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Clinic Management System: Business Process Re-engineering based on User Experience (UX)

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Abstract. Clinic management systems function is to arrange and organize the inherent process in the health facility to be harmonized with the patient's demand. The purpose of this paper is to analyse the common themes to be used in user interface of the application through identification of user specification based on the context. The user experience has been utilized to consider the critical aspect of successes of implementation related to human factor of mental model, which are utility, ease of use and efficiency. The contribution of this paper is twofold. Firstly, the design process should be done through tremendous re-design of primary business process to obtain excessive improvement in the capacity, capability and quality of the service. Secondly, the information presentation should be provided in alternative way involving the effort to have more platform and modes to increase accessibility and availability.

1. Introduction

Innovation is not merely creating new type of product or service but it is the expansion of new enhanced one to be utilized in the business practice within organizational structure. As a matter of fact, health sector has been considered to be the appropriate place to conduct inventive work to provide systematic solution considered many problems reside in the process while it supposed to solve rapidly such as biotechnology, bioengineering, biochemistry, brain computing, hospital management, pharmaceutical, nursing, dental and many more. Actually, the health sectors have obtained tremendous benefits by utilizing various type of information systems (IS) into their business function and process to store, retrieve, exchange or compute data for the sake of management and administration. Within this domain, pharmaceutical has many obstacles to implement IS, which can be seen from many perspectives such as the lack of confidence toward capacity and availability or the long term investment in term of resources, effort and skill that deter the eagerness wherein the prove of success implementation is rarely seen. On the other hand, the best implementation of IS can be shown in the hospital management systems where the business process has been improved at tremendous way such as letter of intent, consent or complaint that deal with thousand of patients, scheduling and replacement process of hundreds of staff, maintain the resources and assess such as equipment details, operational tools, monitoring devices and many more. In addition, the market demands and stresses on how the patient care process should be delivered while the increased management and operation cost, lack of skilled employees, information exchange and privacy issues, the long time to queue, different standard of service quality, overload storage and so on become the challenge in the implementation of information systems.



In general, clinic, puskesmas and posyandu are the front gate to serve the patient in the initial process before deliver the acute or escalated case to the hospital. At present, clinic still utilizing paper in administrative process, while the use of IS is highly expected to transform the process to be absolute paperless wherein every data about staff, patients, workers, equipments even the diagnose images, receipt result and historical records are stored in the server. It can made the activity process become easy and fast especially in the data extraction and information exchange within internal operation. Interestingly, the capacity of storage is another challenges that many clinics need to deal with, especially, for high resolution images that supposedly to be received, sent and stored from one location to another regularly while the historical record should be maintained. On the other hand, the pool of data resources in the storage can reveal the pattern of patient's daily activities such as eating, sleeping, defecating and working order, which can be used to adjust with the level of doses of medicine and monitoring process of the implication and the consequences of treatment to patients. It also can reduce the missing, invalid and error data about certain process of diagnose through comparing and checking with other historical data, while verification and validation with more expertise in the hospital through consultation process can be done easily. Furthermore, related staff are required to conduct collaborative work with other healthcare providers especially in the payoff activities when transferring the patients' data should be done complementarily and accurately to prevent incomplete result or misinterpretation as the absence of the critical. This study wants to design the clinic management system through business process re-engineering based on user experience to improve the performance and align with the needs in the coordination with puskesmas and posyandu, even to the hospital closed by or within the range.

2. Literature Review

Supposedly, the patients can ask the clinic staff, nurses or even doctors directly to request specific detail or diagnose without the need to manually register in every process within administration domain. In some cases, it is seen that this kind of issues has been known widely that strange persons may take sick child or visit any room without permission easily. Thus, through data analysis, the current state of the patient's health provides information about them for greater appropriation of medical care, which means that the clinic grants more control to the patient than to the staff so the issue in visitation can be solved. Instead, the director can submit a non-disclosure agreement to establish the responsibility and authority of the staff to access and protect the security of the patient's data. On the other hand, privacy violation combined with complex and conflicting health privacy laws have been proved to reduce the patient's confidence that their health information will be protected [1]. It is more effective to interact and communicate with brokers than to negotiate directly with the client for business development and progress through a series of small steps that put businesses in front of their peers, as well as to change the usual practice [2]. Indeed, the growing innovation is helping researchers better understand physiological pathways and develop increasingly specific drugs, which the IS can support the mechanism to bring the effectiveness and efficiency of studying the characteristic and attribute of specific disease and its cause through collection and series of complementary data on the behalf of future treatment in the clinic and hospital.

Research and further development to address the limitations of certain negative consequences of the medicine is not merely to eliminate the undesirable effects but also result in a completely new understanding of the enzyme involved [3]. It has been determined that the stagnant growth of productivity is the main reason for reducing very low growth rates in real income per capita due to the death of a great invention [4]. Specifically, it will choose the degree of technical and commercial renewal of its portfolio of innovation projects to match the benefits of increasing shareholder wealth against the cost of increasing risk to shareholders. Large companies have some diversification of risks from their multiple projects, since the results of these projects are likely to be inextricably linked. A variety of risks indicates that it is generally less risky for large companies to add relatively ambitious creative projects to their innovation portfolios than small businesses that may face bankruptcy risks often if ambitious technological or business innovations do not achieve good results. [5]. There are three main groups of product innovations, which are related to the first group of introductions of exams, medicines and

materials included in the context of prevention, early diagnosis and treatment to cover the medical care of the population. The second set of innovations in the field of products consisted in the provision of new services according to the social, cultural, economic and epidemiological characteristics of the population in question. The third group of product innovation responded to the introduction of higher education professionals from different backgrounds, who, together with academic and technical apprentices, were providing access to new services [6].

To produce required improvement in care service that align with continuous demand from the patients, hospital often invest in the incremental innovation compare to the radical, which account for just six to ten percent of project while long process normally happens due to stacked documents still be implemented [6]. In addition, hospital should prioritize their own core competence before focusing to competitive advantage, in which strategy that discuss value proposition, generate lead, extract prospect, control niche market or provide alternative solution should be take the backlog instead of decision making, conflict resolution, flexibility management, interpersonal relation, persuasive communication, project management or risk management and assessment. In principle, company has been identified based on the harmonized strategy to combine various individual perspective in utilize multiple resource and skill to deliver quality promised care service. In addition, customer often ask for the values added when use certain solution in the healthcare as benefit that have equivalency with sacrifice cannot distinguish its competitive position compare to the others. On the other hand, study indicated huge gaps between planning and operational management as there is a lack of monitoring and feedback bring frustration in the process and reduce the spirit to increase the quality. Many factors that become the hindrances to the hospital system such as the distance location to the object, national regulation, mutational disease trends, patients' lies on the symptom, different type of satisfaction among family member, lack detail in the letter of consent, condition of workplace performances and many more which should comply with professional standards [7]. Meanwhile, the government might misinterpret that the healthcare system has been work extremely well to serve the patient but in the practical, it is clearly shown that the inefficiency process exists and often rude and rush [8]. In fact, the healthcare system cannot depend too much on the usual ethic or norm based on localized determined value because the mistake by human occur easily and tend to disrupt every business process to hectic condition. Many notices or reminders are not received by the patients or late arrive in the location due to incorrect address, incoordination in the administration process, inaccurate data entry or even server down. Furthermore, healthcare industry is under pressure to change the focus to adopt the advancement of technology to provide better performance where are patients often willing to pay dearly but of course with exclusive service in the treatment compare to the others, which appreciation seen more valuable [9-11]. In addition, figure below, drew the classical relationship of patient in healthcare industry to support the implementation within business re-engineering in the business process of clinic to implement IS [10].

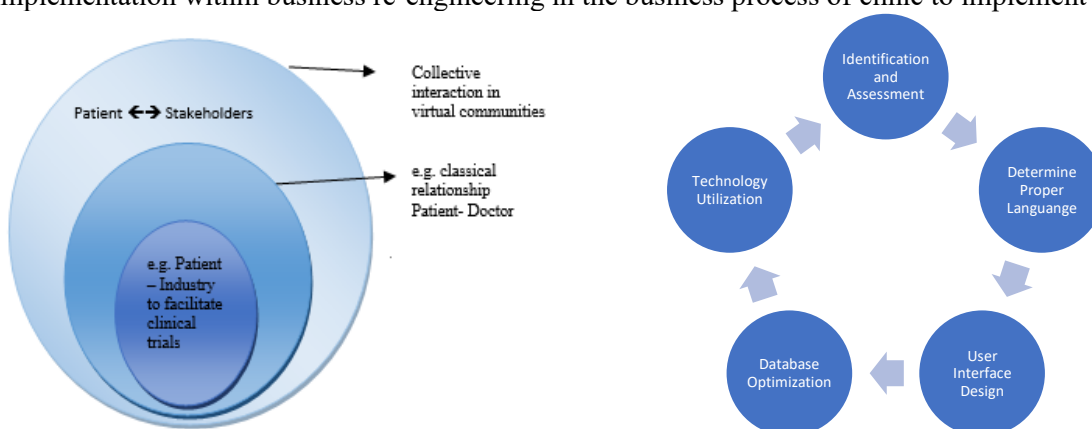


Figure 1: Business Process Re-engineering

3. Research Method

Proper procedure in the healthcare should be developed to ensure that the person input the right value into the system to create quality record about the patients. The process of creating solutions for serving the patients have tendency to outsourcing IS management process towards IT-related company that has function to operate database and archive service. In addition, this study divides the task to design the user interface of clinic management system to four groups by identifying the different theme, taste and feel in the form of modes. Interestingly, different interpretation on how such delivery service should be conducted usually follow prior experience, desires and ideals of certain individuals, which at certain extent fails to expect or understand specific promises from healthcare provider [11]. Therefore, the group delegators should observe the concept of healthcare services in term of availability, accessibility and usability to connect with the same perception on the user experiences of providing the platform to have ease of approach [11-13].

4. Discussion

The primary function of clinic is to maintain the safety of patient by control the environment to prevent infection spread widely. Thus, the adequate treatments should be done effectively to diagnose the patient status accurately, which may be differed as the implication of certain circumstances and event. Moreover, clinic also need to protect the environment through control the wastes properly derived from the equipment or tools that has been used in the medical care to prevent the spread of blood-borne diseases such as hepatitis B or C. Thus, the implementation of IS should consider various aspects in term the availability of infrastructure, patient's genetic disposition, geographical location, number of relevant medicines and the monitoring requirement. Therefore, successful implementation can extend the variant of treatments offered to patients in which medical records can give many added values namely maintained documentation, sustained service, resource sharing and higher impact of satisfaction. In the context of healthcare, the user interface design is remarkably valuable with dominant products characterized by high performance and high price, but through business process re-engineering, it can present simple design and universal.

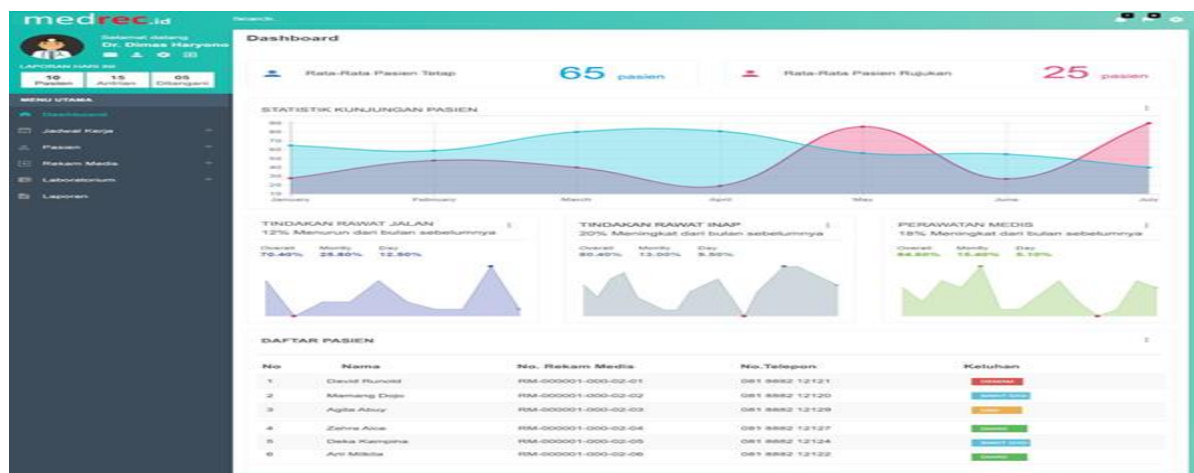


Figure 2: User Interface for Patient Visit Statistics (mode: BIZ)

To fulfill the variety of emotional aspects from the doctor, nurse and patient in anticipating the deadlock or disruptive process in coordinating or managing every activities in the clinic or health center, this study design four modes with different background, mental model and scenarios in mind, which are business/BIZ (code name: *medrec.id*), casual/CAS (code name: *medivery*), normal/NOR (code name: *semeedi*) and professional/PRO (code name: *mPuskesmas*). It is essential to include the interest of different stakeholders in aligning with data quality management by providing the platform with focus on pleasuring the user by meet their expectation with holistic approach through extension of usability and deliver value in the performance and availability. The process of designing the variety that follow different structures and hierarchies based on similar user specification and job task that previously

identified. In general, two modes (BIZ & CAS) will be utilized the website attribute while other two modes for mobile platform. However, this study incorporates all four design into personalization scheme that automatically accommodate the user preference to deliver more value to the customer in the iterative optimization of sub-process, either in the patient-related data management or clinic-related interaction [14, 15].

SURAT RUJUKAN PASIEN

Tanggal :

No.Rujukan :

Puskesmas :

Kab/Kota :

KODE :

Kepada Yth. TS dr. Poli :

Di RSU :

Nama :

No.Kartu BPJS :

Diagnosa :

Umur :

Kelamin : ☐ L ☐ P

Status :

Demikian atas bantuannya, diucapkan banyak terimakasih.
Salam sejawat,

Figure 3: User Interface for Patient Referral Letter (Mode: CAS)

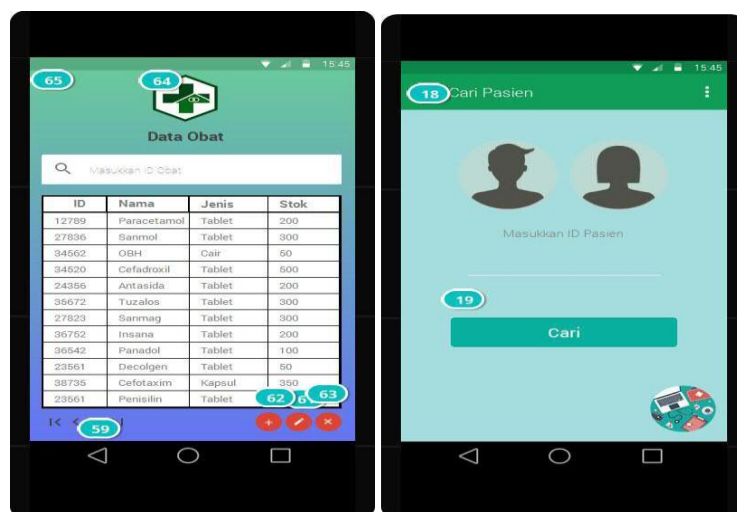


Figure 4: User Interface for List of Medicines (Mode: NOR/left) and Search Patient (Mode: PRO/right)

Moreover, analysis on data gives insight to health care providers to determine populations at risk for illness. By doing so, proactive steps can be taken initially. At present there are still many health centers in Indonesia that enter medical record data manually, thus slowing down the performance of the Health Clinic. Based on the results of the observation, nurse has been spent at around 15 minutes per patient to complete the registration process and search for manual medical record books. This application has the potential to help health centers to facilitate the search and recording of patient data so that it can reduce the patient queue time and time to make medical records or reports. In the future, this medrec.id application can potentially be further developed so that it can connect one health center with another health center or another hospital. That way the patient's medical record data will be single and not different in one place and another. This will make it easier for doctors to analyse the patient's disease history without needing to be re-examined.

5. Conclusion

The patient's data should be served as patient's belongings, which staff borrow and must be returned safely in its origin form. Thus, measurement of the proximity of a data value to some other value that is considered correct should be executed. In addition, once a particular physiological pathway is identified, physician staff or doctors will have capability to use computer-based methods to explore possible modifications to existing medicines or to simulate the treatment to particular disease to increase efficacy, safety, and quality. It involves process of mapping how particular medicine interacts with certain activities due to diverse reaction from patients in a therapeutic situation. It is almost a myth in the perspective of user or developer that the application determines the success of implementation, however, the quality of data is excessively critical, in which application have main role as proxy in representing the value of the service. A replacement or cannibalization effect should be avoided as the process reduction in the incumbent's incentives to innovate relative to an entrant's, due to the incumbent's current returns forming an opportunity cost not shared by an entrant. These should be done to allow incremental innovation to be executed in the health market that bring more health competition that have pressure and demand in the equilibrium. The purpose of designing many modes by providing alternative navigation, menus and features is to enable users to fulfill their needs in an efficient and satisfying manner that is most effective based on fast time estimates.

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