The effect of technology implementation in providing drug information on consumer satisfaction in Jakarta, Indonesia

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ABSTRACT: The provision of drug information (PDI) is a crucial factor influencing consumer behavior and ensuring appropriate drug use, thereby achieving therapeutic goals. With advancements in technology, digital platforms such as tele-counseling, WhatsApp, and social media are increasingly being used for PDI. However, challenges such as unclear communication, incomplete information, and delayed responses remain, which may affect consumer satisfaction. This study aims to assess consumer satisfaction with PDI through the implementation of a pharmacy application, using the End User Computing Satisfaction (EUCS) model, which evaluates information content, accuracy, format, ease of use, and timeliness. The research employed an associative, cross-sectional design and involved 250 consumers at Atma Jaya Pharmacy. Data were collected via a Likert-scale-based questionnaire, with responses analyzed to determine satisfaction levels in each EUCS dimension. Results showed that consumer satisfaction was consistently high across all dimensions, with the average satisfaction scores being 89.10% for information content, 90.19% for accuracy, 87.25% for format, 85.33% for ease of use, and 86.78% for timeliness. In conclusion, the use of technology in PDI significantly enhances consumer satisfaction, offering more accessible, accurate, and timely drug information. This study highlights the importance of optimizing technological tools in pharmaceutical services to improve user experience and satisfaction.

KEYWORDS: Consumer satisfaction; EUCS methods; post-pandemic; telemedicine.

▪ INTRODUCTION

Provision of Drug Information (PDI) is one of the impacting parameters that can influence consumer attitudes and knowledge in the proper use of drugs so that the goals of drug therapy are achieved[1]. Drug information can be done using technology such as tele-counselling media, WhatsApp and social media. The survey results show that there are several obstacles in providing digital information, such as unclear sound, incomplete information, and late responses due to unstable internet networks. Consumer satisfaction is a measure of the level of one's feelings resulting from a comparison between expectations and reality [2]. Consumer satisfaction with information system users is the consumer's attitude when receiving PDI which can be shown by increasing application users to receive drug information. Satisfaction can also be shown by loyalty from consumers who use the application to get PDI from pharmacists. Successful implementation of technology if it has diverse and technically feasible features, meets financially economic factors but provides optimal productivity, is easy to use, enjoyable, useful and efficient for users and can be developed to meet sustainable needs. End User Computing Satisfaction (EUCS) is an evaluation of the satisfaction of information system users based on their experience using a system [3]. Parameters measuring EUCS satisfaction are seen from 5 dimensions, namely information parameters, data accuracy, information format, ease of use, and timeliness of providing information [4].

▪ MATERIALS AND METHODS

This type of research is associative, to determine the relationship or influence of the variables studied using a cross-sectional research design. The research flow can be seen in Figure 1. Data collection was done through a questionnaire with a google form which was distributed to all pharmacy consumers. The questions refer to the EUCS model, with the rating scale used in this research being a Likert scale, where each question has a value of 5 referring to very satisfied, satisfied, fairly satisfied, less satisfied and not satisfied. This research instrument is a questionnaire consisting of 5 main questions, each of which is explained into 5 detailed

questions that describe consumer satisfaction with information content, the accuracy of the information provided, information format, ease of obtaining information and timeliness.
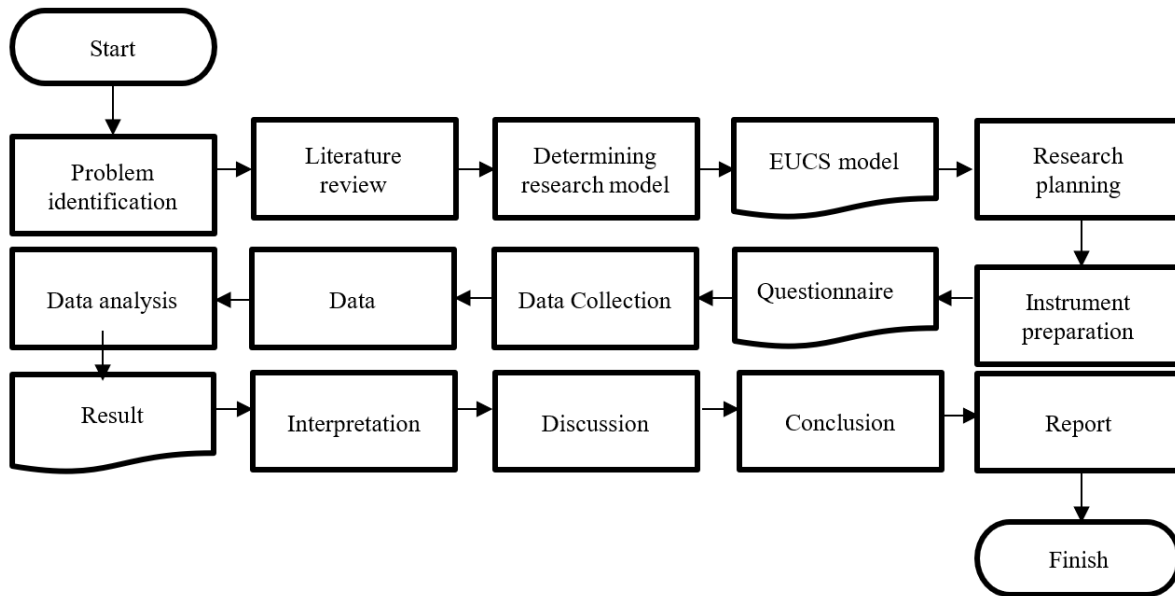

Figure 1. Flow of research process

Table 1. List questions for satisfaction dimension.

No	Question
Information Content (K Code)	
1.	The pharmacy application provides information conformity (K1)
2.	Complete information provided (K2)
3.	Information according to my needs (K3)
4.	The information provided is useful for me (K4)
5.	Quality information provided (K5)
Accuracy (Code A)	
1.	The information provided is correct (A1)
2.	The information submitted is accurate (A2)
3.	The information conveyed is consistent (A3)
4.	Does the pharmacist convey information on how to store medicines to patients? (A4)
5.	The information submitted is in accordance with pharmaceutical service standards (A5)
Format (F Code)	
1.	Interesting information format (F1)
2.	Clear information format (F2)
3.	Quality information format (F3)
4.	Easy to understand Information Format (F4)
5.	Information format convenient to use (F5)
Ease of use (code M)	
1.	Easy to use app (M1)
2.	Easy to understand features (M2)
3.	Convenient to use application (M3)
4.	Easy to access applications (M4)
5.	Applications provide opportunities for interaction (M5)
Timeliness (W code)	
1.	Up to date information (W1)
2.	Information can be used within a certain time (W2)
3.	Information provided in a timely manner (W3)
4.	Easy to understand Information Format (W4)
5.	If there are problems, they can be responded to in real time (W5)

The population used in this research is Atma Jaya Pharmacy consumers who receive PDI. The total population based on purchasing medicines both prescription and non-prescription (self-medication) from

May 2022 – December 2022 is 706 people. Sample units are calculated using the Lwanga and Lemeshow formula [5,6]

$$n = \frac{Nx\ Z\alpha^2 xpx(1-p)}{d^2\ x(N-1) + Z\alpha^2 x\ px(1-p)}$$

$$n = \frac{706\ x\ 1{,}96^2 x\ 0{,}5\ x\ (1-0{,}5)}{0{,}05^2\ x\ (706-1) + 1{,}96^2 x\ 0{,}5\ x\ (1-0{,}5)}$$

$$n = 249{,}0148 \sim 250$$

In this study the sample was taken using random sampling technique. Collecting data using a Likert scale measurement (summated rating). The data processing stage was carried out with the following steps:

1. Editing
    The editing process is done by checking the completeness and ensuring the answers. If there are incomplete and incorrect answers, they are completed by re-interviewing the respondent.
2. Coding
    The data that has been collected is coded, namely by converting data in the form of sentences or letters into number data.
3. Data entry
    The data entry process is done by filling in the column or code sheet according to the respondents' answers to each question. The question was give to the respondent using a google form link.
4. Tabulating
    The tabulating process is carried out by moving data from the questionnaire into a prepared table.

The level of patient satisfaction can be measured by assessing the answers given by respondents. Scoring is done by giving 5 points for very satisfied, 4 points for satisfied, 3 points for moderately satisfied, 2 points for less satisfied, and 1 point for dissatisfied. After that, the total number of scores was calculated. The total number of scores is then divided by the highest number of possible scores, and the result is multiplied by 100% to get the percentage value. By referring to the resulting percentage value, it can be ascertained whether the value meets certain criteria. The evaluation of the satisfaction level will be classified to not satisfied (0-35%), less satisfied (36-50%), moderately satisfied (51-65%), satisfied (66-84%), and very satisfied (85-100%)[7].

▪ **RESULTS AND DISCUSSION**

In this study, 250 patients from Atma Jaya Pharmacy were surveyed to evaluate consumer satisfaction with drug information provided through a technology-driven platform. The results indicate high satisfaction levels across all five dimensions measured using the End User Computing Satisfaction (EUCS) model. Based on characteristics, the majority of respondents were female (74.4%), aged 17 – 25 years (90.1%), with the latest education being Bachelor/Magister/Doctoral (59.3 %), work as a student (85.7%), with more than one visit (67%), offline purchasing method (82.4%), and non-prescription services (86.8%).

Table 2. Sociodemographic characteristics of respondents.

Sociodemographic characteristics	Percentage (%)
Gender	
Man	23.1
Woman	76.9
Age	
17 - 25 years old	90.1
26 - 45 years old	6.6
46 - 65 years old	4.8
> 65 years old	1.6
Level of education	
High school	40.7
Bachelor/Magister/Doctoral	59.3
Job status	
Private Employee / Entrepreneur	13.2
Student	85.7

Sociodemographic characteristics	Percentage (%)
Doctor	2.2
Housewife	1.1
Visit to the pharmacy	
First time	33
More than 1 time	67
Purchase Method	
Online	17.6
Offline	82.4
Service	
Prescription	13.2
Non-prescription	86.8

Table 3. Information content dimensions.

No	Kind of service	Total Score	Percentage	Criteria
1	The pharmacy application provides information suitability	1092	87.36%	Very satisfied
2	The information provided is complete	1102	88.16%	Very satisfied
3	Information according to my needs	1131	90.48%	Very satisfied
4	The information provided is useful for me	1122	89.76%	Very satisfied
5	The information provided is quality	1122	89.76%	Very satisfied
	Average	1113.8	89.104%	Very satisfied

The first dimension regarding information content consists of 5 questions. Content is the main parameter because in it there is a process of collecting data which is then processed and the results are presented in the form of information [8]. This dimension aims to find out whether the patient is satisfied with the pharmaceutical services at the Atma Jaya Pharmacy regarding the suitability of the pharmacy application in providing information, whether the information provided is complete, the information is as needed, the information provided is useful, the information provided is of high quality. The satisfaction level index on this dimension at the Atma Jaya Pharmacy averaged 89.104%. This suggests that users found the information provided by the pharmacy application highly relevant and complete, meeting their specific needs and being of good quality. This aligns with the findings of earlier studies indicating that comprehensive and relevant content plays a crucial role in user satisfaction in healthcare services. User satisfaction with an information system can be increased through the provision of content information in the system and has an influence on the effectiveness of using the system. [9,10].

Table 4. Dimensional accuracy.

No	Type of Service	Total Score	Percentage	Criteria
1	The information provided is correct	1155	92.4%	Very satisfied
2	The information conveyed is accurate	1131	90.48%	Very satisfied
3	The information provided is consistent	1122	89.76%	Very satisfied
4	Pharmacists convey information on how to store medicines to patients	1110	88.8%	Very satisfied
5	The information provided is in accordance with pharmaceutical service standards	1119	89.52%	Very satisfied
	Average	1127.4	90.19%	Very satisfied

The second dimension of accuracy consists of 5 questions. Accuracy is a component used to measure user satisfaction based on the accuracy of the data when the system receives input and then processes it into information [8]. This dimension aims to find out whether the patient is satisfied with the pharmaceutical services at the Atma Jaya Pharmacy regarding the information provided is correct, the information submitted is accurate, the information conveyed is consistent, the pharmacist conveys information on how to store medicines to the patient, the information conveyed is following pharmaceutical service standards. The satisfaction level index on this dimension at the Atma Jaya Pharmacy averaged 90.19%. his score reflects the precision and correctness of the information provided, suggesting that consumers trusted the drug

information they received. Ensuring accurate information is critical in pharmaceutical services, as it supports safe and effective medication use, which directly impacts consumer satisfaction. Davis *et al* (1989) found that accuracy had a stronger and more consistent relationship with acceptance of information technology compared to other variables, such as attitude, satisfaction, and other perceived measures [11,12]. The results of research conducted by Igbaria (1994) also found the same thing, namely that there was a positive relationship between perceived usefulness and the use of information systems. [13]

Table 5. Format dimensions.

No	Type of Service	Total Score	Percentage	Criteria
1	Interesting information format	1053	84.24%	Very satisfied
2	Clear information format	1107	88.56%	Very satisfied
3	Quality information format	1098	87.84%	Very satisfied
4	Information format is easy to understand	1101	88.08%	Very satisfied
5	The information format is convenient to use	1094	87.52%	Very satisfied
	Average	1090.6	87.25%	Very satisfied

In the third dimension, the format consists of 5 questions. The format has an important role in user satisfaction [14]. This dimension aims to find out whether patients are satisfied with the pharmaceutical services at Atma Jaya Pharmacy regarding attractive information formats, clear information formats, quality information formats, easy-to-understand information formats, and comfortable information formats to use. The satisfaction level index in this dimension at the Atma Jaya Pharmacy is an average of 87.25%. This indicates that the format of drug information—whether presented clearly and attractively—was easy for users to understand and use. Research supports the idea that clear and user-friendly formats enhance consumer interactions with digital systems, leading to higher satisfaction. These results are in line with research conducted by Mason *et al* showing that the display aspect (format) has a positive influence on user satisfaction, which shows that the display (format) has a significant impact on the level of user satisfaction with a system [15,16,17].

Table 6. Dimensions of application ease of use.

No	Type of Service	Total Score	Percentage	Criteria
1	Easy to use application	1073	85.84%	Very satisfied
2	Easy to understand features	1049	83.92%	Very satisfied
3	The application is comfortable to use	1071	85.68%	Very satisfied
4	Easily accessible application	1073	85.84%	Very satisfied
5	Applications provide opportunities for interaction	1067	85.36%	Very satisfied
	Average	1066.6	85.33%	Very satisfied

The fourth dimension regarding ease of use of the application consists of 5 questions. This dimension aims to find out whether the patient is satisfied with the application by measuring the ease and comfort of the application used. The average satisfaction level index in the convenience dimension is 85.33%. Users found the application convenient to navigate, which is essential for fostering positive experiences. Ease of use is a pivotal factor influencing technology acceptance, as it simplifies the interaction between users and the system, encouraging repeated use. These results are in accordance with research by Davis (1989) which states that the variable ease of use (perceived usefulness) in the use of information technology has an influence on use through attitudes (attitude towards using) regarding the information received [18].

Table 7. Timeliness dimensions.

No	Type of Service	Total Score	Percentage	Criteria
1	Up-to-date information	1086	86.88%	Very satisfied
2	Information can be used within a certain time	1080	86.4%	Very satisfied
3	Information is provided on time	1080	86.4%	Very satisfied
4	Information format is easy to understand	1011	88.08%	Very satisfied
5	If there are problems, they can be responded to in real time	1077	86.16%	Very satisfied
	Average	1084.8	86.78%	Very satisfied

The fifth dimension regarding timeliness of the application consists of 5 questions. This dimension aims to find out whether patients are satisfied with the pharmaceutical services at the Atma Jaya Pharmacy regarding the provision of up to date information, the information can be used within a certain time, the information is provided on time, the information format is easy to understand, and if there are problems they can be responded to in real time. The satisfaction level index in this dimension at the Atma Jaya Pharmacy is an average of 86.78%. It was another significant factor in this study. Providing up-to-date, timely information is a key determinant of consumer satisfaction, particularly in pharmacy services where immediate access to accurate information can directly impact health outcomes. The quick response to inquiries further enhanced the user experience. Timeliness is also one of the important things in information systems, the faster the output produced by a system, the better user satisfaction will be achieved [9], [19].

▪ CONCLUSION

The findings demonstrate that the implementation of technology in providing drug information through a pharmacy application significantly enhances consumer satisfaction. This is evident from the consistently high satisfaction scores across all five EUCS dimensions. The results highlight the need for pharmacies to optimize technological tools to improve the accessibility, accuracy, and timeliness of the drug information provided to consumers.

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