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ANALYSIS OF PROCESS CHAIN NETWORK FOR BOOK BORROWING PROCESS

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Abstract

In today's fast-growing information technology, libraries should be parallel to the digital world in order to provide the best service to the users. Technology rapidly increases by time and many things become more challenging nowadays. However, the services available in the library are still in the traditional way, especially in book borrowings. Some people are easy with the old ways, but align with the current evolution; the changing in the way of borrowing book is relevant as if become more effective and efficient. Therefore, the study was conducted to analyse the book borrowing service in the library to improve the quality of services. User can get the benefit from the technology enhancement. The approach used in the study is a process chain-network technique. This technique will show the entity involved in the process. An analysis is done on traditional borrowing processes and then is followed by the new or proposed borrowing process. The outcome of the process is the book borrowing process become more efficient. In addition, the user also can prevent the parking problem when going to the library. The result of the analysis will be represented as a reference to form a framework for the development of book borrowing model. Thus, this analysis is important in further continuing the development of the book-borrowing model in order to be relevant to the current situation and to assist in the establishment of a sustainable campus.

Keywords: Book borrowing, Library services, Process chain-network, Service process, Sustainable campus, User interaction.

1. Introduction

Over the last two decades, the library has undergone significant changes in the development of social change and the technological environment. It is not just a quiet place to read books and book borrowing centres, but even today's functionality and the environment of the library is much more than just for its users [1]. According to Scott [2], the library is currently a community centre that provides services that are not available elsewhere. Libraries store information and have the ability to organize, manage and disseminate the information and knowledge [3]. Thus, libraries should be functionally in line with the digital world in order to provide the best service to the user such as the development of a smart shelf library system [4] and the digital library [5].

A public library is not just a place to borrow or read books or even to access digital materials, but it also acts as a key resource and provides a facility to connecting people with each other [2, 6]. The library should build a relationship with the user and any possible support group to meet their needs [2].

The library is one of the elements in the university that is considered in forming a sustainable campus. A sustainable campus is a university that is involved in reducing the negative impacts on the environment, economy, social and health by utilizing resources on key functions for learning, achievement research and sharing, and surveillance [7]. Universities should have an effective sustainability initiative and information system that can be used to achieve the sustainability of the campus and gain a competitive advantage [8-10].

Due to the increasingly competitive value of the present, libraries are faced with the challenge of maintaining the use of services in ensuring development does not require excessive costs, reduced usage, sharp changes to digital services and increased demand for new services [11]. The development of services in libraries should be actively carried out not only to give value to consumers but also to engage users in the same value for innovation in services [12]. As said by Fabunmi [13], the user is seeking an information service that meets its needs, easy to use and understandable, and service delivered by staff that full of courtesy and knowledge.

Various services are offered from time to time by libraries such as book borrowing and returns, photocopiers, cafes, talk rooms, chambers and other facilities. However, the services available in the library are still in the traditional way, especially in book borrowing. Hence, studies have been conducted to analyse book-borrowing services in libraries to improve service quality in order to be relevant to the current situation and to assist in the establishment of sustainable campuses.

2. Process Chain-Network

The Process Chain Network (PCN) is a process of visualizing the service process that focuses on the interaction between service providers and service receivers [14-16]. The visualization of interactions in the process is stable and balance by considering the service as the source or process to be configured. The PCN diagram is built on a flowchart technique with specific conditions and designs to show an interactive and independent service process [14]. The combination of interactive and free process forms the concept of how a service process should be managed and illustrates the various aspects of service, management and interaction between entities.

PCN is based on three domains of the process: direct interaction, surrogate interaction and independent processing [14]. Direct interaction is a part where the entities in both service provider and service receivers have direct interaction individually. Surrogate interaction is a part where the entities perform the process steps not individually. While independent processing is a part that does not involve entities in direct interaction and surrogate interaction.

PCN has been used in detecting the impact of advanced Information and Communication Technology (ICT) on service systems [17], healthcare supply chain process [18] and analysis of hotel facilities [19]. Rapaccini and Porcelli [17] use PCN to analyse existing service system and proposes the service systems with the integration of ICT elements. Through the PCN analysis, they are able to detect the impact of ICT on the service system. Similarly, Sampson et al. [18] and Borges et al. [19] visualize the supply chain process in healthcare and the hotel facility respectively using the PCN technique to distinguish the process, the interactions between process and entity, the deficiency in the process if any and then suggest the improvements to the process.

The past studies of using PCN analysis lead this study to use PCN technique in the library services process. The library services process, which focuses on the book borrowing services, is visualized to show the interaction or role of librarians and users. The analysis is conducted on the conventional borrowing process and then is followed by the proposed borrowing process. Thus, the approach used in the study is the PCN technique.

3. Book-Borrowing Process

The study was conducted at the library of Universiti Kebangsaan Malaysia (UKM) namely Perpustakaan Tun Seri Lanang (PTSL). The main service offered at PTSL is book borrowing and returning. But the focus of this study is towards the book borrowing process. In book borrowing services, librarians always keep the book in-store and update from time to time. Each book in the library is stored by indexing, classifying and cataloguing. The book information is updated at the library website called e-gemilang before placed back on the provided shelf.

If the user wants to borrow a book, he/she needs to go to the library. User needs to use e-gemilang website to identify the status of the desired book either borrowable or not. Further, other related book recommendations, as well as the location of the book are informed on the website. Then the user will get the book at the shelf by himself/herself. After the user has the desired book, he/she needs to go to the loan counter to create a barcode scan in the vending machine provided. User can borrow up to seven books in two weeks for the undergraduate student. While for the post-graduate students, they can borrow up to 20 books for a month. Users can renew the loan period through the e-gemilang website. However, sometimes there is a case where the book in e-gemilang is available, but it does not exist at the shelf.

4. Book Borrowing Process Analysis

4.1. Conventional book borrowing process

The process of borrowing a book is then identified using PCN technique. The entities involved in the book borrowing process are users and librarians with each play a role in the independent processing and the surrogate interaction. The steps

that occur in the process of borrowing a book for the user are as told before. The role to borrow a book mainly is a user itself. While the steps that the librarians are trying to do are, process the book by indexing, classifying and coding the book before being updated and stored on the shelf provided. Book updates also occur once the books are borrowed or reproduced by the user. Figure 1 shows the visualization by sections for the steps that take place in conventional book borrowing processes.

However, based on Fig. 1, it was found that there is no direct interaction between librarians and users in conventional book borrowing processes. The users get the services by themselves as shown in the independent processing column of "do-it-yourself" and the surrogate interaction column of "self-service". At this point, users go to the library, then firstly looking for the parking. In getting the book, user checking the book in e-gemilang, then make sure the book exists or not. After that search manually for the book in shelf, either user may not found the book. If the book exists, the user can directly go to vending machines to borrow the books without getting any help from the librarian. While the librarians do the backend process of managing the book in the independent processing column of non-service production and the surrogate interaction column of "back-office" service steps such as handle the book storage process, book indexing, book classification, and book catalogues. Then they need to update the booking system. This situation creates a gap, where librarians and users are interconnected when users still have to communicate with librarians if they need any related help. Therefore, the study proposes solutions towards creating a direct interaction between librarians and users.

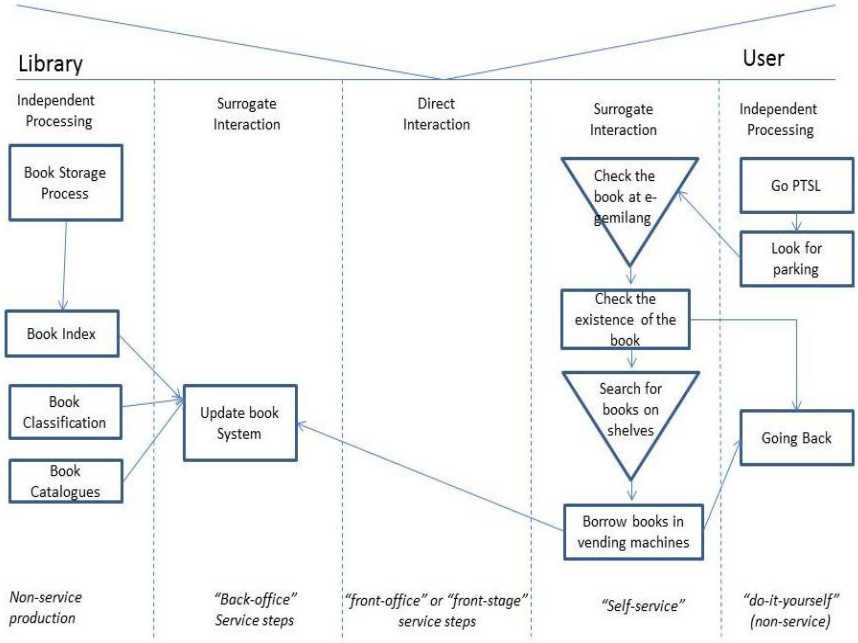

Fig. 1. PCN for conventional book borrowing process.

4.2. New book borrowing process

Each section involving users and librarians are reviewed individually. Users' problems are observed where there is a problem with parking if the users need to go to the library. Limited parking problems occur because the existing space is not only for the library users but also open to lecturers and students at nearby faculties. Users also sometimes have trouble finding books that are not available on the shelves when they are in the system. Here, a waste of time and energy should be avoided.

With this, the library offers new book borrowing services. The process of borrowing books on a pilot basis starts with the user contacting the library by either telephone, email or fill out the form for the application of book borrowing. The status of the book is then reviewed by the librarian either borrowable or not. If the book can be borrowed, the librarian should inform the user. Next, the user either by his own at the drive through or sent by the librarian to the user (door-to-door) when receiving the borrowed book. This new process of book borrowing is visualized by using the PCN technique as shown in Fig. 2.

Based on Fig. 2, there is a direct interaction between the user and the library. The process of deportation or delivery and acceptance of books between librarians and users is the direct interaction that occurs when the book borrowing service is on a rolling basis. This happened in the direct interaction column of "front-office" service steps. However, no changes occurred in the independent processing and the surrogate interaction of the library entity. While there are some changes occurred in the independent processing and the surrogate interaction of the user entity. Here, the user only needs to apply for book borrowing, waiting for feedback from librarians about the booking status and then receives the book either by taking on his own or asking the library to send the book to him. With this new process of borrowing book, it is easier for the user to borrow the book without having the parking problems or the unavailable of the desired book. Both the user and the librarian can also interact with each other in improving the book borrowing process.

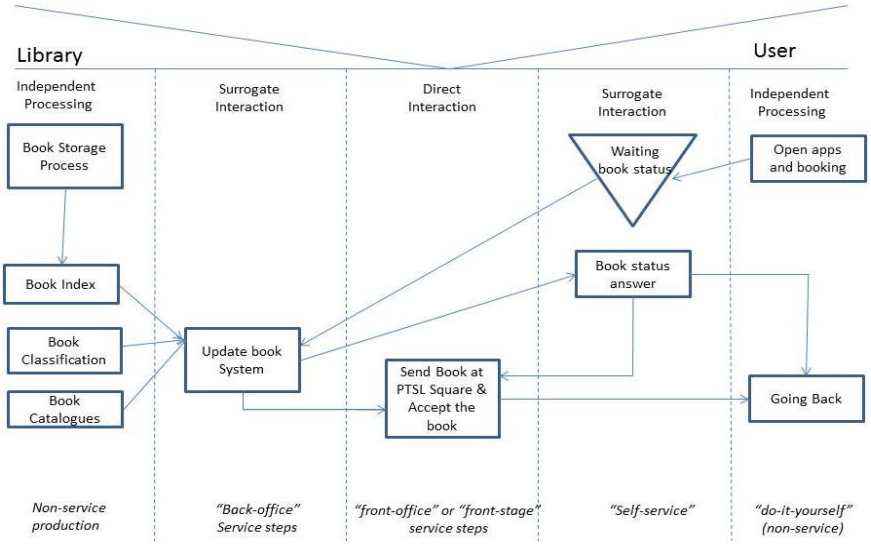

Fig. 2. PCN for new book borrowing process.

Table 1 shows the comparison between the processes exists in a system and application based on Sampson model. Difference occurs between the two processes is the direct interaction that happen to the system process, but not happen on the application process. Direct interaction that happens to the application is sending the book by the librarian and accepting the book by the user. The model of the new book borrowing process on Fig. 2 shows the novelty of this research. It help improvises the relationship between librarian and user whereas there exists direct interaction between them that make the service more effective and efficient based on user needed.

Table 1. Comparison between system process and application process based on Sampson model.

	System	Application
Independent processing (librarian)	\	\
Surrogate interaction (librarian)	\	\
Direct interaction (librarian and user)	x	\
Independent processing (user)	\	\
Surrogate interaction (user)	\	\

5. Discussion and Conclusion

The concept of PCN is used in the conventional book borrowing process and the new book borrowing process. In the process of borrowing book conventionally, there is no direct interaction between the user entity and the library entity. However, in the new process of borrowing book, there is a direct interaction between these two entities. Each entity displays the processes that occur in each section. The independent processing and surrogate interaction for the library entity have the same process in the process of borrowing books conventionally and in the new one. However, independent processing and surrogate interaction for the user entity has different processes in the conventional and the new book borrowing processes. The difference in book borrowing process is in allowing the direct interaction between librarian and user as visual in Figs. 1 and 2.

Analysis that is done using the PCN concept is useful for further research. Hence, a review to analyse the conventional book borrowing process in conjunction with the new book borrowing process using the concept of PCN was successful. The adoption of the conventional book borrowing process can be demonstrated and subsequently solved in the new process of borrowing a book where there is a direct interaction between the library and the user. With the new book borrowing process, the user can get the benefit of saves time and energy without having to deal with parking problems or in the absence of the desired books. The results of the analysis will be used in further studies to develop a book borrowing application.

From the previous analysis that held by Sampson [14], the study conducts the PCN analysis that done for pizza restaurant between the relationship of the restaurant and customer. Within the case, the customer receives benefits such as save their cost. Thus, in this study, a questionnaire was also conducted for the user of the library. The question is about either the user of the library preferred to use the new services based on the PCN's analysis or not. For the result, 81.25% of them choose to use the new services provided. Therefore, the PCN analysis is done as a reference to form a framework for the development of book borrowing model.

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