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From Fragmentation to Integration

An UX-Focused Design Approach to Developing a Unified Web Platform

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Bachelor’s Thesis | Abstract

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This thesis focuses on developing a UX-focused unified web platform to cater challenges and issues faced by working students and administrative staff while using various platforms. The existing platforms are fragmented and use older technologies which makes their use ineffective and challenging task due to lack of integration and incompatible user interfaces. The objective of this thesis was to design a comprehensive platform that would facilitate and streamline the operations for project application, recording working hours and accessing other essential workplace information. The work included improvement ideas for user experience, creating effective operational approaches and decreasing administrative work for staff members.

A user-focused design protocol was developed to achieve this objective. The processes included qualitative and quantitative data collections such as feedback, observations, and UI testing. This method gained insights into user problems and staff member´s issues which provided iterative corrections during the development process. Modern web technologies such as Figma, Typescript, Chakra UI and others were utilized in platform creation, enabling secured integration with existing platforms. The design developed addressed best practices in User Interfaces and User Experiences designs with minimalism, precision, and reliability.

The usability testing results provided significant ideas and comprehensions for advancements in task productivity, user satisfaction, and overall enhanced experiences as compared to previous platform. The unified platform successfully addressed all the challenges and issues of fragmentation, providing a more modernized and user-friendly experience. Employing UX-driven methodologies can enhance digital platform functionality and value.

Keywords: unified platform, user experience, Figma, usability testing, user-focused design, platform integration

Contents

Pictures

List of abbreviations

Educational Institute	theFIRMA, TUAS is part of educational institute Turku University of applied Sciences.
Platform	Referring to software, web applications or mobile applications.
Organization	theFIRMA, TUAS is the thesis commissioner
UCD	User-Centred Design focuses on designing products with user´s requirements at core.
UI	User Interface is a visual & interactive layout that user interacts with
UX	User Experience is the overall feel, ease and satisfaction user experiences from interacting with a product.

1.Introduction

1.1 Background

Organizations utilize several platforms to operate their day-to-day activities in the form of software and applications. These platforms help the organization to operate and manage activities smoothly, easily, and efficiently. However, the use of several different platforms has its advantages and disadvantages. This thesis studies such an organization, “theFIRMA”, which is a student-centred project office providing IT-related services and products in the educational institute of Turku University of Applied Sciences, Turku. The thesis aims to establish a unified platform which is an integration of functions from multiple platforms into a single platform. theFIRMA is the commissioner of this thesis.

“*Digital transformation is the rewiring of an organization, with the goal of creating value by continuously deploying tech at scale*” (McKinsey & Company, 2024). A unified platform combines different functions and tools into one system, making tasks easier and more efficient. Such a unified platform will be developed to meet the requirements of project management, communications, learning and administrative tasks. The lack of integration among such platforms can be potential cause for various challenges such as fragmented workflow, delayed processes, and inconstant results. These issues can be noticeable for organizations that employ a diverse range of users, for example, educational institutions or companies with diverse-background teams (Gulliksen et al.,2003).

In the case study of this thesis, the organization “theFIRMA” is currently using multiple platforms, including an older version of Project Gate, and the learning environment while the users are working students and administrative staff members. The Project Gate 1.0 is a project management web platform, whereas Itslearning is used a digital learning management system (LMS) designed for K12 (primary & secondary schools) and higher educational institutes. Itslearning provides a range of educational activities such as course management, assignments, assessment and a communication channel between students and teachers. The use of fragmented platforms has resulted into multiple issues such as ineffective monitoring progress, overburdened administrative work and delayed processing. However, these platforms are inter-connected in terms of project applications, working hours logging and accessing of internal information.

The increasing need for a singular and unified digital environment is directing the organisation to reconsider and restructure their digital infrastructure. A unified platform which combines all functions and features of these fragmented platforms would increase user experience & satisfaction leading to effective operations. This platform would not be beneficial only to the students but also facilitate for administrative staff in effective monitoring and managing operational work.

1.2 Scope and Objectives

The primary objective of this thesis is to build a unified web platform as a replacement of existing multiple platforms currently in use. This unified platform aims to address certain requirements of working students and staff by presenting a seamless resolution for project applications, logging working hours and using necessary managemental information. This thesis also aims to gain a comprehensive understanding of how UX-focused design approach can result in increased user experience, interaction, and involvement.

The scope of this study is constrained to the design, development, and evaluation of the unified platform. The key parties involved in user experience are students, who use the platform for project applications and log their working hours and administrative staff, who check and manage projects and student performance. The thesis evaluates the challenges faced by these parties in current platforms, collects user feedback & improvement ideas and applies effective and corrects design methodologies to securely address all challenges in terms of technical or non-technical matters.

To reach the above-mentioned objectives, the following methodology was employed:

Review & Comparison of existing platforms in terms of UX designs, inclusion, and design principles.

Analysis of current challenges and technical issues that arise fragmented platforms.

Development of wireframes, designs, and prototypes of requirements into unified platforms and conducting user testing and user interviews.

Analysis of the developed platforms and suggestions for improvement of the and current developed versions and future developments.

Conclusion of this research will result in gaining insights into how the unified platform can possibly resolve certain challenges and technical issues and provide effective & operational solutions. Also, it would provide inputs and information on how UX-focused design development can be implemented to a certain extent. To create efficient and user-friendly environments in the digital era.

2. Literature Review

2.1 Overview of UI/UX in Web Platforms

The fundamental elements of web platform/application are User Interface (UI) & User Experience (UX) designs which create an effective and interactive platform for users. UI focuses on how the platform elements should be developed interactive such as buttons, layout, etc. whereas UX focuses on how users interact and experiences the essence of platform & its features. As Donald Norman has highlighted, the essence of UX design lies in creating products that are not only functional but also provide a delightful experience to its users (Norman et al., 1998).

The importance of UI/UX puts emphasis on user-focused designs which enhance entire user journey and platform performance in the user´s context of use. The fundamental in web platform designs is where users can accomplish their task with minimal effort and friction. The aim of user-centred designs is to develop a digital environment where users feel empowered and have the control while using the platform leading to a positive experience (Garrett, 2011).

In recent decades, the UX-focused web platforms have shifted designs patterns to be more minimalist, flat, and responsive designs to create intuitive interfaces. This shift has highlighted the importance of understanding user needs, behaviours, and knowledge of technology when designs patterns are developed and implemented to use in digital platforms (Moran, 2015).

2.2 Existing challenges in Current Platform

The current platforms utilized by students and staff are fragmented in nature which the user is required to manage tasks across different separate platforms. These platforms are not integrated smoothly. This lack of cohesion results in inefficiencies, as the user spends more time in performing task then required. This also reduces productivity and increased cognitive load. Additionally, the user occupies extra time to input or search relevant data across multiple platforms which can lead to data redundancy and inconsistencies (Norman, 2013).

Furthermore, the difference in the interface design and layouts makes it harder for user to navigate efficiently which can result in frustrated and decreased engagement behaviour. Studies in UX emphasize that this fragmented design can lead to reduced user satisfaction and engagement as a user, especially a new user, and expended effort on adapting to different user interface of platforms than focusing on their tasks (Norman, 2013). This can probably be a reason for steep learning curves for new users.

Simultaneously for administrative staff, these systems can become challenging and ineffective method to manage applications, track workings hours and create required

reports. Similarly to students, the staff are also required to navigate between these platforms for cross-reference information which can most likely cause increased risk of errors.

Overall, the lack of integration of these platforms and the limited support for user feedback hinder productivity and user satisfaction. Addressing these challenges with a UX-focused design approach for unified web platform as a likely solution might aid in reducing cognitive load, improve productivity and ensure consistency in user satisfaction and experience.

2.3 Practices in Unified Platform Designs

To address some difficulties in such fragmented platforms, a unified platform is designed and developed. The concept of a unified platform includes combining multiple functionalities and features and adopting unified design approaches into a single & cohesive platform. Norman´s concept of “design thinking” is relevant in this practice as it emphasizes iterative design processes and continuous user feedback for refining and improving the platform (Gibbons, 2016).

Furthermore, conducting user feedback throughout design process is considered a key practice which advances and underlines the focus on user-centred designs. Performing usability testing and collecting improvement ideas at interval phases facilitates designers to create platform which truly meets user requirements. The other principles of User-Centred Designs (UCD) and holistic approach where UCD ensures entire user experience is seamless and consistent also underline iterative design where designs are repeatedly tested and refined, (Gulliksen et al., 2003)

2.4 Research Approach & Data Collection

This theoretical overview of this section describes how research methods were implemented to develop theFIRMA´s unified platform, focusing on benchmarking, surveys and feedback, user-centred design, usability testing, and iterative feedback. Each method is explained in terms of purposes, strengths, limitations which provided an understanding of how they can contribute to user-centred design and usability improvements.

Benchmarking:

Benchmarking is a comparative analysis method that evaluate current systems against best practices or industry standards. This identifies gaps in functionality and usability. As stated in concept of Goal-Directed Design, benchmarking in UX designs involves reviewing current platforms to understand strengths, limitations, and improvement areas (Copper et al., 2014). This method is advantageous in developing clear objectives by setting a performance baseline, allowing designers to highlight areas that require

enhancements. However, benchmarking becomes limited in scope as it only assesses existing solutions and might not cover future user requirements or features.

Surveys & Feedback:

This mechanism is widely used in UX research to underline both broad and specific insights from users. Surveys help in quantitative data collection, providing information on user experience and usability aspects. Feedback provides qualitative insights on user requirements and challenges (Groves et al., 2009). Surveys are an effective method for identifying trends in large user base, however, they might lack depth in capturing detailed user experiences. On other hand Interviews, in contrast, provide detailed information, but they are time-consuming activity and may involve smaller user base.

User-Centred Design (UCD):

USD is a design framework which prioritizes the requirements, preferences and limitations of users in every stage of design process (Norman, 2013). It is based on iterative feedback loops as it allows for constant adjustments of the product to align with user expectations. Utilized as such, it is highly effective in developing user-friendly designs but might be resource-intensive due to the looped testing and re-designing cycles which are required. Norman´s principles highlight the importance of empathy and iterative designs as it ensures solutions which address real user issues and take care of intuitive interactions.

Usability Testing:

This testing method is an integral part of UX design as it involves observation of users as they complete task on a prototype/platform. This method allows designers to understand functionality, ease of usages and overall experience (Rubin et al., 2008). The main metrics in usability testing covers task completion times and error rates, which gives quantitative evidence on platform performance. The advantage of this method is its direct focus on real user interactions, however, at times it may overlook contextual nuances of user behaviour below testing environments.

Iterative Feedback:

Iterative feedback is another integral part of UX design where frequent rounds of testing and user feedback are involved to adjust and enhance product designs. This process aligns neatly with agile development, as it allows rapid adjustments based on user feedback (Schwaber et al., 2017). It helps designers to stay responsive to user requirements. However, it can delay development timelines due to continuous modifications. This approach is valuable in establishing complex systems, as it ensures that each version progressively improves based on validations from user insights.

These multiple methods allowed study to develop a unified platform with UX-focused design approach which effectively attended fragmentation issues, enhancing task effectiveness and usability.

2.5 Analysis Methods

The theoretical background of the analysis methods outlines methods utilized to analyse data collected for unified platform designs. Thematic analysis was chosen for qualitative data and statistical methods for quantitative data. These methods provide a comprehensive basis for user requirements, issues and performance metrics leading to overall UX-focused design approach.

Thematic Analysis in UX research:

Thematic analysis has been a widely used method for investigating qualitative data, particularly in UX research work, as understanding user experience and perspectives is crucial (Braun et al., 2006, 77-101). The advantage of this method is flexibility as it helps to understand user challenges in fragmented workflows and cognitive load. Also, this method can be subjective as one researcher's way of interpretation vary from another.

Statistical analysis for quantitative data:

Statistical analysis was chosen to measure platform performance through metrics such as time taken for task completion and rate of errors. Descriptive statistics provided report on the user performance whereas inferential statistics were used for comparison of current systems with unified platform prototype. This method provides reliable, quantifiable data on platform performance (Field, 2013). However, this may miss contextual nuances captured in qualitative analysis that is why both methods were combined as mix-method approach.

Rationale for mixed methods:

A combination of thematic and statistical analyses results in depth and objectively, aligning with research that balances user insights with measurable results (Creswell et al., 2017). This double approach allows a thorough understanding of user requirements and validates design improvements with evidence of both qualitative and quantitative.

3 Design and Development Process

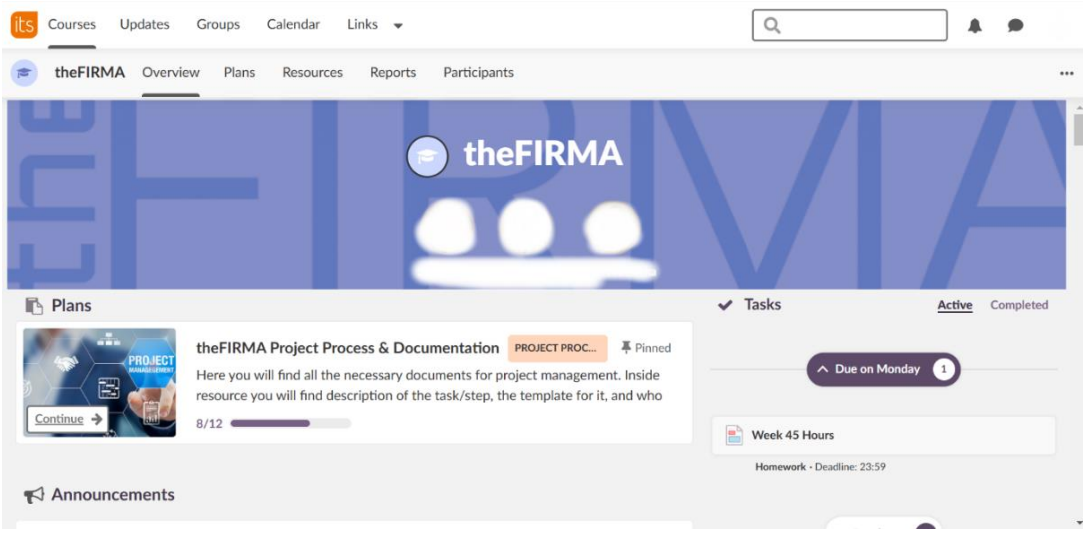
3.1 Current State Analysis

The current state analysis has classified and inspected the challenges within Project Gate and Itslearning. These platforms are functioning independently, however, due to lack of integration it had caused fragmented workflow, increasing cognitive load and inefficiencies for both students and administrators (Picture 1,2 & 3). The design layout of theFIRMA in Itslearning is shown in Picture 1 where the student can add hours on weekly basis and view other information from plans tab. Whereas, the design layout of existing Project Gate 1.0 is shown in Picture 2 & 3 where the student can manage various activities regarding project application and project information. Current state analysis disclosed issues:

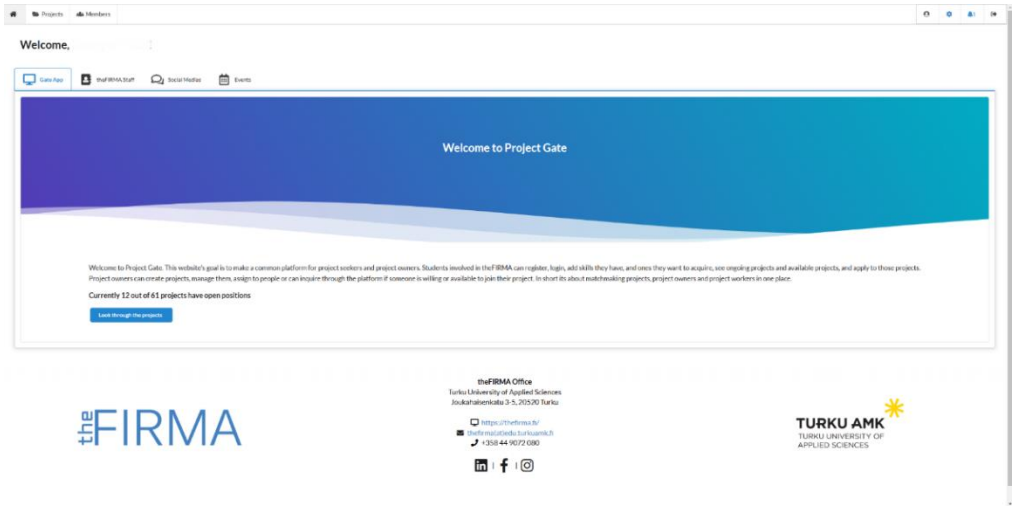
Data inconsistencies: Due to its fragmented nature, data misalignment across platforms required additional administrative efforts to align various information.

Increased cognitive load: Users reported cognitive load due to frequently switching between platforms, which hindered productivity and user satisfaction.

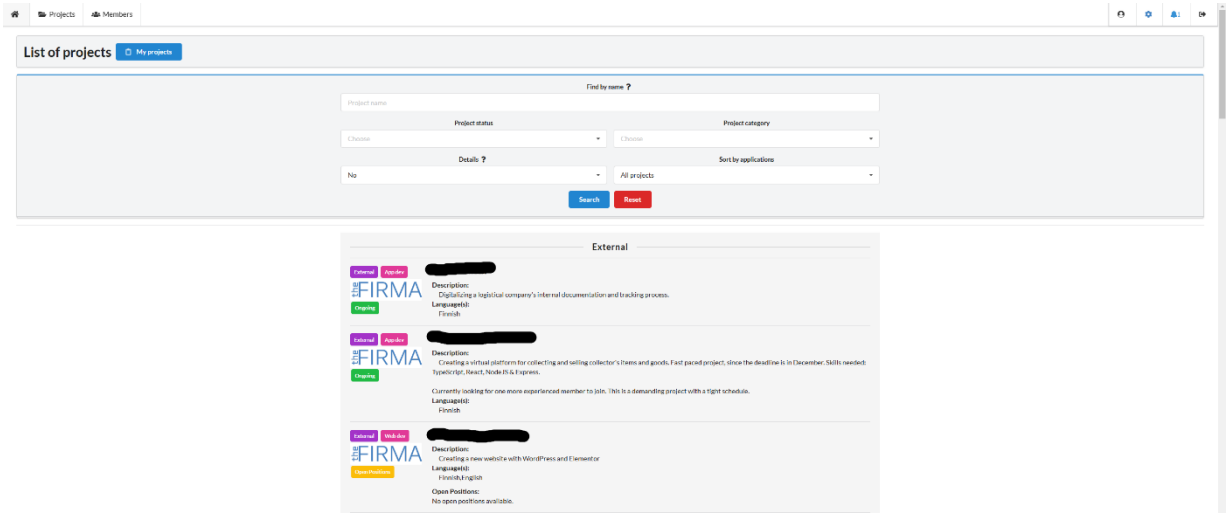
Inefficiencies: Without integration between these two platforms, task processing was delayed, and everyday operations became more complex.



Picture 1 illustrate the design layout of theFIRMA in Itslearning Web application.



Picture 2 illustrate homepage of existing Project Gate.



Picture 3 illustrate design layout of list of projects page on existing Project Gate.

3.2 Design Process and Wireframes

The design process pursued a user-Centered, modular approach to ensure the platform aligned with current user requirements and additionally, it can be flexible enough to adapt and endorse future requirements of the organization. The functionalities such as project management, time tracker, and performance monitoring, have been designed using a modular attempt. This formation gives each feature to perform independently while continuing to be interconnected. This approach, also let the platform be enabled to be adaptable to expansion and integration of additional features in both the short & long term.

The initial step in the design process included conducting a usability study to assess existing platforms. This process identified usability issues and performance gaps that

shall be addressed in the new platform. In terms of application, in theFIRMA, benchmarking confirmed the requirement for an integrated platform with a UX-focused design approach to overcome fragmentation challenges. The developing unified platform is named as Project Gate 2.0 which is an improved version of Project Gate integrated with features of Itslearning. The platform´s designs were evaluated against UX standards of Nielsen´s Heuristics as per following (Nielsen, 1994).

Visibility of System Status: Existing platforms lacked clear feedback mechanism, which make users uncertain about their progress. This was considered in Project Gate 2.0, by integrating real-time status indicators, for example Picture 10 shows the user about logging hours status on various metrics.

Match between System and Real World: Unfamiliar workflows in existing platforms were simplified using intuitive process.

User Control and Freedom: Existing platforms resulted in navigation difficulties as platforms were not integrated, leaving user confused about step-by-step process of each task. Navigation bar was designed to be clear and precise to align with user requirements.

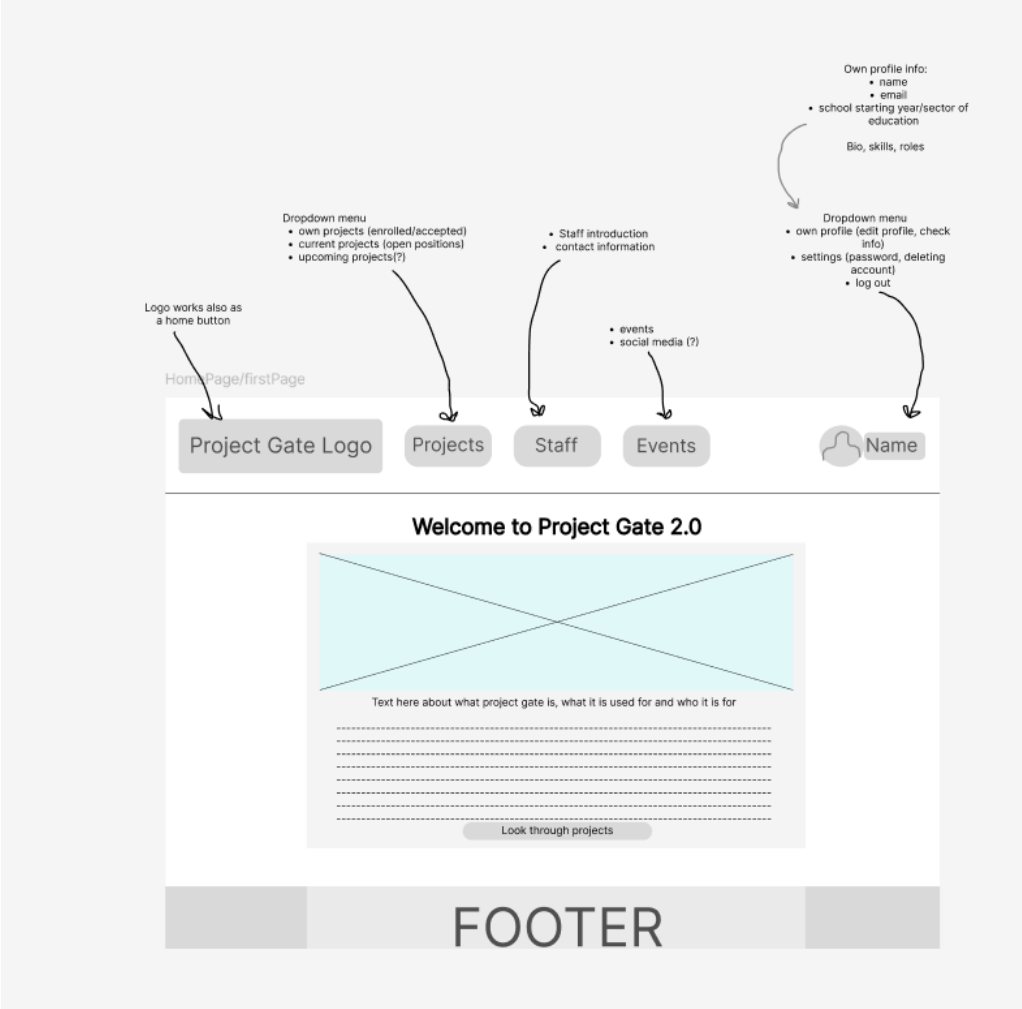
Consistency and Standards: Inconsistencies in layout and functionalities were streamlined into a cohesive design which gave uniformity across the unified platform.

Aesthetic and Minimalist: Redundant features and information clutter were not prioritized, resulting to cleaner and better interface.

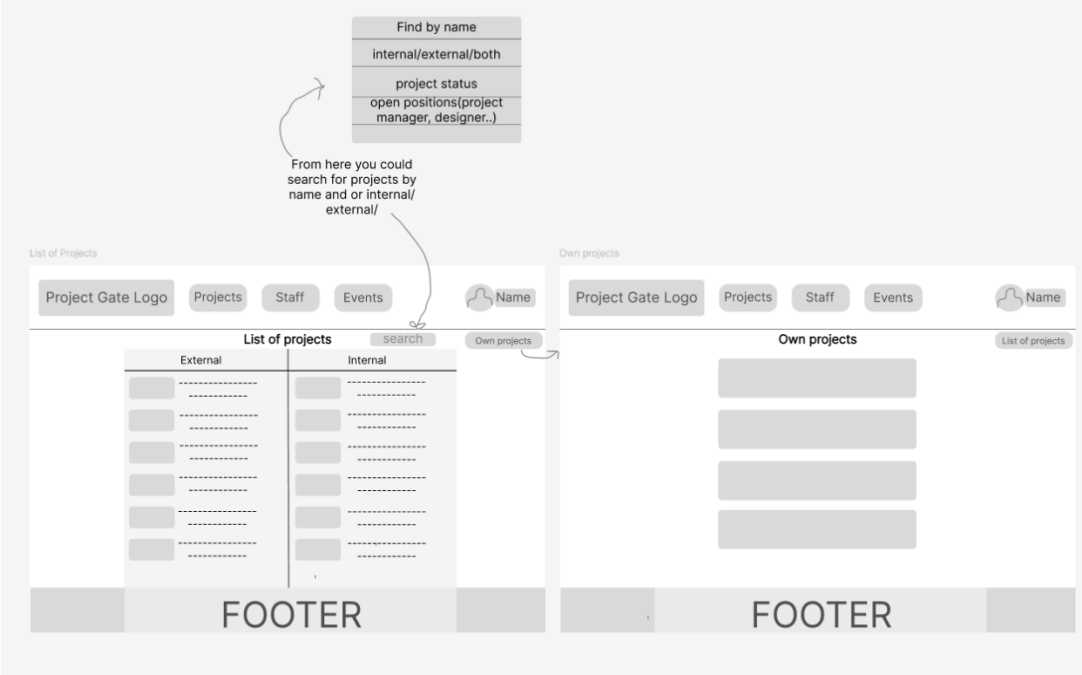
Flexibility and Efficiency of Use: Simplified path for both experienced and new users were considered for easy navigation and avoid any performance gaps.

Wireframe Development:

Wireframes were developed in low fidelity to define layouts and functionality iteratively. Picture 4 & 5 indicates the initial design plan to integrate various functions based on user requirements. Low-fidelity wireframes were directed to create the layouts, task flow, and navigation flow. The required modules such as project management, and time tracking, were designed to integrate seamlessly within the unified platform. With suggestions and improvement ideas from user feedback, the high-fidelity prototypes were designed and developed to ensure the design aligned with user requirements and provided high user satisfaction.



Picture 4 demonstrate the initial wireframe designed to redefine homepage layout with various elements such as Clear Navigation bar, informative welcome note, etc.



Picture 5 illustrate wireframe where initial design layout for project page was created, aligning with user requirements and user experience.

3.3 Feedback Integration and Iterative Improvements

Feedback loops portrayed a central role in guiding iterative advancements through interviews, usability testing, and iterative feedback. A two-phase approach was implemented to collect and examine data, guaranteeing both qualitative and quantitative insights that advised the design progress.

Surveys and Feedback:

Surveys were conducted to gather quantitative data on user satisfaction and usability problems. This provided a broader view of user experiences across the existing platforms. Interviews accompanied surveys by acquiring qualitative insights from students and administrators which allowed depth of understanding of their issues, requirements, and expectations for the new platform.

Feedback was gathered primarily through interviews and informal surveys during weekly project team meetings and bi-weekly/monthly discussion meetings with theFIRMA´s management, including the student CEO and Vice CEO. The project team consist of 10 members where half of the team members were involved in the initial development phase of Project Gate. As their involvement and experience with current platform of Project Gate provided expansive feedback and ideas for modifications of designs.

Insight focus:

Challenges: Team members were asked to describe challenges they encountered while working with Project Gate 1.0 and Itslearning.

User experience: Discussions were focused on inefficiencies factors such as navigation difficulties, complexity of project management, etc.

Suggestions for enhancing designs: The ideas were integrated into design development to create a cohesive design with a user-friendly workflow

These responses directed the development of initial wireframes and design iterations. The design approach was defined as UX-focus designs which address these issues effectively, improving user experience and productivity. The inputs gave a clear understanding of which elements required prioritization in the unified platform. The iterative approach allowed the team to refine the design, aligning it with user needs and operational requirements.

These methods together ensured a balanced perceptive of user requirements, providing a comprehensive foundation for design improvements and adjustments during the development process.

User-Centred Design (UCD):

User-Centered design has been the guiding framework throughout the design which aligned with Norman´s principles of iterative and feedback-guided design (Norman, 2013). UCD emphasized empathy and iterative testing, focused on user wants and preferences at every stage. In this project, UCD was applied through continuous weekly feedback loops with project team members and monthly feedback loops with administrators. This approach incorporated user insights to modify and enhance platform layouts, workflow, and overall UX-focused design development. UCD also ensured that every stage of development was aligned by producing designs that addressed challenges identified in the current state analysis and user feedback.

3.4 Usability Testing

Usability testing of interactive mock-ups and design prototypes was conducted to ensure platform performance with ease of use and overall user satisfaction. This approach involved observing users as they performed tasks on the prototypes, while metrics such as task completion time and error rates were recorded. The statistics of usability testing directed design modifications and offered validation of the platform´s efficiency and effectiveness.

Task Completion Times: Recorded how long users took to complete each task, highlighting areas where navigation can be improved.

Error Rates: Observed errors and points of confusion and pointed out the design elements that be adjusted or improved.

The usability test validated the effectiveness of the unified platform design when compared to existing platforms. The test also demonstrated improvements in both effectiveness and user experience. These tests were conducted by the Quality Assurance team of the organization who made sure that unified platform design was addressing the fragmentation issues in current systems. These tests also guided adjustments in developing designs that optimized user interactions. Usability testing also validated that the new platform reduced cognitive load, improved task completion times, and ease of navigation, and minimized error rates compared to the existing platforms.

3.5 Challenges and Corrective Measures & Solutions

During the whole design process, several challenges were identified regarding unifying diverse functionalities and maintaining user experience. Corrective Measures were employed to adhere to these challenges, ensuring that the final designs were effectively tackling fragmentation issues.

Uneven designs across platforms: Existing systems had inconsistent design elements that were confusing for users and hampered usability issues.

Solution: Research and discussions led to a system with a cohesive design which resulted in a unified platform with standard navigation, united colour schemes, and typography to maintain consistency and reduce cognitive load.

Administrative Overhead: Two different platforms and various online/offline software such as Microsoft Excel and Docs resulted in data misalignment and a heavy workload for staff.

Solution: The integration of all required features into a unified platform which provided real-time data synchronization, reduced administrative tasks, and ensured data accuracy of functionalities and records.

User frustrations: With fragmented workflows, users suffered frustration due to disconnected tasks and lack of flow.

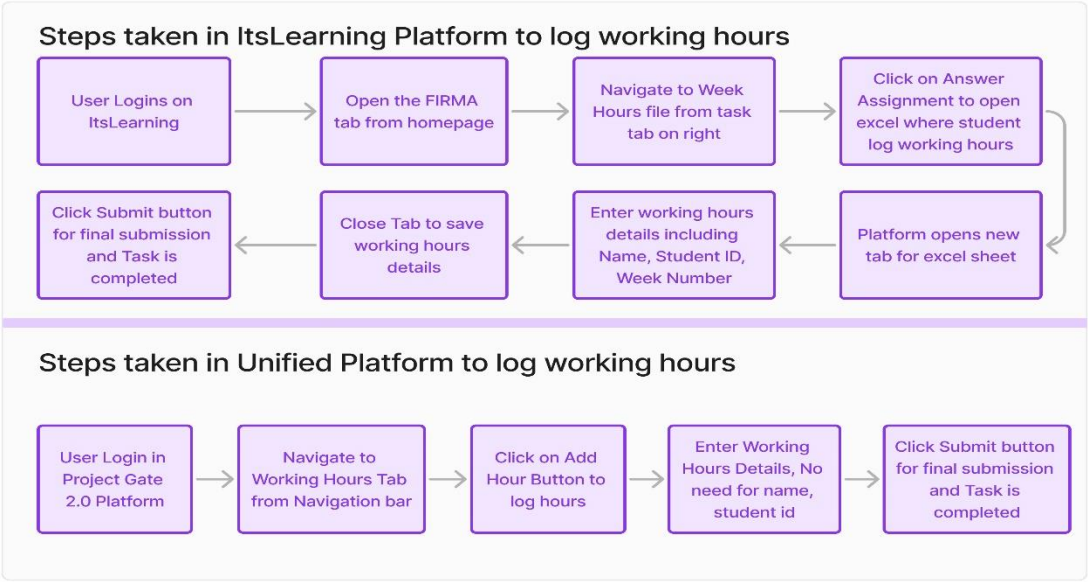
Solution: The streamlined workflow & integration of all required functionalities into a single interface led to simplified task completion.

These corrective measures addressed primary issues, ensuring seamless user experience and validation of user-Centered design principles.

3.6 Key Findings and Impact on UI/UX Activities

The practical implementation of this research methodologies indicated key findings that can impact UI/UX decisions and platform functionality throughout design development phases:

Enhanced efficiency and User Experience: The unified platform demonstrated how integration can improve task completion time, reduce error rates, and enhance efficiency. This also validated the design´s effectiveness when considering workflow and usability challenges in the design development phases. For example, Picture 6, shows number of steps taken for a student to log their hours in two different platform: Itslearning and Project Gate 2.0 (Unified platform). The student had to do total of 8 steps to complete the task of logging hours in Itslearning. However, after integration of functionalities, the student had to do total of 5 steps to complete the same task in unified platform. This reduction in steps indicated the improvement in task completion time, reduced chances of errors, and improved efficiency. This demonstrates how a focused usability effort can result in a tangible benefit for the users.



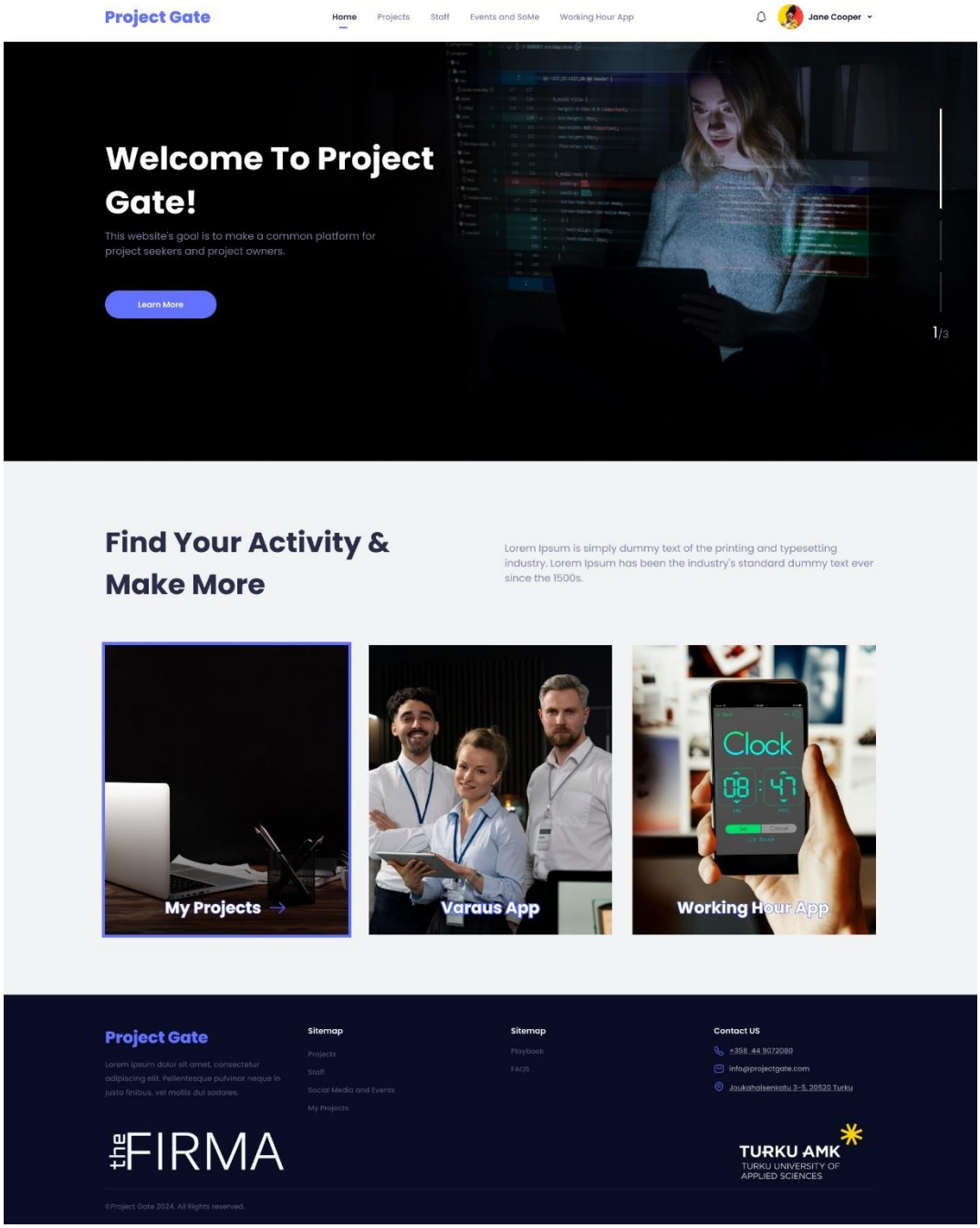
Picture 6 illustrates the step-by-step process for logging hours into two different system.

Increased Usability: A cohesive design system can provide a consistent experience while reducing cognitive load and enabling easier navigation throughout the unified platform. By standardizing visual elements, navigation patterns, and interaction methods, the platform provides seamless user experience. Reduced cognitive load, making it easier for users to navigate. Design iterations were considered by feedback collected during usability testing sessions, ensuring that adjustments aligned with user requirements. Picture 7 to 10 shows how user feedback adjusted design layout to ensure user requirements are intended. Picture 7 illustrates homepage layout where user

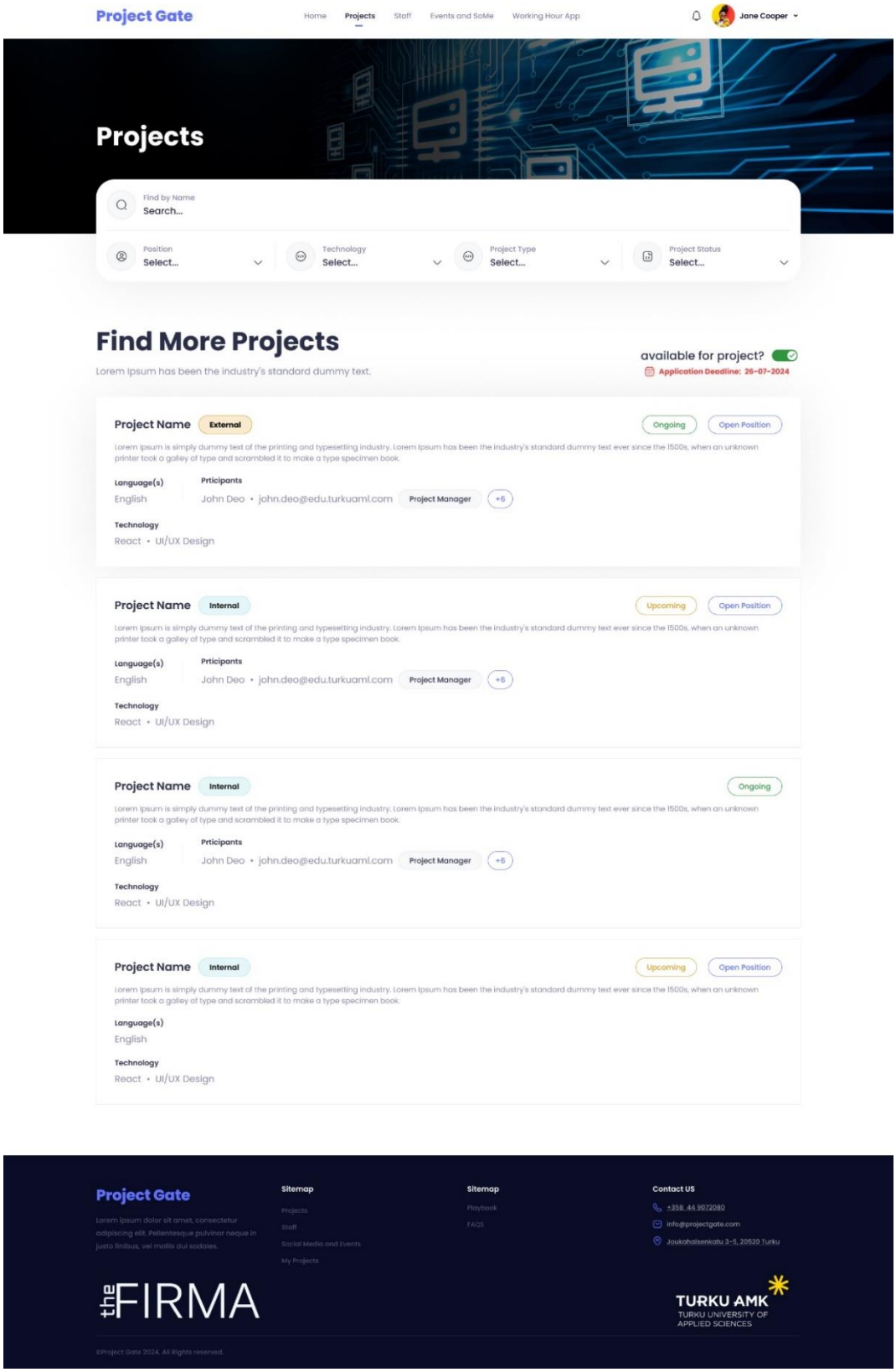
requirements such as easy navigation with integration of project management, logging hours, and information on events are executed. Picture 8 reflects design of the project management page where student can view and apply to various projects with open positions. Picture 9 & 10 reflects design layout of logging hours page within same system after integration, as previously in fragmented platform the student had to use Itslearning for logging hours and Project Gate for project application. Additionally, the students and admin couldn't check the logged hours in real-time as they were processed and recorded manually. However, after integration, the charts in the Picture 9 shows that both students and admins can see the logged hours in real-time.

Modular design: A modular design approach enables scalability, which can execute forthcoming requirements and align with organizational goals for long-term productivity.

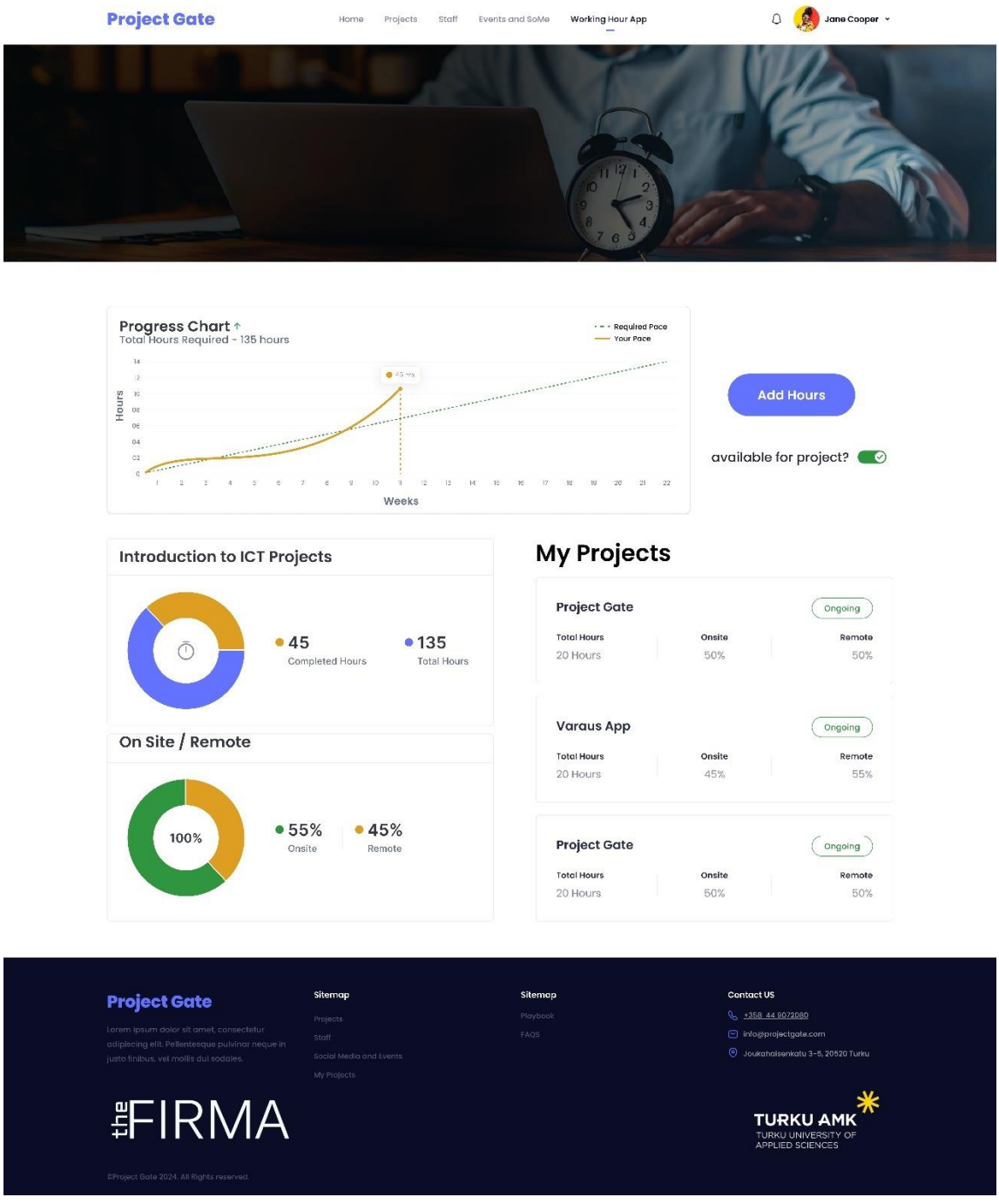
These findings highlight the success of a UX-focused design approach in developing of unified platform whilst addressing fragmentation problems and enhancing user experience and interaction with the system.



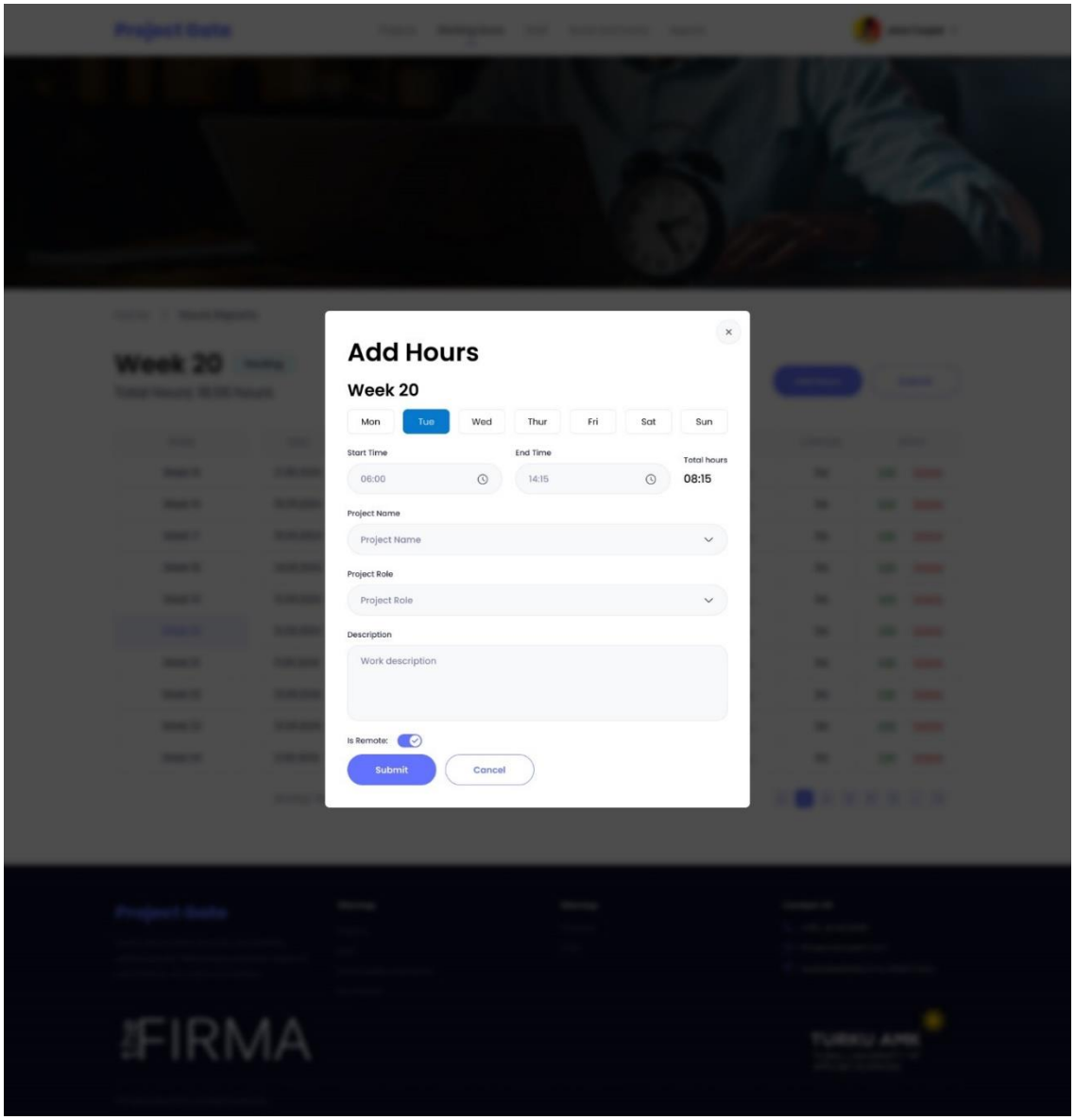
Picture 7 illustrate Home Page of User page showing functionalities of project management and time logging.



Picture 8 illustrate design layout of project management functionality.



Picture 9 demonstrate design layout of working hours app.



Picture 10 portrait function pop-up of logging hours.

4 Conclusion

This thesis set out to identify the challenges associated with fragmented platforms used by theFIRMA and address those challenges by developing a cohesive and unified platform with a UX-focused design approach. The old environment utilized isolated platforms such as Project Gate and Itslearning, had reduced productivity, increased cognitive load, and reduced user experience. With a UX-focused design approach combined with qualitative and quantitative research methods, this thesis identified user requirements, created design solutions, and validated these solutions through iterative testing and feedback practices.

This thesis draws attention to the importance of thematic analysis for identifying relationships in user feedback and determining challenges such as issues in effective workflow and task completion. The statistical analysis of usability testing further endorsed the effect of unified designs on efficiency, with reduced task completion times and error rates, showing improvement merits against the existing systems. This mixed analysis approach also ensured well-balanced and evidence-based results for design progress.

The development of a unified platform addressed the issues identified in the existing system and demonstrated that the integrated interface can reduce task complexity, enhance user experience, and increase productivity. The modular and scalable design approach also ensured that the platform could adapt to the organization's future requirements, making it a sustainable solution that will align with the current and evolving requirements.

In conclusion, this study highlighted the importance of a UX-focused design approach in a unified platform that will not only converge the functioning requirements but also improve user experience. The unified platform demonstrates how addressing fragmentation issues with well-planned integration can lead to improved efficiency, productivity, and satisfied interactions for the users. This study will also be a guide for future developments in unified platform designs and serve as a base for organizations planning to optimize their workflow and enhance user engagement with integrated and cohesive platforms.

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