Development of Web-Based Information System to Support Personal Trainers' Performance in Medan

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Abstract

The project objective is to design a web-based information system that is aimed at recording the training programs and body composition of clients and improve the performance of personal trainers in Medan City. Manual recording systems, because they are more error prone and difficult to analyze or give real-time feedback, become the key problem for personal trainers. It adopted Research and Development (R&D) approach to research using 4D development model (Define, Design, Develop and Disseminate). The user-generated product Trainer Track has features such as digital exercise log, body composition tracking, and visualization of the user's progress. The feasibility of the system was supported by two expert validation and field operation using 25 personal trainers from the fitness centres of Medan. Results It showed that the system reached a feasibility level of 94.75%, rated as highly feasible. These findings indicate that the use of a web-based information system can lead to a much more efficient work, higher accuracy data collection and the empowerment of the personal trainers to run a personalized data based training service.

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INTRODUCTION

The world fitness industry has seen impressive growth over the past few years in part due to rising public awareness of health and the increasing requirement for customized fitness interventions. Here, personal trainers (PTs) have emerged as facilitators in the role of health management, promoting effective fitness training by providing structured instructions, motivating reinforcement and training plans relevant to clients' physical state and body types (Braga-Pereira et al., 2024).

Personal Trainer (PT) is an individual who helps them to perform their physical well-being requirements (Curovic & Grecic, 2025). According to Donie et al. (2018), appearance or self-image are core to professional identity in a personal training career. Personal trainers are experts in both human resource and sports industry, and will provide assistance to their clients for using the facilities properly in a variety of tasks in the gym.

Even though it is crucial for clients' success, personal trainers face substantial challenges in tracking performance, managing client data, or effectively monitoring health metrics while using conventional methods (Bratland-Sanda et al., 2020). Systematic exercise recording has been recognized as an integral part of achieving success in personal training, and it is essential for increasing client engagement, motivation, and compliance with structured training programs. The most important part of a personal trainer's role is to keep a check on their body composition. Body composition assessments of clients, when accurate and comprehensive, offer more accurate assessment of the clients' health status and disease risk.

A web-based information system offers significant potential to greatly enhance personal trainers' capabilities in recording their training programs and assessing clients' body composition. In this scenario, this system is able to narrow the gap between trainers and clients (Nivedita et al., 2025). The integration of information technology enhances work efficiency, ensures data recording accuracy, and supports the use of data for data-driven decision-making processes (Rahmi et al., 2023; Sadali & Putra, 2020). As a practical result, a Web-Based Information System (WBIS) enables real-time management and monitoring of client data, facilitates two-way communication, and offers timely, measurable feedback, which all furthers the effectiveness of personal trainer performance.

According to field observations, the majority of personal trainers in Medan City still go through manual record keeping methods, such as notebooks or basic spreadsheets. With the interviews with ten personal trainers nine were reporting making errors quite often, it took a lot of time and often inefficacious and it is difficult to objectively assess a client progression through manual record keeping. This limitation in the ability of personal trainers to offer exercise solutions grounded in the science and limits the available means of fitness-related services. Unlike structured exercise records and body composition monitoring that have been known to result in clinically meaningful improvements in client level motivation and adherence, and increase fitness outcomes (Lin et al., 2024; Holmes & Racette, 2021). That is, the slow introduction or adoption of digital technology in fitness management efficiently and professionally.

Previously conducted research has proven that web-based information systems are effective tools to enhance the use of data management at every level of the fitness-related domain. Ramadhana et al. (2021) implemented an online membership and nutritional management system for fitness centers, which was found to be very practical in customer data management. Pamungkas (2024) and Gustyar (2024), provided similar findings, stating that web-based systems could quicken administrative and reporting processes within fitness facilities. Angin (2025) also demonstrated that an online application for physical fitness analysis tracked the speed, agility, and flexibility of young athletes with great precision. However, these researches do not have focused on creating systems that combine program recording with body composition monitoring and present them as real tools in day-to-day personal trainers work. This gap is the basis of the present study which strives to provide a more focused and relevant digital alternative for the fitness industry.

Under these conditions, this research aims to design a web-based platform for personal trainers to establish a web-based system which allows personal trainers to record both trainees' programs of training and records data, in an instant and organized way of recording training sessions and monitor participants' body composition in a streamlined, reliable and cohesive fashion. The study is investigating the feasibility of applying the system and its user feedback, as well as users' perception and performance and ultimate result and effectiveness of the system in improving personal trainer performance in Medan City.

METHODS

This research adopted the Research and Development (R&D) approach using the 4D model (Define, Design, Develop and Disseminate) as applied by Thiagarajan et al. (1974). We selected this method as it is suited for manufacturing new product, that is, web-based information system, which can be tested for feasibility and effectiveness before field operation. For this, the main question is to establish and test the feasibility of a web-based information system for recording training programs and tracking the body composition of clients to support performance of personal trainers in Medan City.

The method was a four part study using the 4D model stages:
1. Define: This phase involved a needs analysis carried out by watching and interviewing personal trainers to find problems associated with manual recording and client monitoring.
2. Design: This was the phase in which a system plan came to be proposed, covering the navigation structure, UI/UX concept and important functionalities such as digital exercise logging, body composition tracking, and client progress reporting.
3. Develop: In this phase, the system named Trainer Track was developed based on the design and verified by subject-matter experts and media specialists with a Likert-scale questionnaire to measure content accuracy, functionality, and interface quality.
4. Disseminate: This stage involved the product being tested on a small scale and large scale with personal trainers from various fitness centers in Medan City.

The research tools included validation questionnaires and user evaluation surveys. Content relevance, conceptual accuracy, and alignment of system features with fitness principles were assessed using the expert validation instrument. The media expert questionnaire focused on visual design, navigation flow, access speed, and data security. Meanwhile, the user questionnaire measured usability, functionality, reliability, and user satisfaction with the system.

The research subjects were active personal trainers employed at three fitness centers in Medan—Roxit Gym, Vizta Gym, and Kelas Fitness. A total of 25 personal trainers participated in the trials, comprising five trainers in the small-scale test and twenty in the large-scale implementation. The research object was the Trainer Track web-based information system, which was developed to facilitate centralized, digital, and real-time recording of training programs and client body composition data.

The study utilized both qualitative and quantitative data. Qualitative data were obtained from interviews and user needs observations, while quantitative data were derived from expert validation results and user questionnaires, producing feasibility scores for the system.

Data were collected through several techniques:
1. Observation and interviews with personal trainers to analyze system requirements;
2. Expert validation involving one media expert and one subject-matter expert to assess content and interface feasibility; and
3. User questionnaires distributed to personal trainers to evaluate the system's usability, functionality, and effectiveness in supporting their professional practice.

Quantitative data obtained from the validation and trial results were analyzed using descriptive percentage analysis, calculated using the following formula by Sonia in (Rahmawati & Rumini, 2020) :

$$P = \frac{n}{N} \: x \: 100\%$$

Percentage Calculation Formula

Information:
P = Percentage of feasibility
n = Total score obtained
N= Maximum possible score (ideal score)

The basis for the assessment can be seen in the following **Table 1.**

Table 1. Assessment Criteria

Percentage Range	Score Criteria
< 21%	Very Disagree
21% - 40%	Disagree
41% - 60%	Netral
61% - 80%	Agree
81% - 100%	Very Agree

Source: (Arikunto, 2018).

RESULTS AND DISCUSSION

This study produced a web-based information system called Trainer Track, designed to assist personal trainers in efficiently and integratively recording training programs and monitoring clients' body composition progress. The development of the system followed the 4D model

(Define, Design, Develop, and Disseminate), including validation by experts, limited trials, and field testing. As the study implies, the system developed is technically workable and efficient in improving the professionalization and efficiency of personal trainers in Medan City.

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Development of the Web-Based Information System Product

The process of implementation followed the design documentation, guided by reliable software development principles. After the initial product was completed, iterative testing and refinements were conducted based on feedback from experts and users. The components developed on the Trainer Track website (accessible at **trainertrack.online**) are described as follows.
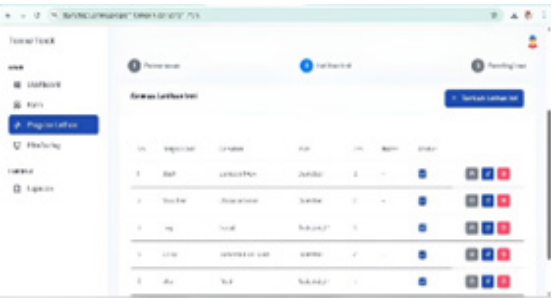

Figure 1. Client Training List Display

This page is the log interface which personal trainers utilize to track the overall completion status of daily or weekly workouts. It would show a list of scheduled exercises for each session, and how much they are completed during one exercise session, you could also record on it for short feedback on the session. The page works functionally as a behavioral intervention mechanism allowing for accountability.
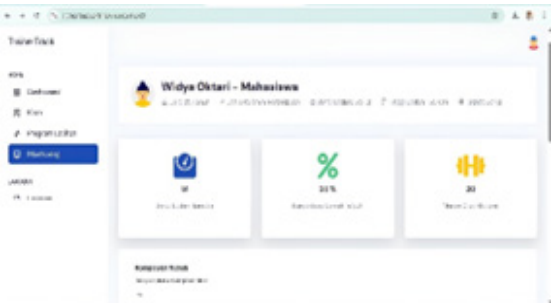

Figure 2. Client Body Composition Monitoring Display

This page aims to show a comparison of data on body composition, during two different time periods (for example, the initial assessment and the most recent evaluation). This visualization is important for personal trainers because it allows us to see micro-observations of physiological change over time. The absence of a comparison feature (as can be argued below) could discourage trainers and researchers from making intelligent adjustments to training program design based upon objective data. This highlights the novelty of the system that offers measurable and digital body composition-monitoring, as training could be delivered in a clear, focused, and data-driven way.

Product Trial Phase I

The first stage of the trial was carried out with the following elements; (1) the trial as per the planned plan for collection, (2) monitoring the trial procedures to detect problems, and (3) recording the data and outcomes at all stages.

Table 2. Results of Phase I Trial

Aspects	Total Score Obtained	Max. Score	(%)	Criteria
Phase I				
System Usability	81	100	81,00%	Highly Feasible
System Function Compatibility	80	100	80,00%	Feasible
System Reliability and Performance	60	75	80,00%	Feasible
Ease of Recording Training Programs	60	75	80,00%	Feasible
Body Composition Monitoring	61	75	81,33%	Highly Feasible
Overall User Satisfaction	61	75	81,33%	Highly Feasible

Table 2. Phase I trial results with 5 personal trainers of Kelas Fitness revealed an AR of 80.6%, with the system assumed to be feasible. At which point some significant recommendations were made; including the requirement for a user-friendly feature for training load history, and automatic report conversion to PDF for ease of printing.

Product Trial Phase II

Once refining was finished, the project was revised in Phase II, using 20 personal trainers from three fitness centers, where 3 gyms, namely Roxit Gym, Vizta Gym, and Kelas Fitness, were located in Medan City for the review.

Tabel 3. Results of Phase II Trial

Aspects	Total Score Obtained	Max. Score	(%)	Criteria
Phase II				
System Usability	374	400	93,50%	Highly Feasible
System Function Compatibility	384	400	96,00%	Highly Feasible
System Reliability and Performance	281	300	93,67%	Highly Feasible
Ease of Recording Training Programs	286	300	95,33%	Highly Feasible
Body Composition Monitoring	287	300	95,67%	Highly Feasible
Overall User Satisfaction	283	300	94,33%	Highly Feasible

Tabel 3. Results of the Phase II trial indicate the marked improvement with an average score of 94.75%, found in a highly feasible category. The points of greatest rating are the efficiency of recording training programs (95.33%), and body composition monitoring (95.67%), which indicate that the system yields a tangible ease in accommodating the daily work of personal trainers.

The solution found in this research also responds to the major research question, which was previously formulated, with regard to the performance, user response for, and effectiveness of web-based information for personal trainers' performance. It can be concluded that the Trainer Track system is practical and works despite the drawbacks of manual recording that did not have an exactness accuracy and efficiency with the testing process. Feedback from the end users is extremely positive and proves that the system is taken into consideration, since it makes it easier for users to report recording, speed the data processing and the client's progress as being recorded easily. Practically, the system also has direct bearing on improving the quality of personal trainer service by allowing customers to get faster and more data-driven feedback.

The Trainer Track system reduces trainers' dependency on conventional recording methods, which are prone to data integrity issues, lack of centralized information sources, and scalability problems. Now this transition towards digital recording directly meets one of the pedagogical principles of training programs at general level-systematic planning and system utilization. Training programs are developed, implemented, and monitored by the system.

Such a study has been found to be in accordance with Sadali & Putra (2020)'s Web-Based Information System theory, which proposed that web-based systems help improve operational functions, data validation, and efficient access to information. The findings further validate the results of Lin et al. (2024) and Braga-Pereira et al. (2024) that showed how digital tracking and visual feedback lead to intrinsic motivation and to effective adherence to training for the clients. Methodologically, this study confirms the original findings of Ramadhana et al. (2021) and Pamungkas (2024), verifying that web-based systems in fitness have increased administrative effectiveness and client data monitoring in the field. But this study makes a new contribution by concentrating on the convergence of training program recording and body composition monitoring in a single digital system designed to meet the professional needs of personal trainers.

The increase in feasibility grade score from 80.6% to 94.75% indicates that the 4D model application for development that is used in this study has been successful. Evaluation, redrafting and testing iteratively allowed us to develop and test a solid system that serves user needs. In principle, this is consistent with the perspective of Thiagarajan et al. (1974) stated that the 4D model provides for product reliability by means of iterative and systematic design. Results show empirically that digitizing fitness recording and monitoring processes can raise personal trainers' work efficiency while also improving the quality of trainer-client interaction.

The results of this study show that Trainer Track provides an effective innovation for improving efficiency, accuracy and professionalism in fitness service. The system not only helps personal trainers to manage the training programs, but also provides added value through graphical progress visualization and client motivation. Therefore, it can be concluded that deploying web-based information systems is a strategic alternative to manual methods. This paves the way to a more modern, objective and data based approach to fitness administration that is also more effective and less burdensome. This study goes way beyond improving personal trainers' performance and opens up a whole new level of possibilities for companies to build similar systems in fitness centers across Indonesia: to move forward with the national fitness industry digitization.

CONCLUSION

Overall, the Trainer Track web-based information system developed using the 4D model was found highly practicable and effective in improving the efficiency, accuracy, and professionalism among personal trainers in Medan City by the findings of this study. In fact, an estimated 94.75% of expert validation, including the use of field trials, indicated it was feasible, proving that the system could effectively replace cumbersome manual recording methods along with a seamless, data-centric digital solution streamlining this process. Trainer Track not only streamlines the recording of training programs and the monitoring of clients' body composition but also facilitates evaluation, enhancing motivation and engagement through objective progress visualization. Hence, this system, therefore, has the great potential for being an inventive solution for the digital transformation of fitness management in Indonesia.

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