaction of the study population with EPRS
- **Attitude (AT)**- is considered the positive view of the study population towards EPRS

For the collection of the data, the same survey questionnaire was conducted before and after the introduction of EPRS.

Each item of the factor in the questionnaire was scored from 1 to 5, depending on the agreeability of the technician/nurse towards EPRS.

1- Strongly Disagree
2- Disagree
3- Neutral
4- Agree
5- Strongly Agree

***Questionnaire has been annexed.**

The data collected from the survey were analyzed using Excel.

ANALYSIS AND INTERPRETATIONS:

The data to identify problem areas in a manual patient record system was collected through direct observation and unstructured interviews with the management team and doctors. The major problems associated with the manual patient record were listed in a table below:

Major problems identified in the Manual Patient Record System
➢ Does not allow immediate organization and rearrangement of data.
➢ Difficult in reporting and outcome analysis.
➢ Wrong billing flow from the records due to wrong entry.
➢ Problem in storage- covers large area of storage.
➢ Improper scheduling due to overwriting and incorrect update of date which increases waiting time for patients.
➢ Double-entry of data or overwriting issues.
➢ Stock Inventory issues due to wrong entries.
➢ No Immediate access to the entire patient record in the dialysis unit, hospital, office, and home.
➢ No readily available standard and customizable reports for quality assurance.

Table no. 1: Problems Identified in Manual Patient Record System

The data collected from the survey were analyzed using Excel. The scores from PRE-Intervention, i.e., before the incorporation of Excel sheets for patient record maintenance (EPRS) and POST- Intervention, i.e., after integration of Excel sheets for patient record maintenance (EPRS), were compared to interpret the acceptance of EPRS by end user's (Technicians/nurses).

1. Perceived Usefulness (PU)

Perceived Usefulness (PU)					
	N	MINIMUM	MAXIMUM	MEAN	STD. DEVIATION
PRE	13	1.66667	3.66667	2.70513	0.51439
POST	13	3.5	4.33333333	4.025641	0.318024529

Table no. 2: Scores of Perceived Usefulness (PU)

PU is the degree to which an individual understands that the use of a specific innovation/framework would help increment their overall professional performance. In this manner, the mean score of study members shows the degree to which staffs considers the use of the EPRS framework as valuable for their professional performance.

Before the incorporation of Excel sheets for maintaining records, the mean score for PU was quite low, 2.71 and when the PU mean score was calculated after the intervention it came out to be quite high, i.e., 4.03

The standard deviation for Pre-intervention is 0.514 and 0.318 for Post-intervention, thus showing that the scores of PU for Pre-intervention were more varied than the scores of PU for Post-intervention. This is evident from the table as the range of scores in the PRE was between 1.67 and 3.67 while the range of scores in POST was limited to the high scores i.e. 4.33 to 4.025.

2. Perceived Ease of Use (PEOU)

Perceived Ease of Use (EOU)					
	N	MINIMUM	MAXIMUM	MEAN	STD. DEVIATION
PRE	13	1	3.2	2.015385	0.580008842
POST	13	2.8	4.6	3.707692	0.459096102

Table no. 3: Scores of Perceived Ease of Use (PEOU)

On account of PEOU, which decides the level to which an individual accepts that incorporated technology/system would be maximally simple to utilize, the staff members didn't consider the EPRS to easy to use before the incorporation of EPRS as the range of score is low, starting from 1 with a maximum score of 3.2. But after the intervention, the mean score shifted a little to the higher side, ranging from 2.8 to 4.6.

3. Attitude (AT)

Attitude (AT)					
	N	MINIMUM	MAXIMUM	MEAN	STD. DEVIATION
PRE	13	2	3.5	2.596154	0.525777812
POST	13	3.5	5	4.179487	0.478527537

Table no. 4: Scores of Attitude (AT)

The attitude of technicians and nurses before incorporation of EPRS was not quite positive as the score ranged between 2 to 3.5, with a mean score of 2.596. But, the overall attitude of staff members towards the EPRS was very positive after intervention. The score ranged between 3.5 to 5 showing that all the participants agreed that the Excel patient record system is a good and wise idea and its use is liked and pleasant.

FINDINGS:

A system was designed to ease the burden on the technicians, who manually maintain the patient records as well as improve the access and analysis of the data for better decision making by both dialysis and administration department. The computerized record-keeping system was considered to result in better patient outcomes and welfare through proper scheduling, better manpower efficiency, regular stock maintenance, staff satisfaction, and effective management decisions in view of issues in performance in the dialysis unit.

Descriptive statistics have been analyzed to examine the degree of acceptance of the EPRS among technicians and nurses of the hospital. The scores are discussed above in data analysis and interpretation.

PRE- INTERVENTION SURVEY RESULT:

The mean scores of all the three factors (PU, PEOU, AT) for PRE- intervention were lower than 3. Thus, showing that earlier staff considered the EPRS to be not that useful for their professional career and claimed that it was not that easy to use. Staff members also regarded themselves as they are not ready to use an EPRS because they lack technical knowledge and it does not correlate to their main core job and has a less positive attitude towards the EPRS. They find a manual record more comfortable and reliable than an electronic record. Furthermore, staff members showed less positive intention with regard to the use of the EPRS and considered it more as a pressure from senior management.

.

POST- INTERVENTION SURVEY RESULT

The survey scores show that staff members of the dialysis unit after proper training and usage considered the EPRS to be useful for their professional career and claimed that it was easy to use. Staff members also regarded themselves as ready to use an EPRS and had a positive attitude towards the EPRS. Furthermore, staff members showed a positive intention about the use of the EPRS.

DISCUSSION:

The findings produced by the present study have a number of important practical implications.

It was found that the staff had a preconceived notion regarding the use of Excel. They considered themselves as less equipped before the training and incorporation of EPRS. But after proper training their perception of EPRS changed.

Because the study has found the Excel Record system to be an acceptable EPRS for recording and sharing renal patient's data in the hospitals, it is suggested that the Excel Record system ought to be introduced fully-fledged (all the types of records) in haemodialysis unit.

However, to improve perceived usefulness and ease of use among the users, it is essential to provide training on the use of the Excel record system to staff members before to the introduction of the fully-fledged system in a haemodialysis unit.

The study also suggests that if the use of the EPRS is necessary for the hospital staff, the role of management can be neglected but for the voluntary use of the EPRS and to encourage the use of this EPRS by staff members of other units, it is important for the management to make its role more supportive and encouraging.

CONCLUSION:

The acceptance of the EPRS was benchmarked using several factors that can affect user acceptance of the technology. Based on these findings, the study concludes that users of the EPRS system in the dialysis unit of EHCC hospital have a good acceptance of this EPRS. However, since proper training was provided to staff members, any plans of introducing the EPRS in other units of the hospital should provide the necessary training as the study concluded that training of the staff members is esseential for increasing acceptability of EPRS among its users.

RECOMMENDATIONS:

- Regular audit on maintenance of the EPRS should be done.
- Daily or weekly data sharing among all the stakeholders of the renal unit should be done to keep a check on data quality.
- Before the incorporation of fully-fledged system, maintenance of manual record is also recommended.
- Regular training should be provided to keep the staff motivated to use EPRS for record maintenance

BIBLIOGRAPHY:

https://www.sciencedirect.com/science/article/pii/S1532046413001627

https://www.sciencedirect.com/science/article/abs/pii/S1386505614001622

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3129962

https://www.nature.com/articles/s41433-018-0065-8

ANNEXURE

Questionnaire

The motivation behind this survey is to measure the degree of your acknowledgment of EPRS (Excel sheets)- a new electronic patient record system introduced in Dialysis unit of EHCC. The information you provide will be confidential and will only be used for the research purpose. The questionnaire contains 15 items which you will have to rate with the help of the scales given below each statement/question. Before start rating this questionnaire, kindly provide your personal information.

1. Name-
2. Age-
3. Gender-
4. Employee ID-
5. Profession-

A. Perceived Usefulness (PU)

1. Using EPRS in my activity would empower me to accomplish tasks more rapidly.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2. Using EPRS would improve my job performance

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3. Using EPRS in my activity would expand my productivity

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

4. Using EPRS would improve my effectiveness at work

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

5. Using EPRS would make it simpler to carry out my responsibility

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

6. I would discover EPRS helpful in my activity

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

B. <u>Perceived Ease-of-Use</u> <u>(PEOU)</u>

7. Learning to work EPRS would be simple for me.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

8. I would think that it is simple to get EPRS to do what I need it to do.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

9. My interaction with EPRS would be clear and justifiable

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

10. It would be easy for me to become skillful at using EPRS

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

11. I would discover EPRS simple to utilize.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

C. Attitude (AT)

12. Using EPRS is a good idea

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

13. Using EPRS is a wise idea

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

14. I like the idea of using EPRS

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

15. Using EPRS would be pleasant

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree