

Website-Based Educational Application to Help MSMEs in Indonesia Develop

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Abstract: In the current era, information technology systems have rapidly developed and are commonly utilized to address company requirements. Implementation of this technology significantly impacts business processes. MSME development collaborator company is actively engaged in helping MSMEs to survive and thrive through collaborative initiatives. Currently, the company does not offer educational support to MSMEs. This research aims to develop a web-based educational application to tackle current challenges. The extreme programming application development method, a five-step process including planning, design, coding, testing, and software increment, will be utilized. The study produced a website-based education application designed to provide educational support to MSME actors.

Keywords: Application, Education, Extreme Programming, MSMEs, Web

Introduction

In modern times, the rapid development of information system technology has been observed. The widespread adoption of technology with the potential to simplify work processes has significantly influenced all aspects of daily life (Qiao *et al.*, 2021). Technology can certainly be employed for organizational purposes, enabling greater efficiency and effectiveness in achieving goals (Yurisca *et al.*, 2020; Andriani and Andry, 2023; Palad, 2022). Numerous companies across all industries have adopted information systems technology to realize effective benefits, which is thought to have a positive impact on organizations (Olaofe-Obasesin, 2020; Hayati *et al.*, 2021; Biagi *et al.*, 2021). The implementation of information systems technology is anticipated to align with the objectives and vision of the company or organization, thereby enhancing operational efficiency, precision, and seamless integration across the system. This, in turn, can substantiate business value and drive growth (Tarigan *et al.*, 2019; Setyowati *et al.*, 2021). Technology offers benefits not only to companies but also to users. For instance, e-learning technology provides knowledge benefits to technology users (Susan and Novianti, 2019; Shrivastava and Shrivastava, 2020; Al Kurdi *et al.*, 2020; Shofwan *et al.*, 2021).

Micro, Small and Medium Enterprise (MSME) Development Collaborator Company serves as a

collaborative entity for MSME development, established on August 17th, 2020 amidst the COVID-19 pandemic's (Adiputra *et al.*, 2021) detrimental effects on Indonesian MSMEs (Sidharta *et al.*, 2021). The company strives to aid MSMEs in surviving and progressing through diverse partnerships. MSME development collaborator company offers solutions for the challenges encountered by MSMEs and other parties within the MSME ecosystem. These solutions are presented through collaborations that give rise to diverse products and services. The most crucial business activity undertaken by the company is providing programs that assist MSMEs.

The use of technology has a big role in helping the company's business activities so that the company's goals and vision and mission can run better and can also create synergy and company integrity (Andry *et al.*, 2021; Tashtoush, 2021; Christianto *et al.*, 2023; Fianty, 2023). MSME Development Collaborator Company does not currently offer educational support to MSMEs that could benefit players in the industry. Given the current technological landscape, businesses can utilize information systems technology to meet company goals and streamline operations (Thaib and Emanuel, 2020; Deny *et al.*, 2021).

To enhance the company's growth, the author proposes designing an education website system at MSME development collaborator company. The website serves as a means of information and communication that is

accessible at any time and from anywhere. This research is conducted with the concept of an education Information System to support the company's business operations by providing assistance to MSME players through training or learning classes, materials, and consultation rooms. The research design will utilize the Extreme Programming (XP) methodology to yield effective, streamlined outcomes with minimal time and cost. The XP approach enables adaptable system development wherein requirements remain flexible and subject to modification (Shrivastava *et al.*, 2021; Coyanda *et al.*, 2022; Adrianus and Po., 2023; Pasaribu and Wahyudi 2023). It is hoped that this research will offer an education website design to be utilized as a business process development guide for companies and aid in the advancement and growth of MSME players.

Materials and Methods

This study relies on data obtained through direct observation and interviews of the company's operations. Based on this data, a web-based education application will be developed for the company utilizing the extreme programming methodology. Extreme programming, introduced by Kent beek, is a software development approach that falls under the agile approach (Kolahdouz Rahimi *et al.*, 2019; Al-Saqqa *et al.*, 2020; Akhtar *et al.*, 2022; Wiratama and Santoso, 2023).

The Extreme Programming (XP) methodology offers significant benefits, including speed, efficiency, flexibility, and low-risk. This approach streamlined software development with minimal complexity, allowing for simple deployment in various fields. XP focuses on the software creation process, emphasizing effectiveness to achieve maximum efficiency (Sari and Ayu, 2021; Coyanda *et al.*, 2022). There are several stages that must be completed in the XP methodology, including planning, design, coding, and testing (Fatmaningtyas *et al.*, 2021; Susilawati and Fauzi, 2021; Anwar, 2022; Lamada, 2022).

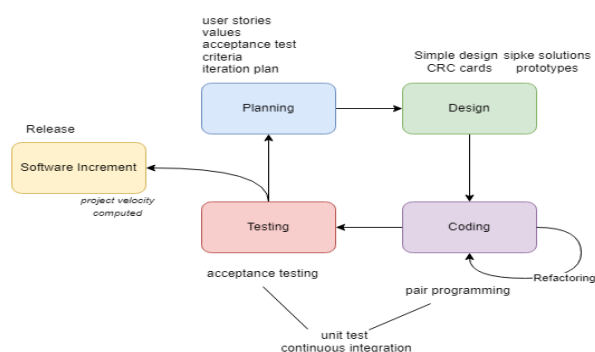


Fig. 1: Flow extreme programming method (Krianajaya *et al.*, 2021; Andriani and Andry, 2023)

The following is an explanation of the stages from Fig. 1 in the extreme programming method (Adrianus and Po, 2023; Andriani and Andry, 2023):

1. Planning phase: This phase will focus on gathering requirements so that the business context can be understood for the application to be designed. In the design of this education website, identification of system needs from the company and analysis of user needs will be carried out
2. Design phase: This phase focuses on creating a system model based on the results of the needs analysis that has been done. In the system model, unified modeling language, use case diagrams, and activity diagrams are designed
3. Coding phase: This phase focuses on implementing the system model design into a programming language that will produce an application prototype. This education website is designed with PHP programming language with the help of visual studio code text editor and XAMPP as a temporary web server database
4. Testing phase: This phase focuses on testing the application that has been designed using Black-box testing. During testing, problems will be analyzed and evaluated continuously until the entire application functions properly and no problems are found
5. Software increment: This phase focuses on adding features and content that can be developed in system functions

Results and Discussion

Planning Phase

At this stage, the author gathers information about the business by directly observing its activities and interviewing the managing director of MSME Development Collaborator Company. The acquired information is presented in the form of a Business Process Model and Notation (BPMN) at company in Fig. 2, which helps to identify more detailed issues.

Based on Fig. 2, BPMN illustrate the user process from pre-employment until registration with the company. The process commences with the disclosure of company information, following which, interested users can sign up. Once registration is complete, the user must await approval from company personnel. Staff responsible for receiving data may conduct an initial screening to ensure accuracy of the MSME information. If the results are verified, they will be approved and forwarded to both the user and the managing director. Approved users will receive recommendations for classes, which they can then select. Once a class is chosen, the user will be registered and able to access various events and features.

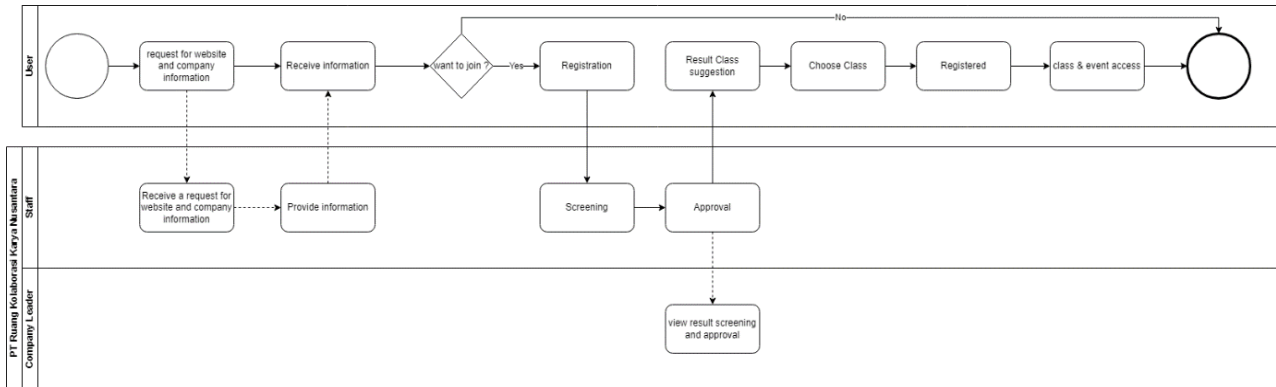


Fig. 2: BPMN at company

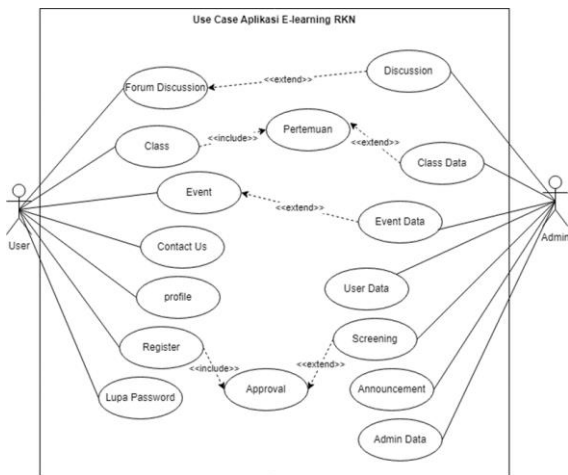


Fig. 3: RKN education application use case

Design Phase

At this stage, the author proposes a web-based education website application design which is described in system modeling with a unified model language. The following is the design of the system model:

- a. Unified modelling language: The author presents use case diagram, activity diagram and sequence diagram on system modeling using this unified model language to define how the process runs
- b. Use case diagram: Use case diagrams help to display the functionality that the system provides from the user's point of view. Use case diagrams are useful for modeling system requirements and are used to make it easier to communicate with stakeholders about system functionality

Figure 3, displays a use case diagram for designing a web-based education application at RKN. The diagram outlines login, registration, access to PDF material, discussions, online classes, and event available to users. An administrator can screen and classify user data, as well as input and view class data and event data.

There are 2 actors involved in the application, namely user and admin. Users are involved in accessing all the features provided by the application, such as registering for events, conducting consultations or discussions, accessing the material (content) provided and then taking registered classes. There is also a contact us menu for users to contact the company if problems arise. Meanwhile, the admin plays a role in organizing the classes and materials that are given to users. Admins can also process event data so that it can be displayed on user pages. Admin also plays a role in screening users who register and can view registered user data.

Users who are not yet registered can register on the application and if they are registered they can log in to access existing features. Users who have just registered cannot log in immediately but must wait for verification from the company. Verification can be in the form of approve and reject. If approved, the new user can register an account via the link sent to the email and after that they will go straight to the home page.

Admins can manage class data by entering a new class and then entering material, links and other information for each meeting in the new class. Admins can also manage event data such as entering new event data along with information such as description, time and place. Users who register for the event will appear on the admin page for participant information needs.

Screening functions to select users with valid MSME data and not fill in randomly to ensure that education is provided according to the desired target.

Activity Diagram

One kind of UML diagram used to simulate the flow of control in a system is the activity diagram. The behaviour of the system is depicted in this diagram. One sort of UML diagram used to represent the control flow in a system is an activity diagram. They offer a well-organized illustration of how the behaviour of a system is attained. Activity diagrams are utilized in this study to illustrate the steps involved in each process, including education and login procedures.

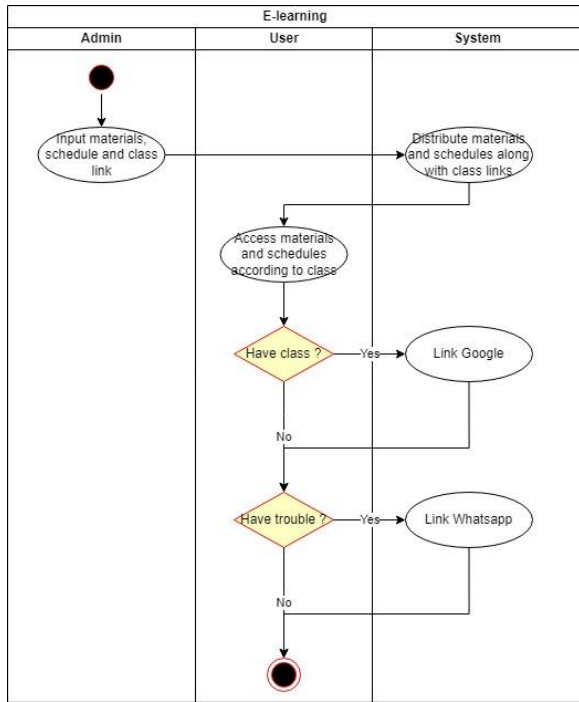


Fig. 4: Activity diagram

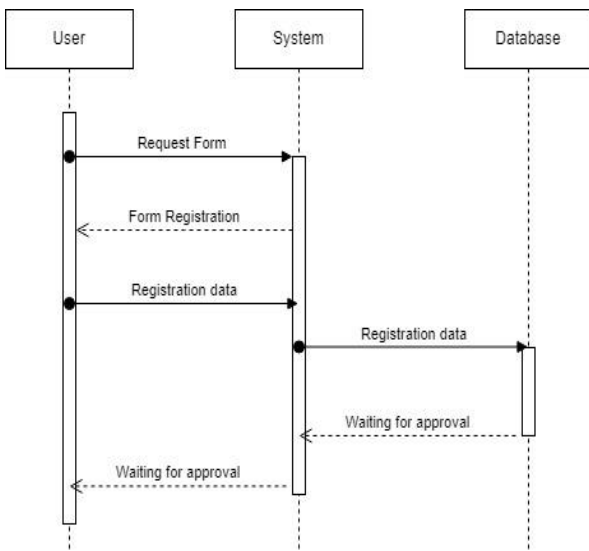


Fig. 5: Sequence diagram

In the activity diagram that show in Fig. 4, this application runs starting from the admin who manages all the data needed for the website, such as entering class and meeting data (materials, class links, class schedules), entering event data, and entering other data needed on the website. After the data input has been completed by the admin, it will be processed into the system and the system will distribute the existing data to the application display so that it can be accessed and according to the

user's needs. Then users can access all the features they need according to the data the admin provides. Users who have a class schedule can enter an existing class using the link provided by the website and it will be generated in a meeting application such as google meet.

Sequence Diagram

Sequence diagrams are a type of UML diagram that portrays system object interactions through messages or commands sent and executed over time. Such diagrams are widely employed to model system behaviour, providing developers with insights into how the system components interact. The sequence diagram explains the interactions that occur from the user or admin to the system and database in the designed educational application.

Figure 5 explains the sequence diagram when registering where the user gets a form for collecting profile and SME data, then the user sends the data to the system and it will be entered into the database. If screening has been carried out, the user will receive feedback in the form of an email sent to the profile form data that the user has entered.

Figure 6 explains how users access class and meeting data. The system will validate whether the user is registered in the class or not. If registered, the user will be given the appropriate data from the database. The data can be in the form of meeting information such as benefits and discussions or what will be done at the meeting and then contains a link that will be generated to google meet and contains class material according to the meeting that can be downloaded by the user.

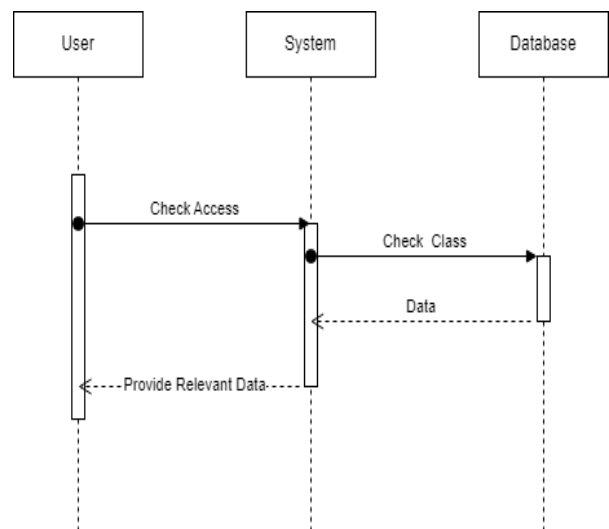


Fig. 6: Sequence diagram

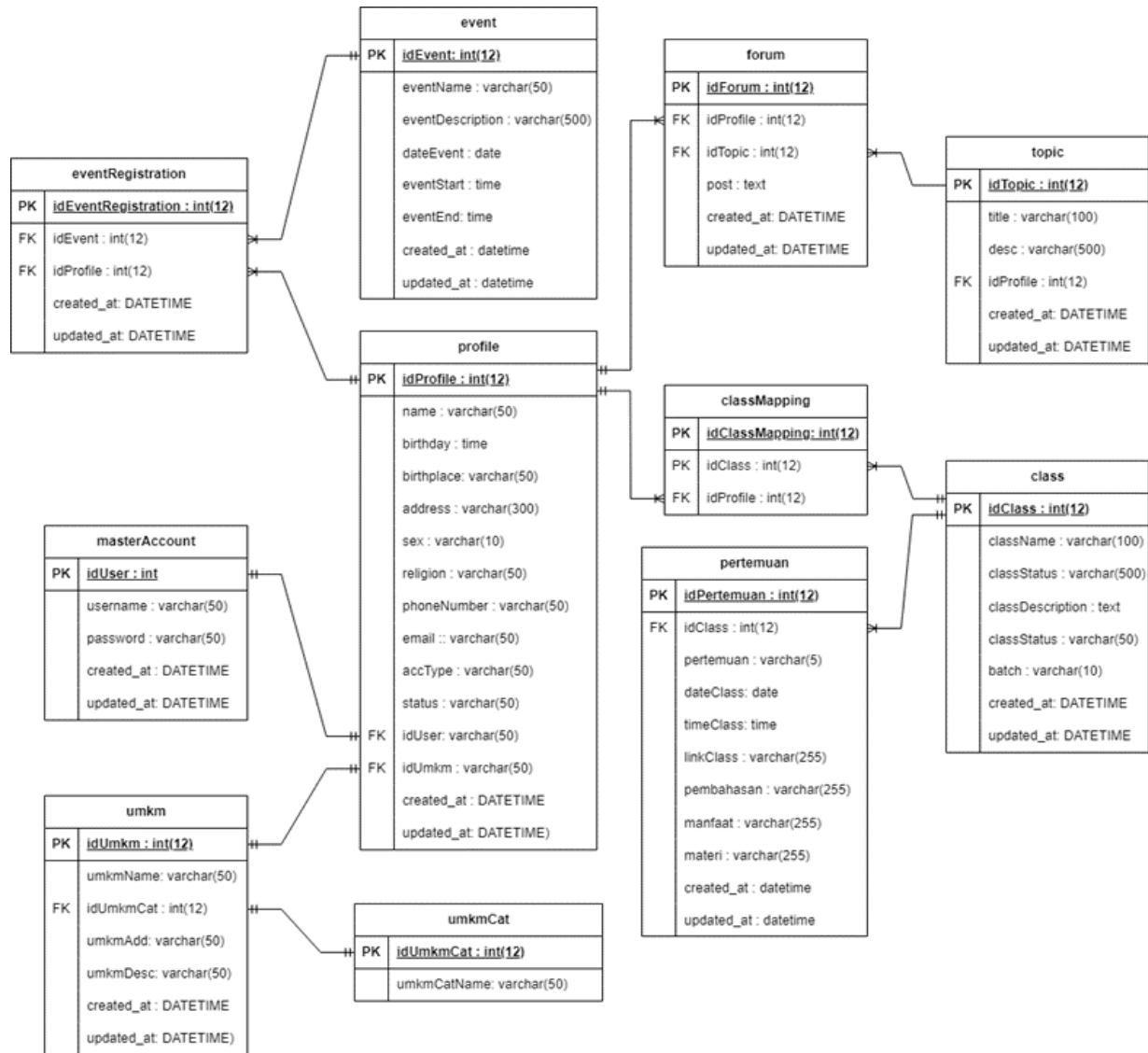


Fig. 7: Entity relationship diagram

Data Base Design

The Entity-Relationship Diagram (ERD) serves as a design model for representing the relationships between entities in a database and other tables. ERD of these systems show in Fig. 7. This study includes twelve entities, specifically: Profile, master account, event registration, event, umkm, umkm Cat, forum, topic, class mapping, class, pdf, and online class. User data collection table profile to connect with umkm.

Existing umkm cat category will facilitate selection. Use master account for user validation to log in. Event registration table to map users who register for events. Event data table for event information. Forum for managing the forum feature, topic for initial data prior to

forum selection, class mapping table for mapping one id profile to the number of classes, class for existing class information, pdf for retrieving pdf locations and validating classes, and online Class which contains links to take classes and validates access to classes. Contact us to hold data when the user submits contact us later.

Wireframe Design

There is a wireframe design created in this study as an initial plan before implementation is carried out in the coding phase. Figure 8 displays a wireframe design of the education application home page, on this page there is a navigation bar, poster and there is a READ process of event data from the database as well as displaying information about the company.



Fig. 8: Wireframe design

Coding Phase

At this stage, the author designs a web-based education application system with programming code that produces an application proposal so that the company can use the proposal to improve the company's business activities. The author uses the PHP, HTML and CSS programming language using the code Igniter framework supported by visual studio code application as a text editor

tool and phpMyAdmin for web server or database.

The website page begins with a login prompt. Users who are not registered can complete the registration process. Once users register, they can provide the necessary information and submit the form Fig. 9 depicts the registration screen. After submission, the data is entered into the database, and the user awaits approval from an administrator. Figure 10 displays the data entered into the database in the admin panel.

On the screening page, a list of registered users is displayed in a table format. Each row includes a detail link, which, when clicked, leads to a page containing the user's registration information. On this details page, there is an option to approve or reject the registration of the user.

Testing Phase

At this stage, the author has conducted testing on the designed and proposed application to identify any deficiencies and errors present. Testing was carried out by performing trial processes to ensure the proper functionality of the application and to fix any issues before implementation.

During this phase, the system will be developed by adding future-required features, necessary pages, and database entities for managing other data. Along with that, maintenance and training sessions for website-employees will be conducted. Nevertheless, this phase cannot be initiated due to limitations in the research, as it involves a proposed website design that cannot yet be implemented. Result of testing phase shows on Table 1.

Table 1: Black-box testing

No.	Test case	Pre-condition	Expected results	Actual results	Status
1	Register	Users do not have an account and register on the website	User can input the required data and submit	User can enter all necessary information and successfully register for the dashboard page	OK
2	Login	Once the user has registered and created an account, they must enter their username and password correctly	The user enters the data for login correctly and is forwarded to the homepage	User successfully logs in and can access the homepage page	OK
3	Screening	There are users whose register on the website, and the administrator screens and approves them	Admin receives complete data and can determine the result	Admin receives complete data and can choose decisions easily	OK
4	Access content	The user is logged in and has a registered class and wants to access the material content	User can open the class and access the content	The user can access content that aligns with their selected class	OK
5	Online class	The user has logged in and has selected a class and wants to enter the class	The online class link appears according to the selected class	Users are granted access to the class hyperlink and redirected to the accompanying program to facilitate virtual classes	OK
6	Consultation	User is logged in and wants to discuss	Users can choose topics and engage in discussions	Users can select topics and have discussions with other users	OK
7	Access event	User seeks access to event listings and the ability to register for selected events	Users can view a list of available events and access information about each event	Users can access a list of available events and register for them	OK
8	Manage class data	The admin wishes to execute create, read, update process for class data	Admin can manage class data according to their needs	Admin can manage class data without any issues	OK
9	Manage event data	Admin wishes to perform create, read, and update process of event data	The admin can manage event data according to their needs	The admin can manage event data according to their needs without any issues	OK
10	Manage admin data	Admin wants to manage the user data recorded on the website	Admin can access all registered user data	Admin can access all registered user data	OK
11	Contact us	users want to contact the company and ask questions related to the obstacles faced	Users can fill in their chosen subject and send the message accordingly	Users can fill in their chosen subject and send the message accordingly	OK

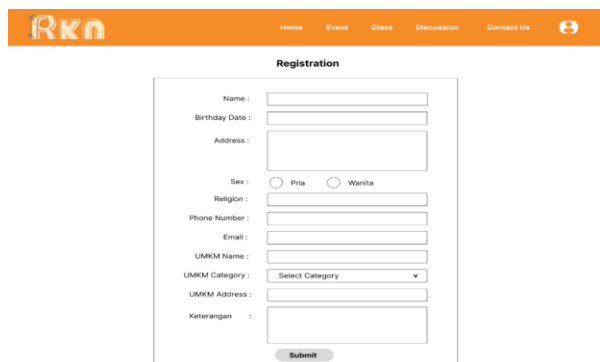
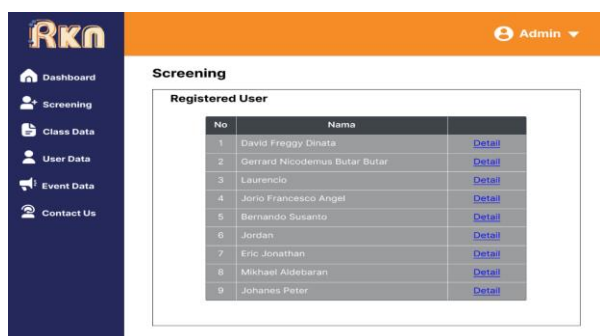


Fig. 9: Page of registration



No	Nama	Detail
1	David Freggy Dinata	Detail
2	Gerrard Nicodemus Butar Butar	Detail
3	Laurenolo	Detail
4	Jorio Francesco Angel	Detail
5	Bernardo Susanto	Detail
6	Jordan	Detail
7	Eric Jonathian	Detail
8	Mikhael Aldebaran	Detail
9	Johanes Peter	Detail

Fig. 10: Screening page

Conclusion

The results of the study indicate that the education application, based on a website platform, assist MSME development collaborator company in enhancing its business operations by offering a knowledge acquisition platform and give better information and more support for MSME in Indonesia. The website incorporates a screening feature available to admins for user registration and data management, tailored to the needs of the company. Furthermore, users can access pages devoted to events, classes, discussions, and communication to promote the learning process. Users can access the website only if they are registered, and they can only select classes that are registered. In this study, the design was carried out in accordance with the initial requirements, and further additions of features and pages are planned for future company needs. This addition will be included in the software increment phase of the method used. The design of this web-based education application uses the extreme programming method which includes planning phase, design phase, coding phase, and testing phase.

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Author's Contributions

David Freggy Dinata: Defined the concept of research, gathered information and the requirements, analyzed the problem and data, interpreted the research results, and wrote the manuscript.

Francka Sakti Lee: Supervised the process, reviewed the result and article critically, and wrote the manuscript.

Yemima Monica Geasela: Formulated the findings obtained in the company and the conclusions obtained in this research.

Shierly Everlin: Identify the business process to analyst and supervise design UI of the system.

Yunianto Purnomo: Analyzed and do testing of the system and give recommendation of the formula and frameworks.

Ethics

This article is original and unpublished. Correspondence authors confirm that all other authors have read and agree that the manuscript does not involve ethical issues.

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