User experience on the newly implemented Electronic Information Management System of the National STD/AIDS Control Programme

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Abstract

Introduction: Information is vital in managing the response to STI and HIV. An electronic Information Management System(EIMS) was introduced to National STD/AIDS Control Programme (NSACP) in early-2019 to streamline information management. A user experience study of EIMS was a timely need.

Objective: This study aimed to describe the user experience of the EIMS at the NSACP clinics (Colombo Central clinic, Balapitiya and Kaluthara.)

Methods: EIMS-users were invited by emailing a self-administered questionnaire. Standard Online questionnaire on user experience was used covering a wide range of classical usability aspects (efficiency, perspicuity, dependability) and user experience aspects (originality, stimulation). The responses were rated from -3(horribly-bad) to +3(extremely-good). Mean scores were categorized as negative (<-0.8) positive (>+0.8) and neutral (-0.8-0.8). Users perspectives were gathered using open-ended questions.

Results: Out of 47 invitees, thirty-six responded (76%) to the questionnaire. The majority of the participants were postgraduate trainees or medical-officers (19). The majority (55.6%) had used EIMS for one to six months duration. Best performing aspect was Novelty (rating-1.86). The worst-performing was Dependability (0.56). However, all other aspects were rated above positively. Worst performing single item was system speed with a rating of 0.27. EIMS scored above average in both hedonic (1.17) and pragmatic (0.99) qualities. The overall User experience score of the EIMs was positive (1.04)

Conclusion: EIMS has been received positively by the staff using it. The majority found it to be efficient and novel. However, the majority also highlighted the connectivity issues and slowness of the system and wished for a more stable system.

Key words: Information management, Electronic data management, strategic information

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Full article

Introduction

The National STD/AIDS Control Programme (NSACP) of the Ministry of Health spearheads the national response to HIV/AIDS in Sri Lanka together with all stakeholders and it networks with a cental clinic, 34 full-time STD clinics and 23 branch STD clinics throughout the country.(1) Information on prevalence and trends of STD/HIV are essential in control and prevention activities of the programme and plays a major role in obtaining Ending AIDS in 2025.(2),(3)

Until the year 2019**,** all these data were managed using the paper-based Information management system. However, this system had issues inherent to any paper-based system like lack of uniformity of recorded data, difficulty in tracing old records, requiring large space to store and difficulty in extracting, analyzing and sharing the relevant information. Reports and returns from the clinics lacked uniformity and timeliness.(1)

The Electronic Information Management System (EIMS) was implemented in the NSACP to overcome these issues and streamline information management as the first programme in the government health sector to implement such a system. EIMS is composed of multiple modules for different user categories from patient registration to report/return generation. EIMS started rolling out in late 2018 in NSACP along with two peripheral clinics, and It was a novel experience to the implementors, the end-users and the beneficiaries (patients). Further, users' perceptions on the new system were unexplored until this study, which is essential to identify required system modifications and to ensure better implementation and sustainability of the new Information management system.

This study aimed to describe the user experience of the EIMS at the NSACP Clinics (Colombo Central-clinic, Balapitiya and Kalutara),and to identify areas of EIMS that needs improvement.

Method

A descriptive cross-sectional study was carried out at the National STD/AIDS Control Programme premises and two peripheral clinics Kalutara and Balapitiya in August, 2020. Due to the limited number of primary users of the system, all staff persons who have been given access to EIMS (n=47) were invited to participate in the study. The list of health care workers in said institutes with EIMS access was used as the sampling frame.

EIMS-users of NSACP (Clinic doctors, Nurses, PHIs, PHNs, Pharmacists and MLTs and PHLTs) were invited to the study by emailing a web-based self-administered questionnaire along with an informed consent form. The email was followed by a request call.

Study instrument.

A self-administered questionnaire was developed in English and Sinhala. It was composed of 3 sections; Section-A contained questions collecting demographic data, Section-B included a user experience questionnaire (UEQ) to assess the user perceptions on the EIMS, and Section- C included open-ended questions to gather data on specific downsides of the system and major changes requested in the system.

A standard User Experience Questionnaire (UEQ) for electronic systems (UEQ-online.org) was adopted to measure the user experience on the system. It is an online tool which is used by numerous agencies to evaluate computer systems and online platforms. (4) The questionnaire assessed the systems Hedonic quality (quality of being Pleasant or Unpleasant); represented by the aspects stimulation and novelty). It also assessed the systems Pragmatic quality (quality of being practical); represented by the aspects *efficiency, perspicuity* and *dependability*.

Each quality of the system in UEQ was measured by a single question with responses in Likert scale ranging from 1-least favourable to 7-most favourable.(4)

A standard scoring system was applied giving a score from -3 (horribly bad) to +3 (extremely good) for each corresponding response. A mean scores were calculated for each UEQ item (quality) and higher mean scores than 0.8 were considered as positive score while mean scores less than -0.8 were named as a negative. Mean scores between -0.8 and 0.8 were considered neutral. (4)

Data Analysis

The database was produced from the web-based questionnaire in Excel format. Statistical package for ocial Sciences (SPSS) version 23 was used to analyze the data. The quantitative data were analyzed with regards to measures of central tendency and dispersion. Categorical data were analyzed with regards to proportions. Qualitative data were analyzed in the form of thematic analysis.

In the analysis of responses in UEQ, response for each item was given a score from -3(horrible bad to 3(extremely good). Then the mean score was calculated for each item (quality) of the system and individual mean scores were calculated for each domain (aspect) namely dependability, efficiency, perspicuity, stimulation and novelty. Similarly, overall mean scores were calculated for hedonic and pragmatic qualities as well as the final overall UE score. Mean scores between -0.8 and 0.8 were considered neutral while higher than 0.8 were positive and lower than -0.8 were negative

Results and discussion

Socio-demographic profile

Thirty-six (76.6%) out of 47 invitees responded to the online questionnaire. The mean age of the respondents was 37.8 years (SD=7.6). The largest group of respondents were medical officers / PG Trainees and consultants (n=19). The majority 67% were female. Most (n=21) had worked at NSACP for more than 3 years. The socio-demographic profile of the study participants is shown in table 1.

Table 1 - Socio-Demographic data

Variable		No	%
Language	Sinhala	35	97.2%
	Tamil	1	2.8%
	Total	36	100%
Education level	Up to A/L	2	5.6%
	Holding a diploma/ degree	21	
	Postgraduate qualifications	12	33.3%
	Total	35	100%
Gender	Male	12	33.3%
	Female	24	66.7%
	Total	36	100%
Occupation	Consultant Venereologist	5	13.9%
	Medical officer / PG trainee	19	52.8%
	PHLT	4	11.1%
	Nursing Officer	1	2.8%
	MLT	1	2.8%
	PHNS	2	5.6%
	Pharmacist / Dispenser	2	5.6%
	PHI	2	5.6%
	Total	36	100%
Service Experience at NSACP	Less than 1 year	5	13.9%
	1 years – 3 years	8	22.2%
	3years – 5 years	11	30.6%
	>5 years	10	27.8%
Marital Status	Married	34	94.4%
	Unmarried	2	5.6%
	Total	36	100%

PHLT-Public Health Laboratory Technician, MLT-Medical Laboratory Technologist, PHNS- Public Health Nursing Sister, PHI- Public Health Inspector

Usage of the system

The period and the type of usage of the system by participants are shown in table 2. The Majority (56%) had used the system for 1 – 6 months duration and the majority (54%) used the system for clerking patients

Table 2 – Usage of EIMS

Variables		No	%
Period of usage of the system	Never	1	2.8%
	<5 months	5	13.9
	1-6 month	20	55.6
	6-12 month	9	25
	12 months	1	2.8
	Total	36	100%
Type of use of the system*	Patient registration	7	20%
	Patient clerking	19	54.3%

	Ordering / processing Lab tests	6	17.1%
	Prescribing / dispensing Drugs	8	22.9%
	Other uses	12	34.3%
	Total	52	148.6%

*Responses are not mutually exclusive

User Experience question scores

Users perceptions of the systems were measured using the user experience scores.

Table 3 – User Experience questions scores

Domain	Item	Score	95% CI
UEQ scores of individual items (qualities)			
Dependability	Doesn't meet expectations vs Meets expectations	0.56	0.04-1.07
	Obstructs work vs Helps work	0.83	0.34-1.33
Efficiency	Inefficient vs Efficient	1.33	0.98-1.78
	Slow vs Fast	0.28	-0.35-0.90
	Cluttered vs organised	1.22	0.62-1.82
Perspicuity	Complicated vs Uncomplicated	1.06	0.61-1.50
	Confusing vs clear	0.94	0.47-1.42
	Difficult to learn vs easy to learn	1.69	1.30-2.01
Stimulation	Boring vs Interesting	0.92	0.44-1.40
	Demotivating vs Motivating	0.72	0.15-1.30
Novelty	Traditional vs Novel	1.86	1.50-2.22
UEQ score of individual domains			
Dependability		0.69	0.22-1.17
Efficiency		0.94	0.49-1.40
Perspicuity		1.23	0.89-1.57
Stimulation		0.82	0.32-1.32
Novelty		1.86	1.50-2.22
Summary UEQ scores of the EIMS			
Hedonic (quality of being Pleasant)		1.17	0.77-1.56
Pragmatic (quality of being practical)		0.99	0.61-1.37
Final overall Score		1.04	0.67-1.41

Each item on the questionnaire was given a score in a way that extremely unfavourable marking on EIMS item was given "-3" while extremely favourable marking on an item of the system was given "3". A score of "0" meant that the item has been scored neutrally. The mean scores of each item, overall scores of each domain, and final UEQ scores are shown in table 3 along with their 95% confidence intervals

Graph 1 – Box whisker plot comparison of the user experience domains.
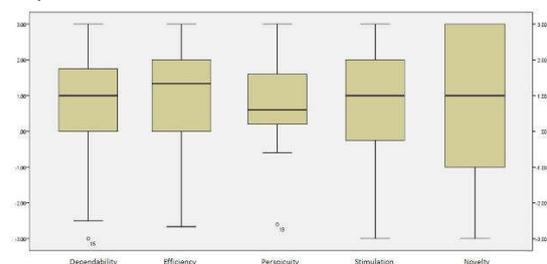
None of the items in the user experience questionnaire received negative scores (<-0.8). Items "Not meeting expectations vs Meeting expectations" (0.56) "speed of the system" (0.28) and "Demotivating vs Motivating" (0.72) received neutral scores (-0.8- +0.8). The Speed of the system was the worse rated single item among all qualities with a confidence interval of -0.35 to 0.90 which shows the statistical insignificance of the neutral score.

Items "Obstructs vs Helps work" (0.83), Inefficient vs Efficient (1.33), Complicated vs Uncomplicated (1.06), Confusing - clear (0.94), Difficult to learn vs easy to learn (1.69) Boring-interesting (0.92), traditional vs novel (1.86) received positive scores (>0.8). The item "traditional vs novelty" received the best single score.

Overall score in dependability domain was neutral (0.69) while overall scores of efficiency (0.94), Perspicuity (1.23), stimulation (0.82) and novelty (1.86) domains were positive. All had neutral-positive confidence intervals which statistically signifies the result. Graph 1 illustrates the comparison of box whisker plots of each domain showing how the domains have scored. It depicts that most of the domains were very positively rated. When applying the domains scores to a practical context, the overall scores of items representing hedonic quality and pragmatic quality were both positive (1.17 and 0.99 respectively) indicating that people perceived the system to be pleasant and practical. The overall user experience score of EIMS was 1.04

which is positive and above average. All the summary scores had non-negative confidence interval values signifying the statistical value.

There was no statistically significant difference in each domain scoring (negative, neutral or positive) with regards to participants gender, working experience or the designation.

Main problems identified in the system

Summary of the responses given for the qualitative question inquiring problems in the system is shown in table 4.

Table 4 - Main Problems identified by the users

Issues in the system (n=36)	Number of users	%
Network connectivity issues and slowness of the system	15	41.7
Logistic issues (Space and hardware insufficiency]	11	30.6
Specific deficiencies in the software	3	8.3
Lack of training	3	8.3
Lack of technical support	1	2.8

*A single person has given more than one response.

Network-connectivity issues and slowness of the system was a major complaint of staff persons. This was the main complaint of clinic doctors and persons engaging in registration. The nurses in the bleeding-room and injection room found that space is inadequate to keep EIMS instruments. Some did complain of logistic issues like lack of furniture and electricity access points. Some (especially Doctors and MLTs) highlighted that specific sections of the system still need improvements to make it more user friendly. A nurses and an MLT expressed that the training on EIMS is inadequate. Some users highlighted the fact that few modules are still under development (eg- reporting/return generation and lab serology module) which gives a sense of incompleteness in the system.

In the qualitative responses, a PHI mentioned that " This is the best system I have come across to register patients, We do our work with great ease now" while a nurse responded, " This reduces the report generation time drastically which will be a great help". A doctor mentioned that "It is difficult to build a good rapport as it is difficult to maintain eye contact with the patient." While another stated " system Blunts the thinking and analysing capacity in the view of learning from patients especially for postgraduate trainees" An MLT stated that "Handling Lab equipment's and typing on computing on the same time can result in errors and inconveniences."

Requested system changes by the staff members

Table 5 summarizes the result of the thematic analysis of the responses received for the question on the user's suggestions to improve the system.

Table 5 - Main requests by the users

Requests of users (n=36)	No.	%
Need to establish a better network connection	19	52.7%
Specific Change in the EIMS platform.	10	27.8%
Requesting more training / user guides	7	19.4%
Hardware improvement	6	16.7%
Need more technical support	1	2.8

*A single person has given more than one response

Stable network connectivity was the major request by 19 persons belonging to all the categories followed by request for specific changes in the system and more training opportunities.

The small sample size was a limitation of this study which resulted due to the limited number of staff persons with exposure to the system in the three institutions at the time of data collection.

Conclusions

The EIMS has replaced the old paper-based system almost entirely in the patient registration and the majority of the patient clerking at the centres. The Bleeding room, pharmacy, and the laboratory modules have replaced the old system in the two peripheral clinics. Majority of the staff was using the system.

The user experience questionnaire yielded a positive response from most of the users. None of the user experience scales received a

negative rating. The overall user experience score of the EIMS was above average. It is evident that EIMS has been well received by the majority of the staff members.

The main Issues found in the system was network stability issues, slowness of the system and logistic issues including lack of space. Main suggestions of the users were to have a stable network connection and to have some specific changes to the EIMS so that it is more functional and user-friendly. It is recommended to establish a stable network at the NSACP and while doing some specific changes in the EIMS platform. The system performed well against the user experience questionnaire and expansion of the system to island wide STD clinics is encouraged.

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