



The Design and Development of School Cooperative System

Check-Yee Law¹ (✉) , Yong-Wee Sek² , Choo-Chuan Tay² , Tze-Hui Liew¹ ,
Leonard-Chi-Boon Yew¹ , and Nur Sarah Najihah Binti Nor Alahyadi¹

¹ Multimedia University, Melaka, Malaysia
{cylaw, thliew, cbyew}@mmu.edu.my

² Universiti Teknikal Malaysia Melaka, Melaka, Malaysia
{ywsek, tay}@utem.edu.my

Abstract. School cooperatives have been set up in Malaysian schools since 1968. Today, most secondary schools in Malaysia have established school cooperatives managed by students and teachers. However, in this digital era, while e-commerce is popular and continues to explore the best business practices, the operation of most school cooperatives remains in the physical store. There is no proper system to manage the marketing of products and business operations. While numerous research studies have shown the establishment of school cooperatives can instil entrepreneurial spirits and management skills among the school communities, especially the students, there is a dire need to have a proper system for the students to learn how to manage the operation of a school cooperative with a system. This research work proposes the design and development of an online marketplace for school cooperatives known as the School Cooperative System, moving school cooperative operations towards a ubiquitous marketplace. In this way, school cooperative products can be advertised to the school communities and transactions can be conducted via the online platform. The cooperative members can also track their investments and dividends via this system. This can better instil entrepreneurial spirit and management skills among students in this digital era.

Keywords: Dividend · E-commerce · E-marketplace · Investment, · School cooperative · School communities

1 Introduction

A school cooperative is a place where the school communities can buy school necessities. Cooperatives were set up in Malaysian schools in 1968 [1]. Today, most secondary schools in Malaysia have established school cooperatives managed by students and teachers. School Cooperative is not a foreign word to every Malaysian who has gone to public schools. From secondary school Form 1 (equivalent to middle school Grade 7) until Form 5, students gather at the school cooperative to buy stationeries, school supplies, official school merchandise and even food, especially during the start of a school term.

One of the objectives of the establishment of a school cooperative is to provide affordable school supplies for the school community. Other objectives include involving students in running a business and exposing them to gain experience and skills in entrepreneurship. This means students can learn how to manage a business from the financial and commercial aspects. The experience and skills gained would benefit students in taking a future career path in entrepreneurship if they are exposed to these skills since school age [2]. School cooperative plays an important role in instilling entrepreneurial spirits among students [1, 3]. Research studies have shown an increase in marketing and business skills among students and teachers who had been involved in running businesses in school cooperatives [4].

In this digital era, while e-commerce is popular and continues to explore the best business practices, most business operations at schools such as school canteen and school cooperatives remain in the physical store [5]. They do not have a digitalized system to manage the business operation of the school cooperatives such as tracking the transactions and inventory level [6, 7]. Without a proper system to manage the operation of a school cooperative, this causes a big disadvantage for the students to learn how to manage a business using a system. These would be essential skills required for them to learn entrepreneurial knowledge and skills in this digital era. The cooperative teachers would also encounter problems in efficiently managing the cooperative without a suitable cooperative system.

School cooperatives nowadays need to actively promote and handle commercial activities. These activities can be conducted easily to reach prospects or customers with an e-commerce platform. The platform not only can serve as an online marketplace to advertise and promote the products to the school community, but it also can enhance efficiency in business operations such as providing more efficient ways for order processing, order fulfilment, and inventory tracking [8]. By having an online marketplace, school cooperatives can increase efficiency by lowering the operational cost and reduce business transaction hassle and burden [9]. Although there are existing e-commerce platforms such as Shopee and Lazada in Malaysia, they are not suitable for school cooperative products which are exclusive to the school communities. For example, the school merchandise such as exercise books, t-shirts, and badges of a particular school. Without the existence of an online marketplace, school cooperatives have to keep their commercial activities limited to physical transactions.

This research work proposes the design and development of an online marketplace for school cooperatives known as School Cooperative System, moving school cooperative operations towards a ubiquitous marketplace. In this way, school cooperative products can be advertised to the students, teachers, and administrators via the online platform. The school communities can also track their investments and dividends via this system. Besides instilling entrepreneurial spirit and management skills among students in this digital era, this system also plays a crucial role in helping them understand and recognize their contributions to the school cooperative. Section 2 presents a system review of three similar cooperative systems and a features comparison. Section 3 explains the design and development of the proposed system with illustrations of a context diagram, screenshots of the system interface, and user activity diagram. Some functional testing cases and

results are presented in Sect. 4. The research work is then concluded in Sect. 5 with some recommendations for future work.

2 Literature Review

School Cooperative System is an online platform that provides a management site for the admin and an online marketplace for the school cooperative to sell school-related products to the cooperative members in a ubiquitous manner. Currently, cooperative systems that support school use are quite limited and not accessible. To design the proposed School Cooperative System, three cooperative systems that support universities and organization use were reviewed to gain a better understanding of the key features and functionalities of a cooperative system. The cooperative systems include Koperasi UNIKEB Berhad, Koperasi Kakitangan USIM, and Koperasi Kakitangan FELDA Malaysia Berhad (FELKOP). This literature review was conducted to view the systems and compare the features of each system to gain more insights for this research project. It is important to note that these systems are exclusively for the cooperative members, and the literature review can only cover the guest mode, excluding the access privilege as a cooperative member.

2.1 Koperasi UNIKEB Berhad

Koperasi UNIKEB Berhad is an online cooperative system for Universiti Kebangsaan Malaysia that is used to handle all the cooperative matters related to the cooperative members [10]. It is only exclusive to cooperative members of Universiti Kebangsaan Malaysia only. Koperasi UNIKEB Berhad offers a lot of products and collaborations with brands like Apple and ASUS. The categories that are included on the website are also vast, for example, kitchen appliances, electronic devices, furniture, and smart appliances. The e-commerce site of Koperasi UNIKEB Berhad provides a shopping cart for users and offers multiple contact choices via Facebook, Instagram, email, and hotline. This website also provides a promotional banner for new and updated information about the cooperative.

2.2 Koperasi Kakitangan USIM

Koperasi Kakitangan USIM is an online cooperative website exclusive to staff at Universiti Sains Islam Malaysia, developed in 2021 [11]. It focuses on the products and services offered by the cooperative. The website provides a comprehensive homepage that consists of cooperative information, services offered, products, gifts, payment, and membership. The information regarding the products offered by this cooperative is listed in picture form, without ordering features on the website. This means the product list could be only for information display purposes. The members of the cooperative need to log in or sign up to enter the members-only website that offers information and options to view their investments and dividends.

2.3 Koperasi Kakitangan FELDA Malaysia Berhad (FELKOP)

Koperasi Kakitangan FELDA Malaysia Berhad is an online cooperative website developed exclusively for FELDA staff. On this website, the cooperative members or visitors can get more information about the cooperative and there are various features available on this website [12]. On the website, a promotional banner is included to attract a visitor’s attention. On the tabs provided, there are a few information tabs including forms for FELKOP, guidance for the FELKOP members and content for annual general meeting. There is also a tab for FELKOPMALL, which will direct members to the online marketplace. The FELKOPMALL homepage contains the types and brands of products offered. Shopping Cart is available to facilitate online shopping. There are also tabs for purchase information, a service centre for the products, a form download tab and a contact tab. On the product page, the pictures and descriptions are clearly shown. Users can navigate their desired products or services via the navigation pane specifying the product type and brand. However, there is no direct contact number on the contact page. A user needs to either scan the QR code for WhatsApp or contact the admin via email [12].

In general, these cooperative websites include a product page, user-friendly navigation, a shopping cart, and a categories page to facilitate user navigation. Table 1 presents the feature comparison of these cooperative websites and the proposed system–School Cooperative System.

Table 1. Feature comparison of cooperative system website and the proposed system

Feature	UNIKEB	Koperasi Kakitangan USIM	FELKOP	School Cooperative System
Information Page	Yes	Yes	Yes	Yes
Online Market page	Yes	No	Yes	Yes
Navigation Pane	Yes	No	Yes	Yes
Shopping Cart	Yes	No	Yes	Yes
Promotion Banner	Yes	Yes	Yes	Yes
Dividend Calculator	No	No	No	Yes
Sales analytics	No	No	No	Yes
Investment Analytics	No	No	No	Yes
Customer Review	No	No	No	Yes

The proposed system consists of an information page and a promotional banner to advertise the latest information and promotions available. A user can navigate the information available on the website through the navigation pane. With the Shopping Cart feature, the system supports merchandise transactions and processing. The customer review page is also available. Besides that, sales and investment analytics can be generated. As an additional feature, there is a dividend calculator that will help a cooperative member track and count a cooperative shareholder’s dividend,

3 The Prototype Design of School Cooperative System

As the name suggests, School Cooperative System is a web-based platform to support the management of school cooperative marketing and business processes. Figure 1 shows the context diagram of user interaction with the proposed system.

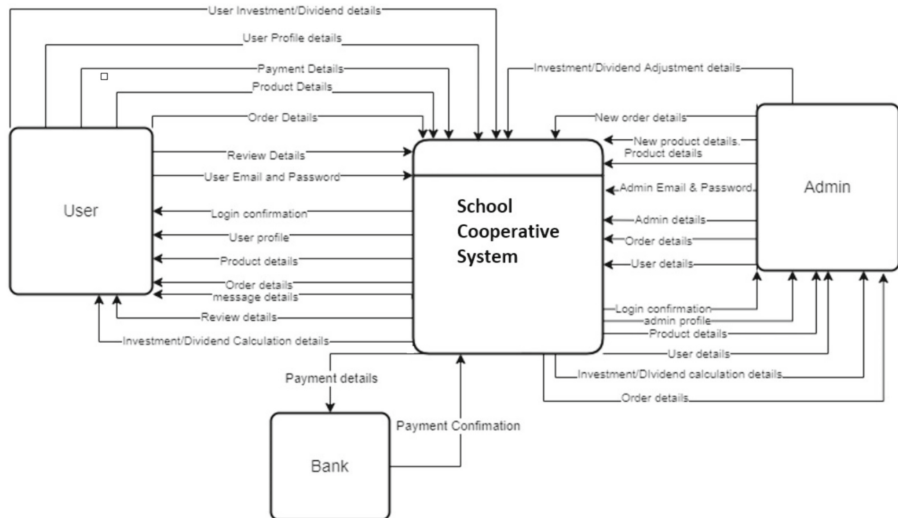


Fig. 1. Context diagram of school cooperative system

There are three external entities in School Cooperative System that include the user, admin, and bank. In every entity, the functions performed are different according to the entity's needs. As for users, they can login, enter user profile details, payment details, view product details, enter and view order details, and review details, view investment or dividend details. Admin can login, view user details, view and edit order details, product details, and investment details. The Bank entity can receive payment details and send payment confirmation to School Cooperative System. The presentation of this paper focuses on the e-commerce features that include investment, dividend features, investment analytics as well as the investment calculator in this system.

3.1 Prototype Design that Facilitates Product Transaction in School Cooperative System

In this section, system interface screenshots are utilized to explain the transaction of products in the School Cooperative System. For the users, they need to login to the system according to the email and password that is provided by the school. Once a user logs in to the system, they can see the system landing page of School Cooperative System that shows the latest information and the popular products for sale as in Fig. 2.

Users can place an order via the School Cooperative System. They can view the product page from the product categories (Clothing, Stationeries, Books, Accessories)

at the header of the home page (see Fig. 2). When users click on the product category, for example, Stationeries, they can view the products available in this category. To purchase the product, users can click Add to Cart (see Fig. 3) and indicate the quantity they wish to order. After the product quantity and details are confirmed in the cart (see Fig. 4), the user can proceed to checkout and make payment for the product. When the user has received the product, they can rate the product (see Fig. 5).

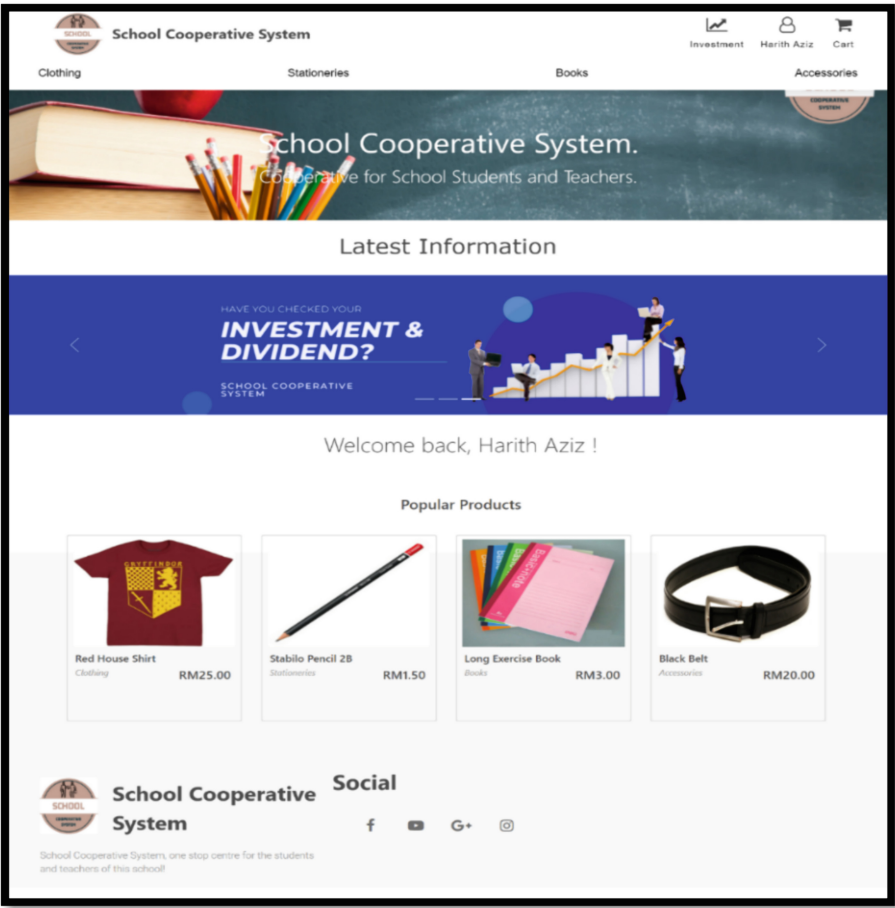


Fig. 2. School cooperative system user landing page

3.2 Prototype Design of User Investment and Dividend Features

The flow of using the investment and dividend calculator process is illustrated by the user activity diagram in Fig. 6. The user can access this Investment page while they are logged on to the system.

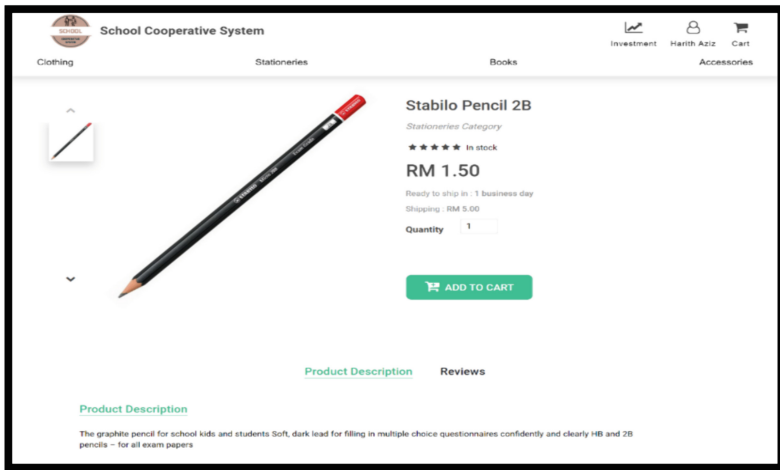


Fig. 3. Interface of product details and add-to-cart feature

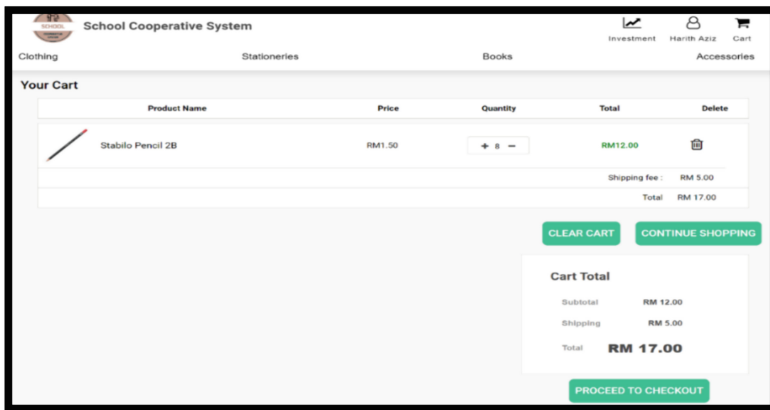


Fig. 4. Interface of the cart feature

The cooperative users can view their investment amount and dividend for the year. The cooperative members also can use the calculator in the system as in Fig. 7 to calculate their expected dividend based on the investment amount. The calculator has been coded based on the formula: $\text{Investment amount} \times \text{Dividend percentage} = \text{Total dividend}$. This can help a user to understand and predict their total investment to either increase or decrease their investment in the coming years.

If the member has made investments for a few years, they also can view the investment record by years from a stacked bar chart as in Fig. 8. When the user hovers over the bars of the chart, a brief description pops up to inform the user about the investment amount, dividend allocation or dividend amount for the year.



Fig. 5. Interface of product rating feature

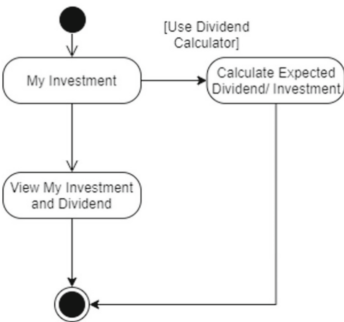


Fig. 6. Activity diagram of investment and dividend calculator process

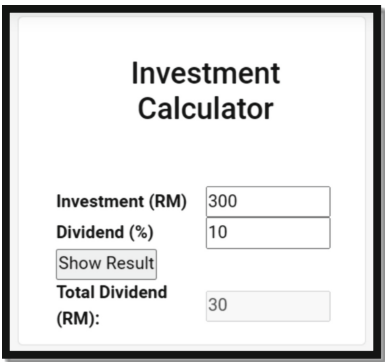


Fig. 7. Investment calculator on the investment page

Once the dividend allocation has been finalized by the cooperative committee, the admin can update the dividend allocation in the admin investment page as in Fig. 9. In this page, the admin can view a user’s investment type, dividend percentage, total investment, and the total dividend for the year. The Edit button is for the admin to edit a user’s investment account. Admin investment analytics page is also available for the admin to view the investment analytics in a bar chart. The admin can view and see the

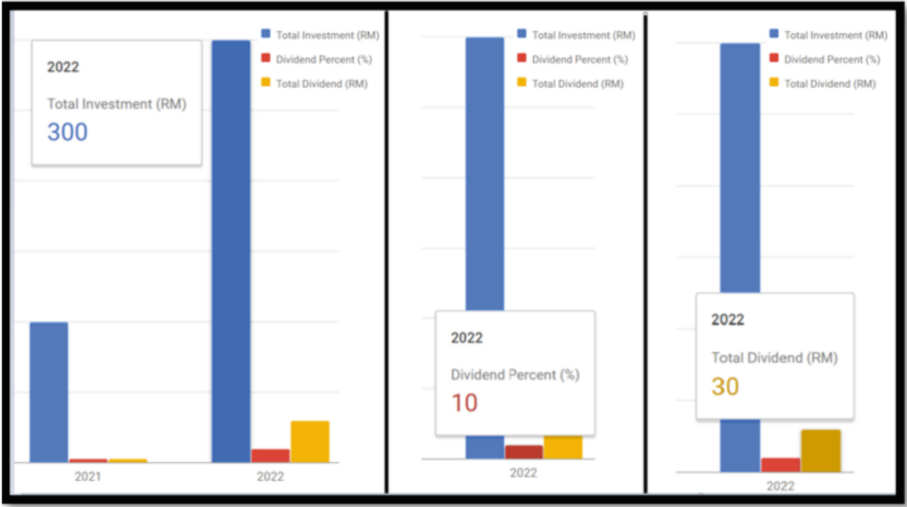


Fig. 8. Investment record

comparison of the total investment amount and total dividend allocation by user type from the bar charts as in Fig. 10.

Investment							
No.	Name	Investment Type	Dividend Percentage (%)	Total Investment (RM)	Total Dividend (RM)	Year	
1	Harith Aziz	student	10	300	30	2022	
2	Hermione	student	2	200	4	2022	
3	Ahmad Kassim	teacher	5	1000	50	2022	
4	Jamilah Abdul Karim	teacher	4	1000	40	2022	
5	Ahmad Karim	student	2	200	4	2022	

Fig. 9. Admin investment page

4 Prototype Testing

To make sure the features in the School Cooperative System works well and fulfills the expected outcomes, functional testing has been conducted from the User and Admin features, and the system navigation. The entire system works smoothly and there are no

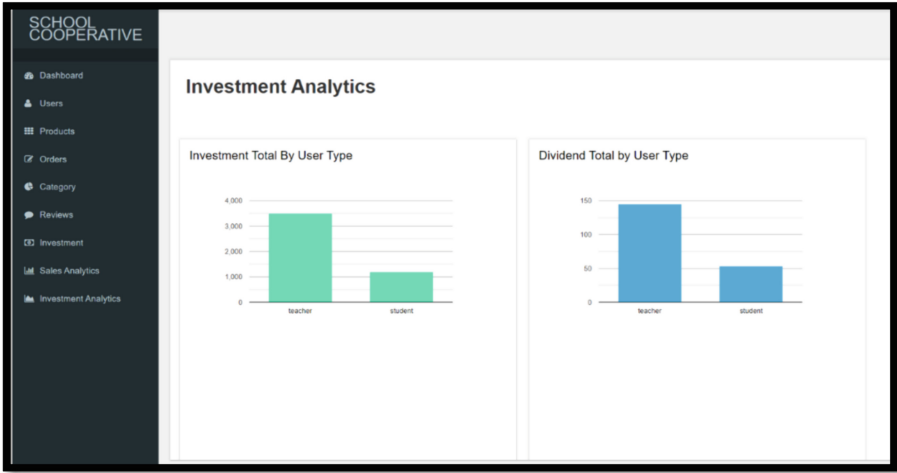


Fig. 10. Admin investment analytics page

major functional problems detected. In this paper, only some of the functional testing for the user and admin are shown. Table 2 presents the results.

Table 2. Functional testing test cases, expected outcomes, and results

Test cases		Expected outcomes	Results
User			
1	Purchase product	A user should be able to purchase product	Fulfilled
2	View purchase history	A user should be able to view purchase history	Fulfilled
3	Rate product	A user should be able to rate the product after receiving it	Fulfilled
4	Dividend calculator	A user should be able to use and calculate total dividend using the dividend calculator	Fulfilled
5	View current year investment details	A user should be able to view the investment details of the current year without error	Fulfilled
6	View investment chart by year	A user should be able to view and hover to see investment chart by the years correctly	Fulfilled

(continued)

Table 2. (continued)

Test cases		Expected outcomes	Results
Admin			
1	View orders	Admin should be able to view orders placed by users	Fulfilled
2	Update orders	Admin should be able to update the orders by the users from paid until rated	Fulfilled
3	Update and edit investment	Admin should be able to update and edit investment details like investment total and dividend percentage of the user	Fulfilled

5 Conclusion and Future Research

School Cooperative System is targeting to help the students and teachers to understand the operation of a school cooperative. Besides serving as an online platform for the school cooperative to manage marketing and transaction of products, key features include tracking investment and dividend. It serves as a platform for school communities to buy school necessities and to generate income through school cooperative, and hence provide profit sharing to the school community. Through this system, entrepreneurial skills and spirits can be fostered within the school community. Future research work may include converting the dividend to e-wallet for the school community to purchase product with the dividend they earned. Enhancement also can be made to the calculator to include more formulas for interest or dividend calculation such as simple interest, compound interest, and return on investment (ROI) in the calculator. Mobile applications can also be developed for the users to navigate School Cooperative System.

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