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Advancing Project Management Methodologies: An In-Depth Analysis of Jira in Managerial and Developmental Contexts

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A B S T R A C T

A study was conducted to examine the satisfaction levels of project teams with the Jira mobile application, a leading project management tool, in Saudi Arabian companies. Through usability tests and surveys, the research addresses three key questions related to the satisfaction of project managers and developers with Jira mobile application and improve their experiences. While most project managers found Jira to be an efficient and easy-to-use tool, some suggestions for improvements were made, including the ability to edit, delete, and clone projects as well as a resource management ability. Similarly, developers have reported that Jira has significantly improved task tracking and status monitoring, while also suggesting improved mobile functionality. Usability testing and surveys highlighted specific issues with Jira's mobile application and provided recommendations for enhancement. The study aims to empower project teams with effective management capabilities through Jira.

1. INTRODUCTION

Before the increased reliance on software tools, project management processes were entirely conducted using traditional methods such as papers and analog tools to plan, execute, and monitor projects (E.D.C. Carvalho, 2020). While in recent years, with the numerous enhancements in technologies and the significant evolution in software industry, some organizations build, develop and manage projects with completely geographically distributed teams that rely on technology for communication which may add more complexity to the project management and relying solely on manual processes is insufficient to handle the complications involved (S.Morrison-Smith and J.Ruiz, 2020). Most businesses now are moving toward Agile methodology in developing their software projects. Agile methodology is described by Conboy and Fitzgerald as "The continual readiness of an entity to rapidly or inherently, proactively or reactively, embrace change, through high quality, simplistic, economical components and relationships with its environment" (S.Chopra and M. Chaudhary,2022). Based on the nature of rapidly changing requirements in software projects, the Agile methodology accommodates these changes because of its flexibility characteristic, as also requires active collaboration between, the team and the clients to understand the domain, identify the needs, and prioritize them. Therefore, organizations are increasingly going toward using software tools to control project management processes (P. Marnada, et al., 2021). However, the assessment of a project's success or failure is a subject to varying opinions. It typically evaluated based on three key points, which are time, budget and product quality (M.D.Kadenic, et al., 2021).

Significant project delays potentials and working beyond the scheduled projects timeline is highly expected and unavoidable for many reasons such as rapid changing of project requirements or design, unrealistic timelines or estimations and the lack of resources (F.Hayat, et al., 2019). In addition to increasing project costs, reduced team productivity and increased defects in the developed software, these delays reduce software shareholders' satisfaction and delay general market demand and benefits (R.Pellerin, et al., 2013). Because of their benefits, software management tools are highly recommended in software projects,
including improved project date estimation and better resource utilization, which ultimately increase the success rate of software projects. Recently, various tools available in the market that come with different features, usability rate, and pricing plans. These tools are designed to assist organizations and teams in effectively managing various aspects of the project management, and they are responsible for the evaluation and selection process based on their needs and preferences.
Accordingly, due to the Kingdom of Saudi Arabia's awareness of the significance of digital technology and its impact on society and the economy, its government began a plan as a crucial part of Saudi Vision 2030 for completely digitalizing traditional processes and utilizing the most recent software technologies (M.E.Bogopa and C.Marnewick, 2022). To achieve the goal of completing the National Transformation Program (NTP) by 2030, projects specifically software projects, must be effectively managed and delivered within the timeline. However, there hasn't been much research on project management techniques and software tools reviews targeted for Saudi Arabia companies, this study will fill this gap in this domain literature and focus on the projects team satisfactions with the software project management tools. Organization often have difficulty identifying and adopting appropriate tools that meet their specific needs and project objectives. By investigating the widely distributed tool in terms of the tool's main features and limitations in the usability context. Currently, Jira is used extensively in the industry and by organizations to manage their projects, tasks, and workflows (H.Yogaantara and A.N.Fajar, 2020). This makes it a suitable area for investigation. To better understand Jira's strengths and weaknesses, as well as the challenges facing project managers and developers when implementing and using it. Ultimately, this research aims to contribute to the improvement of project management practices and to the enhancement of organizations' efficiency and effectiveness in projects management execution.
The objective of this study is to conduct a usability testing to qualitatively assess the satisfaction levels of six project managers and six developers working on Saudi Arabia's IT company with Jira Software's management tool for tracking project and task progress, respectively. This study aims to identify areas for improvement and assist the overall satisfaction levels with Jira Software's management tool. It captures feedback, suggestions, and recommendations from both groups of users.
This research is targeted mainly towards addressing the following three questions:

- How satisfied are project managers with the project management tool that they are currently using?
- How satisfied are developers with the project management tool that they are currently using?
- How to create a design that improves both project managers' and developers experience?

Following is the structure of the remaining sections. The second section provides a literature review consisting of an overview of software project management tools. It also provides a brief introduction to agile methods and management. The third section presents the research methodology used in the study. The fourth section contains usability test results and survey responses. The authors discuss the presented results to address the research questions in the fifth section of the paper. The sixth section outlines the limitations and future work. The seventh section concludes this paper.

2. LITERATURE REVIEW

This section provides an overview of Agile methodology regarding project management, discuss the advantages and disadvantages of using these tools in a project and a comparison of the available software tools.

2.1 Overview of Agile methodology

The purpose of this subsection is to describe what Agile methodology is, what the main methods are, and how Agile methodology is applied to the management process of a project.

2.1.1 Definitions

Agile project management and software development have been widely discussed and applied. Therefore, several authors and experts in the field have provided detailed definitions and clarifications (A.Behrens, et al., 2021).

Ciric and Lalic in their article (H. Rahman, et al., 2018), outlined Agile as a set of management practices founded on iterative cycles and incremental development that focuses on delivering products in small, incremental steps that can be completed in a short amount of time. These practices are founded on collaborative effort of self-organized teams to evolve requirements and prioritize solutions based upon the stakeholder's collaboration, communication, and feedback. In the Agile methodology, (M. Hamid, et al., 2019) explains that software development is continuously improved and iterated based on the actual experience of using the software. As part of every iteration, there are phases for design, implementation, and testing, as well as an analysis of the requirements. However, (M. Kuutila, , et al., 2020) emphasize the flexible nature of Agile software development as well as its ability to allow for changing requirements during the development cycle. Agile methodology comprises a set of principles. Agile methodology focuses on people and interactions rather than processes, and similarly, it prefers to work on working software rather than preparing documentation. (J.R.da Costa Filho, et al., 2022) has concluded that Agile attempts to minimize the risks inherent in traditional waterfall processes, along with the extremely high risks associated with requirements changes and final integration. However, the transition to an Agile environment may require the use of updated tools and technical environments, as well as changes to organizational guidelines and policies.

In summary, the Agile approach, as defined by multiple authors (D.Ghimire and S. Charters, 2022), encompasses a variety of management practices as prioritizing collaboration, flexibility, and iterative development.

2.1.2 Methods

Considering that every Agile method has its own limitations, it cannot be used for all projects, particularly those that are complex, large, and extremely important as mentioned by (Y.Chouhan, et al., 2022). Following is a brief description of each method used in software development using the Agile methodology:

Firstly, Rational Unified Process is an incremental process in which new releases are released over time. It consists of main four phases, namely inception, elaboration, construction, and transition.انقر أو اضغط هنا لإدخال نص. Secondly, Scrum utilizes short iterations, known as sprints, to deliver working software incrementally. It focus on self-organizing teams, close collaboration between stakeholders, and continuous improvement, it suitable for both small and large projects, it is an iterative and incremental model (M.N.Mahdi et al., 2021). Thirdly, Extreme Programming emphasizes customer satisfaction, frequent releases, continuous testing, pair programming, and collective code ownership.

Fourthly, Kanban become increasingly popular in software development, team members can visualize their work and optimize the flow efficiency through visual management methods (A.Puška, et al., 2020). Fifthly, Lean Software Development the goal of this approach is to reduce waste, optimize flow, and deliver value as quickly as possible. Sixthly, Feature-Driven Development one of the popular Agile methods, follows eight best practices, such as domain object modeling and development by feature. Seventhly, Adaptive Software Development which values are created by rapidly adjusting to internal and external events rather than using process optimization techniques, in general, the size and degree of uncertainty of the project determine the length of an iteration.

2.1.3 Agile project management

Agile project management (APM) is the process of managing projects within an Agile framework. As stated by (M.Mahmud, 2020) APM focuses on delivering small chunks of work quickly and iteratively, rather than all at once. It also emphasizes communication and collaboration and encourages teams to be flexible and responsive to customer needs. APM can help teams deliver high-

quality products and projects on time (M.Talukder, 2020). The iterative and flexible nature of Agile methodologies allows the traditional phases of project management to be adapted to fit the nature of Agile.

2.2 Project management software tools

Using software management tools when adapting Agile methodologies can impact project management decisions. A wide variety of such tools are available, including Jira, Trello, and versionOne. These tools help project managers improve communication and resource allocation, plan their work effectively, and achieve desired results (E.Ismagilova, et al., 2019) .

2.2.1 Advantages and disadvantages of using project management tools.

The authors Özkan and Mishra (A.-D. Salaou , et al., 2021) emphasize in their research that software tools provide advantages as enhancing efficiency by automating repetitive tasks, simplifying workflows, leading to improved schedule management, and progress tracking. Additionally, these tools promote improved collaboration through features such as shared project dashboards, continuous updates, and document sharing, enabling seamless teamwork regardless of geographical locations. Software tools provide a centralized repository of project-related information, such as plans, requirements, documents, and communication records, can be centralized. Similarly, authors (A.Mishra and Y. I. Alzoubi, 2023) noticed as a result of software tool's centralized information, it allows information to be accessed and retrieved more easily, allowing everyone to stay up-to-date (A.Faudot, et al., 2022). Likewise, author Chouhan makes the case that software tools are beneficial due to its assist in resource allocation, tracking, and optimization. By assigning tasks, monitoring resource utilization, and identifying potential conflicts, project managers can manage projects efficiently. Additionally, the tools are used for increasing the rate of throughput and eliminate bottlenecks by closely monitoring and managing progress while maintaining control over the scope of the project. On the other hand, author argues as well that using software tools for project management activities can produce a few challenges such as some tools can have a steep learning curve, particularly for team members who have no prior experience with the tool (E.Ismagilova, L, et al., 2019). Which implies that it's a critical to ensure that everyone can use a software tool effectively, so training and onboarding may be required as proposed by author. Again, author Chouhan points out that high-quality project management software tools often cost money. It may also be difficult and time-consuming to implement and customize these tools to meet the specific needs of a specific project as author (D.Özkan and A. Mishra, et al., 2021). Nevertheless, author Chouhan discusses that it can be challenging to integrate project management software tools into existing workflows and systems. It may be necessary to expend additional effort to ensure seamless data interchange due to compatibility issues with other software. Moreover, maintaining, and providing technical support for software tools is a continuous process. Support quality and responsiveness vary from tool to tool.Insufficient support can prevent the tool from being effectively used.

2.2.2 Tools comparison

According to (M.I.Lunesu, et al., 2020) agile have keys characteristic as online accessibility, cost involvement, task boards for progress tracking for defining, monitoring, and reporting tasks.The most suitable tool can be selected based on factors as task scheduling, resource management, time tracking, estimating, risk assessment, process management, and portfolio management.As part of the selection process, it is necessary to evaluate the features of different tools and choose the optimal combination of features for maximum utility across projects, taking into consideration factors such as cost and features availably (D.Ghimire and S. Charters, 2022). The most common features include generating reports and dashboards, facilitating collaboration, managing requirements, budgets or resources, and tracking time. The bellow Figure1 clearly illustrates a significant observation regarding Jira management tool. It is noteworthy that the tool has successfully targeted the majority of the criteria outlined and it has demonstrated to provide a reliable solution for managing various aspects of projects and teams. Therefore, the authors conduct this research using this tool

Name	Platform Based	Web Based	Online	Cloud Based	Burn Down Chart	Agile Boards	Milestones	Resource Management	Time Tracking	Bug Tracking	Tasks	Integration	Reports	Documents	Version Control	Workspaces	User role	Pricing	Free Version
Jira		✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	
Active Collab			✓	✓					✓		✓		✓	✓			✓	✓	
Agilo for Scrum	✓					✓					✓		✓	✓			✓	✓	
SpiraTeam by Inflectra	✓		✓		✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	
Pivotal Tracker			✓			✓			✓				✓	✓		✓	✓	✓	✓
VSTS			✓		✓	✓	✓		✓		✓		✓	✓	✓		✓	✓	✓
Icescrum	✓		✓	✓	✓	✓				✓		✓	✓		✓		✓	✓	
SprintGrounds			✓		✓		✓			✓	✓	✓	✓		✓		✓	✓	✓
VersionOne			✓			✓	✓		✓	✓	✓	✓	✓	✓			✓	✓	✓
Taiga	✓	✓				✓	✓				✓	✓	✓	✓	✓		✓		✓
Agielan			✓	✓		✓				✓	✓		✓	✓				✓	
Wrike	✓		✓	✓	✓	✓	✓	✓	✓		✓			✓			✓	✓	✓
Trello			✓	✓		✓	✓		✓		✓		✓	✓				✓	✓
Axosoft			✓	✓	✓	✓	✓	✓				✓						✓	
Planbox			✓	✓			✓	✓	✓		✓							✓	✓
Asana	✓		✓			✓	✓	✓			✓		✓					✓	✓

Figure1 .Comparison of software project management tools

2.2.3 Overview of Jira project management software tool

Jira is project management software tool that is widely used by professionals and institutional designers working in collaborative environments. It is known for its ability to track progress, track issues, manage tasks, and project backlogs.J ira ticketing system was created by Atlassian Corporation in 2002 for monitoring and tracking bugs. Later, with Jira's advanced features, it has been widely used to manage IT projects. It has a significant impact on how project team members conceptualize Agile projects.In many instances, the approach and understanding of the team is influenced by the data structures managed within the tool (A.Gupta, G. Poels, and P. Bera, 2022).

In addition to providing an effective work environment, Jira assists both co-located and distributed teams in anticipating, identifying, and resolving potential deadline issues. All members of the team have access to project milestones, updates, and reminders in one central location. A fundamental role of Jira is to manage the backlogs of the Development, Architecture, and QA teams, each with different workflows. Since Jira can be used to create Kanban and Scrum boards, schedule sprints, estimate completion times for work items. Also, create burndown charts and cumulative flow diagrams easily. In addition, fields and screens can be customized to ensure accurate tracking and recording of work items. The tool is globally wide used by large community.

3. METHODOLOGY

The purpose of this study is to gather in-depth insights into participants' interactions with Jira's mobile application through a qualitative research design, specifically a usability tests, which allows to

observe users as they interact with the targeted application and uncover any difficulties they encounter**.** The study involved 12 participants, selected based on the criteria outlined by the authors. Each has an IT background and at least one year of experience working with the Agile as a developer or project manager. All of them work in one organization; however, each participant has different previous experiences from different organizations. They are chosen in a random selection from a variety of projects within the organization to ensure fairness and minimize bias. The test accomplished by using Lookback tool which combines direct observation, screen recording, and participant feedback as methods for data collection. The selected data was analyzed to identify common themes, usability issues, and patterns of interaction based on the participants' interactions and nonverbal and verbal cues during the test**.** An informed consent form was obtained using Jotform tool from each participant prior to the test. The authors conducted the testing in a controlled lab equipped with Jira application running devices. Participants were assured that their data will remain confidential. They were encouraged to express their thoughts and suggestions through the use of the application. A series of predefined tasks were provided to participants during the testing process. To gather more information about the participants' experience,a survey is presented following the completion of the test**.** Each participant is required to complete a questionnaire using Google Form.This questionnaire is divided into three parts. The first section includes questions for personal job information as the number of years of experience with the software. The second section contains a background question for the tools used previously. In the third section, participants are asked scaled questions with rating answer which are (Strongly disagree, Disagree, Neutral, Agree, Strongly agree) or with this scale (Very Easy, Easy, Moderate, Difficult, Very Difficult) regarding Jira software management tools, such as how user-friendly it is, the usability of the application, and whether the participant plans to use Jira in their future projects. In addition, an open question is included to obtain any enhancements or desired features for Jira. The first two sections were answered prior to the the test, while the last section was answered after the completion of the test. During the experiment, participants were divided into two groups, with six participants representing each role. Three tasks was assigned to project managers. The first task (T1) is to create a project. It's began when the "Create Project" button in the project tab is clicked. Project forms must be completed with necessary information, including the project name, in this case "Volunteer system," the project template, in this case "Scrum," and the project key, which may be as "VS". Once the form is complete, they ware asked to click on the "Create" button to finalize the creation of the project.

Their second task (T2) is to create multiples user stories. The first two user stories should be assigned to developer AB and the third user story should be assigned to developer CD. The list of the user stories as follows:

- User story 1:As an admin, I want to create a volunteer opportunity.
- User story 2:As an admin, I want to edit a volunteer opportunity name.
- User story 3:As an admin, I want to edit a volunteer opportunity timeline.
- User story 4:As an admin, I want to delete a volunteer opportunity.

Lastly**,** the third task (T3) project managers were required to move all created user stories from the project backlog to the sprint backlog as their final task. Further, the developer with the least number of tasks should be assigned the last user story added to sprint 1, "User story 4".

As for the second group, which is comprised of developers, the first task (T1) is based on the user story assigned to them on an existing project "Volunteer system" those states, "As an admin, I want to create a volunteering opportunity." Two subtasks should be created and assigned to them, which are

- Create a table for opportunities in the database.
- Create a user interface for the opportunity creation form.

Next, the second task (T2) the developers should change the status of the subtasks they created in the backlog from "To Do" to "In Progress." Additionally, the status of user stories from "To Do" to "In Progress." As well. Finally, their ware requested for the last task (T3) is to search for their assigned bug on a specific user story and change it status to be done.

4. RESULT

To gather more information about the participants' background and the other tools that they used previously, and based on the Figure2, all the selected project managers participants are using Jira currently in their projects with different years of experience. While only 83% of the selected developer participants are using Jira currently it with different years of experience as well and only one is new for the application.

As shown in Figure4, 67% of the project managers participants used Team Foundation Server (TFS) project management tool to manage their project, and other used Trello and Excel sheet. Similarly,83% of the developer's participants used TFS project management tool, and other used excel sheet.In Figure5 and Figure6, 84% of project managers agreed that the tool they used previously is easy to learn and use, except excel sheets which is reported to be extremely difficult to use in project management by 16%.The developers had different views regarding the ease of use and learn of TFS tool that they used previously.

In Figure7 and Figure8, all project managers were asked to rate the project creation process based on the tools they used previously, and 67% of them found the process of creating a new project is not easy, and it took them around 5 up to 10 or more minutes to add only four users' stories. Same with developers, they were asked to rate the tasks related process based on the tools they used previously, but only 66% of the participants agreed that the tools they used previously is not easy in regard of tracking the tasks and its status, as well as it took them around 1 to 10 minutes or more to track bugs assigned to a user story that they responsible for.

After finalizing the test, participants were asked to answer the last section of the survey about their opinions about Jira applications, Figure9 shows that 100% of the project managers and developers agreed or strongly agreed that Jira mobile application is user-friendly. With respect to the ease of learn and use, 100% of project managers found Jira mobile application is easy to learn and use, while only 84% of developers agreed with that. Regarding the project creation with Jira, Figure11 shows that 84% of the project manager agreed that it's easy to access and create projects on Jira application, with maximum 9 minutes to create four user stories. On the other hand, regarding the access and retrieval of the tasks, only 17% of the developers found it difficult on Jira application, with maximum 9 minutes to track assigned bugs for specific user story.

When the participants were asked if there willing to use Jira mobile application in their project management, Figure13 shows that both 83% project managers and developers agreed that they will but only 17% are disagreed or remained neutral on the matter. For the opened answer questions, the authors intended to collect the main strengths and weaknesses of the software tools based on project managers and developers' opinions from real experience in the workplace prior to the test. Most of projects manager commented on the ability to manage the tasks and resources through the tools directly is one of strengths of the tools. While some weaknesses are included that there are no mobile application versions of the tool nor reporting dashboards and the need of complicated configuration to be handled. In contrast, developers commented on the ability to integrate with the integrated development environment (IDE), they used to link the code sections with its associated user stories. While some weaknesses including that there is no history for the changes made and it's not easy to learn for first time users. After finalizing the usability test, participants were asked again an opened answers questions to get as much feedback, suggestions and enhancements as possible from their previous experience with Jira. The project managers outlined that the there are some missing features such as creating project using the information of existing one, edit project info, resource management activities. While the developers outlined that the there are some missing features such as handling the tasks or user story in case of assignee updates, more extensive filters, and direct code linking configuration. For usability testing results, Table1 provides an overview of the time duration for each task performed by the participants and tasks' average time. Also, During the usability test, participants provided valuable suggestions for improving the project management system. Suggestions include the ability to clone a project and delete a project. In addition, there is the introduction of a resource management tab and delegation options for

Table 1Usability test summary for project managers

employees. These suggestions will enhance the application's functionality and user experience.

Task description	Participant Name	Duration	Average Duration
T1	Participant#1	00:01:04	00:01:07
	Participant#2	00:00:31	
	Participant#3	00:01:12	
	Participant#4	00:01:19	
	Participant#5	00:01:17	
	Participant#6	00:01:23	
T2	Participant#1	00:02:13	00:02:49
	Participant#2	00:03:41	
	Participant#3	00:02:05	
	Participant#4	00:01:20	
	Participant#5	00:04:14	
	Participant#6	00:03:26	
T3	Participant#1	00:01:34	00:01:30
	Participant#2	00:01:27	
	Participant#3	00:02:13	
	Participant#4	00:02:17	
	Participant#5	00:00:09	
	Participant#6	00:01:30	

Table2 provides an overview of the time duration for each task performed by the participants and tasks' average time. Also, During the usability test, the authors gathered valuable suggestions from participants to improve the application. In terms of user stories, participants recommended that the system should automatically update a user story's status when its sub-task status changes. Moreover, participants expressed a desire to display their assigned user stories by default in the backlog. Furthermore, they suggested that priority fields be added to indicate the severity of the bug to facilitate a better prioritization process.

Task Description	Participant Name	Duration	Average Duration
T1	Participant#1	00:02:16	00:02:27
	Participant#2	00:02:29	
	Participant#3	00:02:56	
	Participant#4	00:03:10	
	Participant#5	00:01:27	
	Participant#6	00:02:28	
T2	Participant#1	00:01:15	00:00:56
	Participant#2	00:00:36	
	Participant#3	00:00:34	
	Participant#4	00:01:08	
	Participant#5	00:01:09	
	Participant#6	00:00:50	
T3	Participant#1	00:01:09	00:01:26
	Participant#2	00:01:16	
	Participant#3	00:01:20	
	Participant#4	00:01:10	
	Participant#5	00:02:26	
	Participant#6	00:01:18	

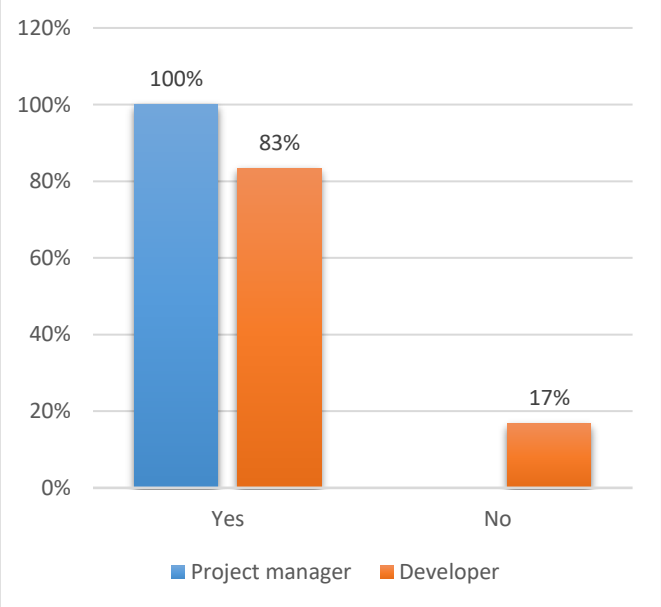


Figure2.Participates currently using Jira

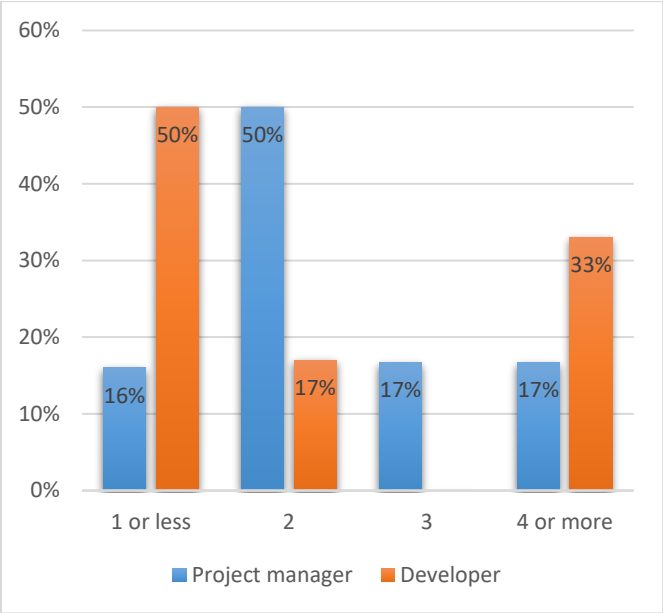


Figure**3** .Participates years of experience using Jira

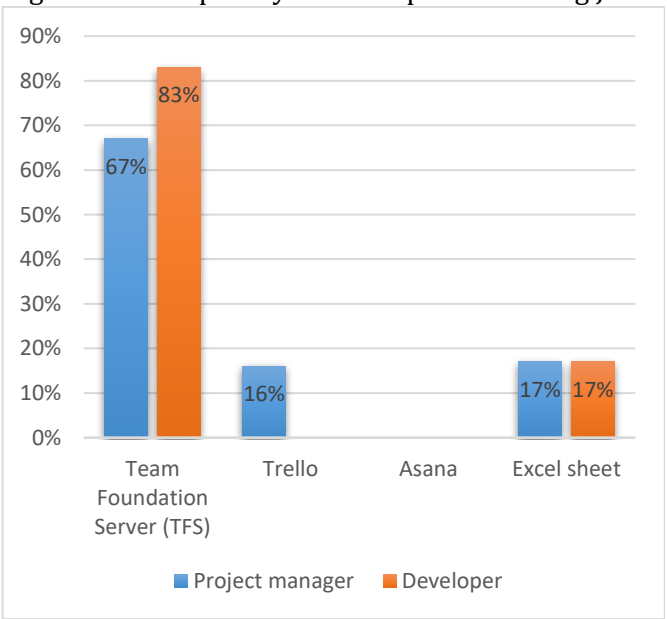


Figure4.Previous tools participates used

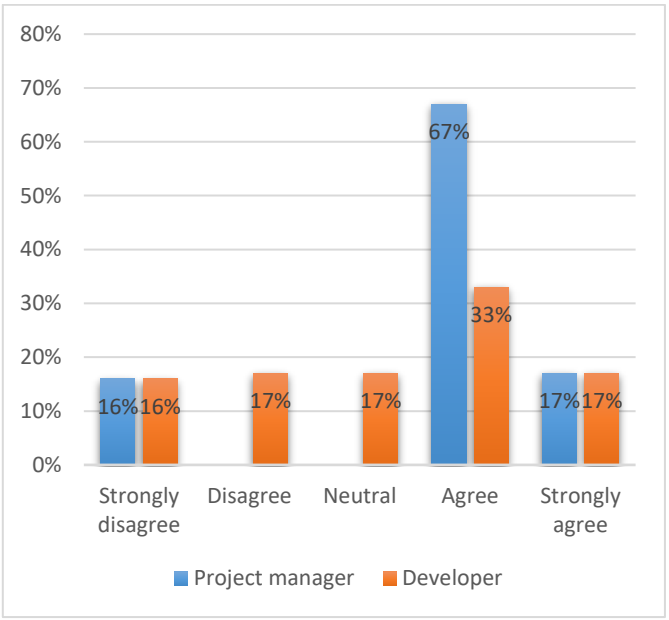


Figure**5** .Previous tools participates used with user friendly rating

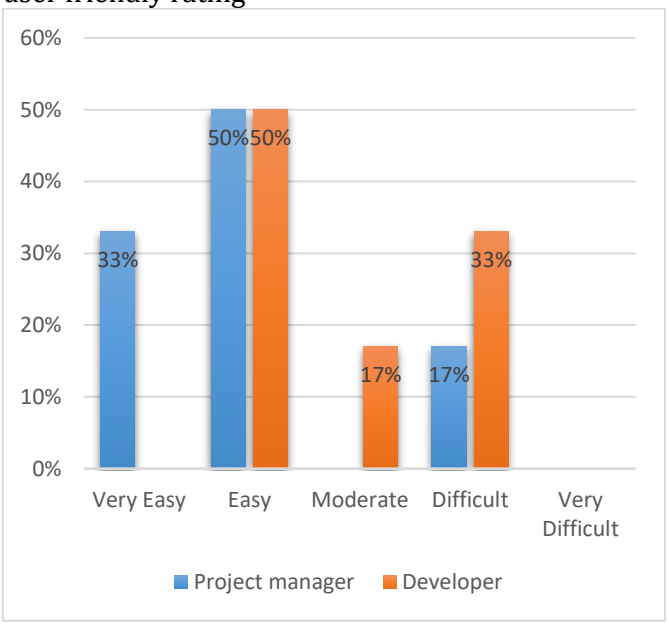


Figure6.Previous tools participates used with ease to use and learn rating

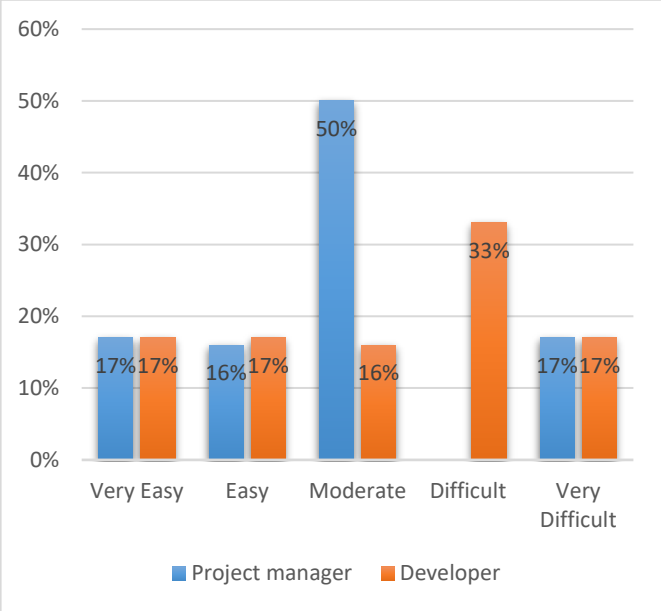


Figure7.Previous tools participates used rating for project creation or tasks management based on role

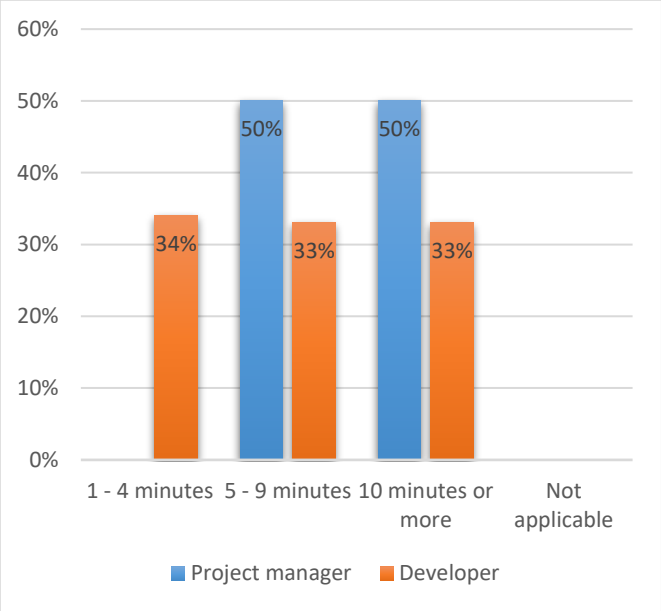


Figure8.Previous tools participates used rating for average time for project creation or tasks management based on role

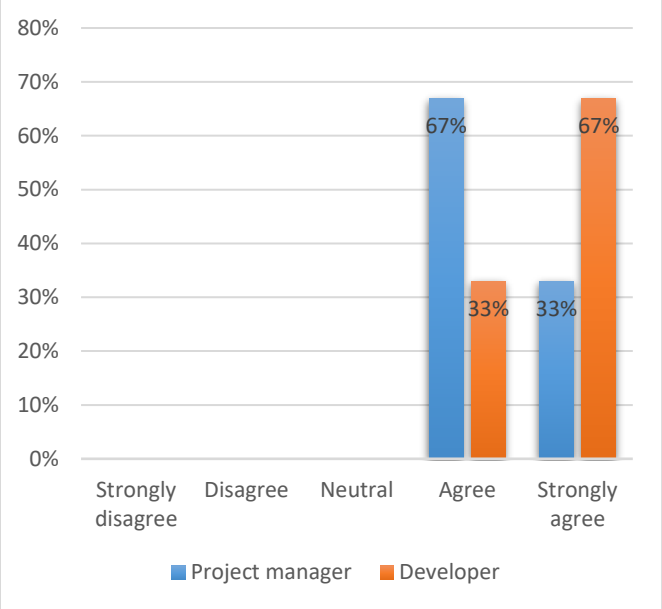


Figure**9** .Jira's application with user friendly rating

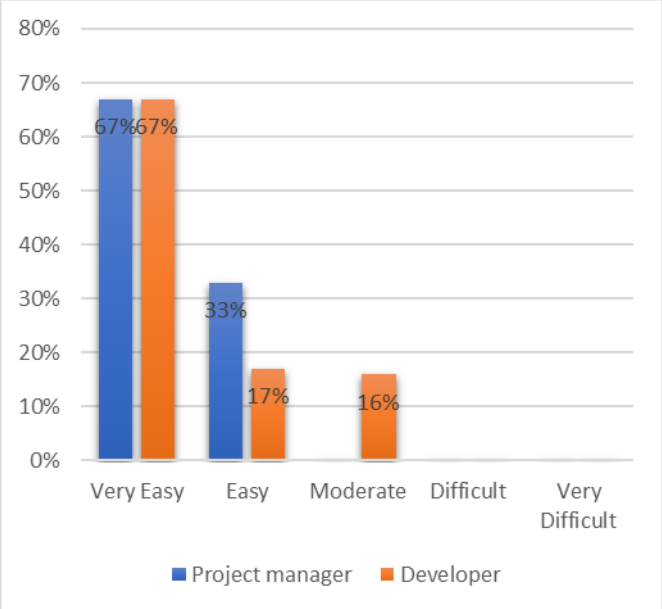


Figure10. Jira's application with ease of use and learn rating

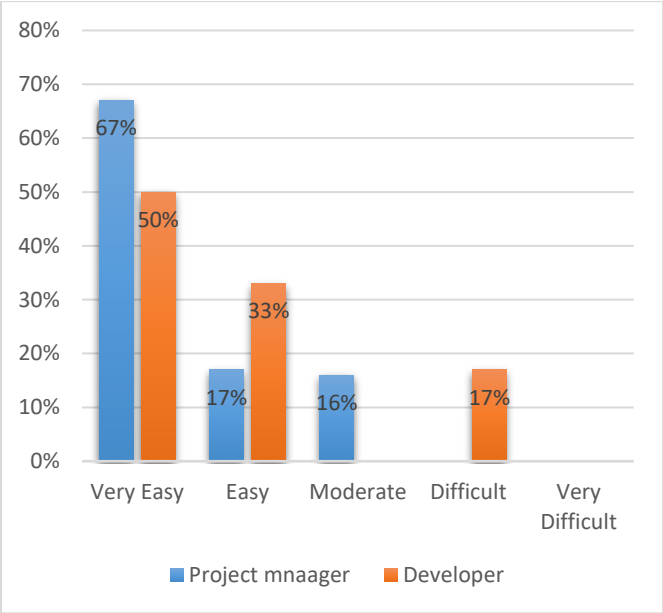


Figure11. Jira's application rating for project creation or tasks management base on roles

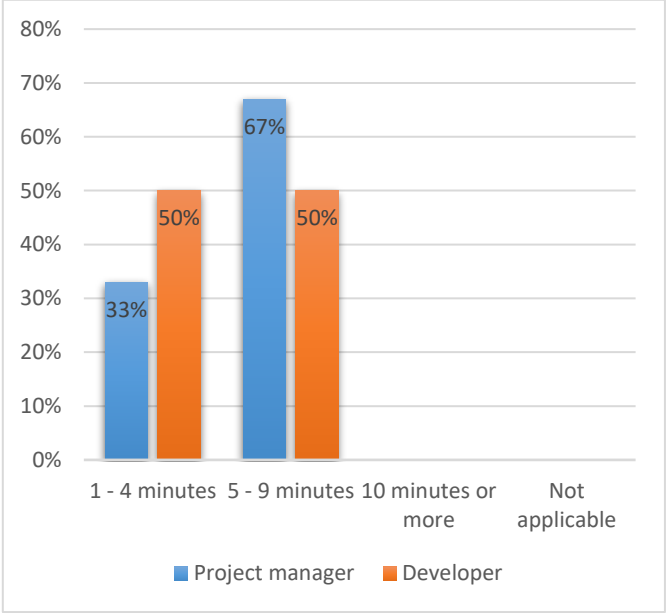


Figure 13. Participants intention to use Jira's application in future

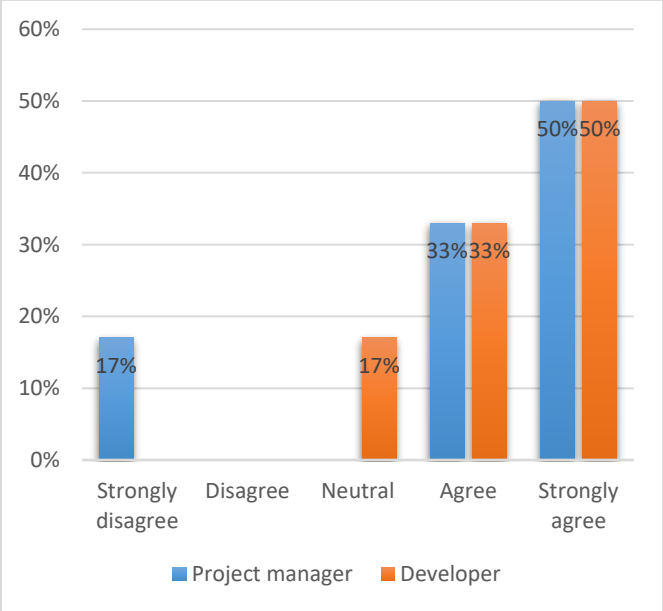


Figure12. Jira's application rating for average time for project creation or tasks management base on roles

5. DISCUSSION

After all the collected results have been presented, this section delves into a comprehensive analysis with the primary objective of addressing the research questions at hand.It is intended to provide conclusive answers and insights to the research questions by carefully examining the data gathered throughout the testing process.

5.1 Project managers' satisfaction with current tools

The study seeks to understand how effective and efficient the tool is in facilitating the project creation process.The findings reveal that all the selected participants are currently using Jira in their projects, indicating its popularity among project managers with varying levels of experience as reported previously by the result of Ozkan study (R.Imran and T. R. Soomro, 2022). However, when it comes to project creation on software tools, 67% of project managers expressed that the process of creating a new project with TFS,Trello or excel sheets was not easy, and it took them approximately 5 to 10 minutes or more to add only four user stories.While with Jira, significant majority as 84% of the participants agreed that it was easy to access and create projects. Using Jira, the average time taken to create four user stories was reported to be a maximum of 9 minutes.This average time is calculated as well during the

usability testing the authors conducted using the same variable as four user stories, and it's shown to be about 3 minutes only. Therefore, this suggests that project managers can create user stories in significantly less time and more efficiently when using Jira compared to other tools. However, for big projects, it contains a hundred of user stories, so Jira must be enhanced to accommodate that. As a result of the outcomes obtained, 100% of the participants agreed or strongly agreed that Jira mobile application is user friendly and generally expressed satisfaction with Jira software's management tool in terms of project creation especially in compared with TFS, which was used by 67% of project managers prior to Jira, it doesn't have a mobile version as reported in the survey. In addition, 83% of the participants are agreed that they are willing to use Jira mobile application in their project management and only 17% are disagreed which reported by them to be because of its learning curve as this is one of the challenging facing project management tools as mentioned by (D.Ciric Lalic, et al., 2022).

5.2 Developers' satisfaction with current tools

The goal is to evaluate how satisfied developers are with the tool's functionality in relation to monitoring and tracking their tasks including any bugs that may arise. The findings indicated that Jira is currently being utilized by 83% of the chosen participants in their projects, regardless of their varying years of experience. Furthermore, 66% of the participants expressed agreement regarding the difficulty they encountered with previously used tools in terms of task tracking and status monitoring. On average, it took them between 1 to 10 minutes, or even longer, to track bugs assigned to a user story for which they were responsible for. When it came to accessing and retrieving tasks using Jira,83% of the participants expressed its ease of use, with a maximum of 9 minutes required to track assigned bugs for specific user stories. Approximately, the activities of creating tasks, tracking its bugs and updating its statuses was calculated through the usability testing sessions to be an average of 5 minutes, indicating a significant improvement using Jira.

The outcomes also revealed that 100% of the participants either agreed or strongly agreed that the Jira mobile application was user-friendly.Additionally, 84% of the participants reported that it's easy to learn and use.

5.3 Improvements to enhance project management experience

Based on the survey and the suggestions during the testing sessions, to a achieve higher satisfaction rate Jira must offer some missing features. Firstly, there are a need to take an advantages of the tasks automation abilities in software project management suggested by authors Özkan, an efficient and automatic way to
manage task assignees in situations like employee vacation or retirement, which is currently requiring manual updates to individual user stories, tasks, and bugs. In addition, to ensure the same experience across the mobile version, it should maintain a compatible user interface with the web version, as compatibility is an important feature as mentioned by (M.Younas, D.N.A.Jawawi, et al., 2022), such as the displaying of all user stories is not recommended for developers using the mobile version as it takes time to search through them. Instead, it is preferred to filter to display only user stories assigned to them as existed in web version. Secondly, enable project management efficiency, the project manager should be provided with the ability to edit, delete or clone projects, thereby saving time by avoiding the need to create new projects from scratch.

This feature enables the creation of a new project based on an existing one within the application, which if it is implemented will be unique for Jira and there are no other tools available for that. Thirdly, quick, and simple method for creating user stories should be implemented. This enables the project team to generate user stories efficiently, ensuring clear communication and understanding of project requirements specially with the rapid changes in Agile projects. Finally, in order to manage project resources, a dedicated resource management tab should be available to the project manager as its one of the main advantages of the software tools. This tab allows the addition or removal of project members as required. It should include a comprehensive list of employees assigned to the project, along with their respective tasks. This facilitates better coordination and allocation of responsibilities within the project team. Although Jira's mobile application and project creation capabilities were perceived as beneficial by participants, some challenges were

observed with the Jira tool and other enhancements were needed which is addressed in the prototype section later.

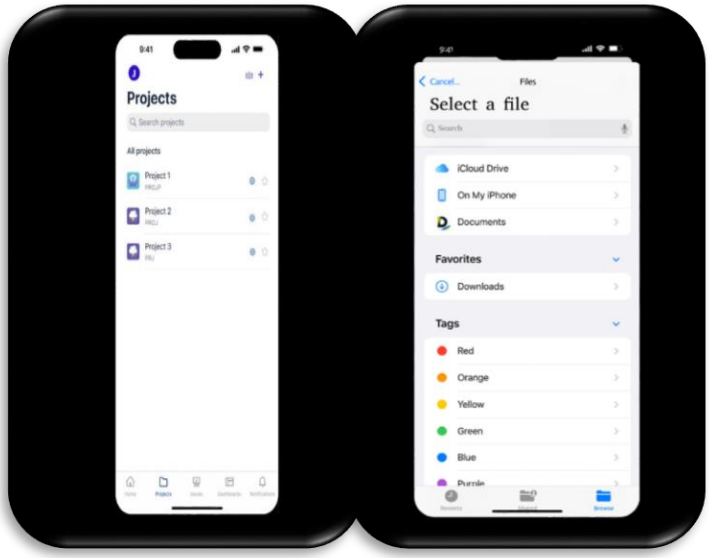
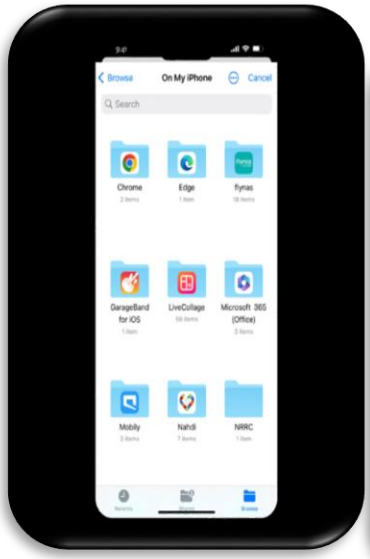
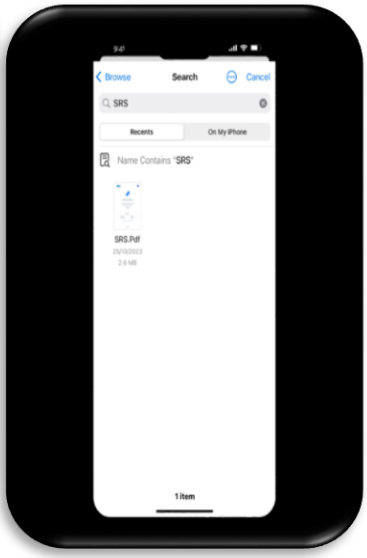
5.4 Design implication

Based on the feedback and suggestions from the participants through usability testing and survey, we developed a mockup of Jira application. Only basic functionalities are shown and basic screens are visualized, including new functionality.

5.4.1 Create A Project by Upload a File

Table**2** .Create project mock-up screen summary.

Once manager completed the Software Requirements Specification (SRS) file, which includes sections for functional requirements, they can upload the file to the application. The application will read it and generate user stories based on its contents. The process of generating user stories will be significantly improved, saving valuable time that would otherwise be spent manually creating them. Table3 shows each mock-up screen with their description.

Mock-up screen	Description
 *Figure14 .Project list* *Figure15 .Select file step one*  *Figure16 .Select file step two*  *Figure17 .Select file step three*	Figure14 shows the project tabs display all manager projects. To create a project, the manager clicks on the "plus" icon.A manager can also create a project using the "upload file" icon. It will automatically extract the file as shown in Figures15,16,17 if it is uploaded.

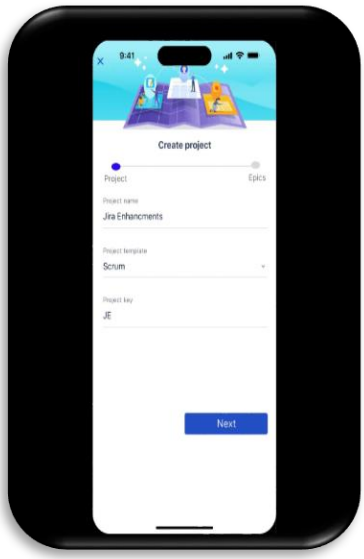


Figure 19 .Creation project form

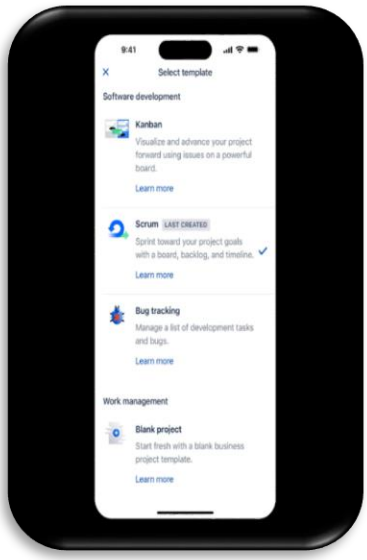


Figure 18 .Project templates

In Figure18, the application automatically extracts data and fills in all fields except the project template. Figure19 shows a list of templates will appear when the manager clicks on the project template field.

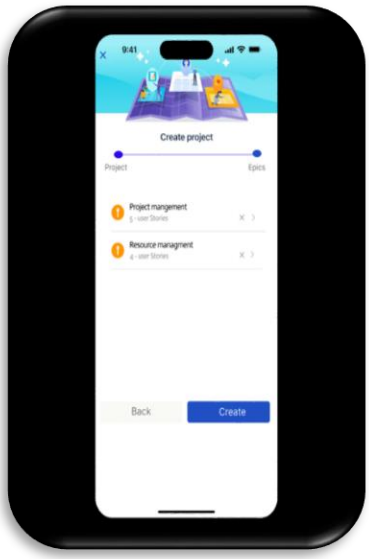


Figure 21 .Epics on the project creation form

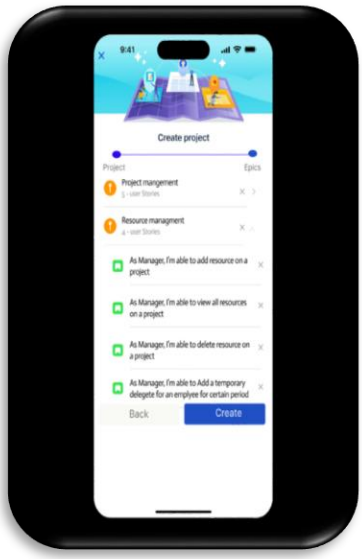


Figure 20 .Epics and user story on the project creation form

In Figure18, when a manager clicks "Next," the application shows the "Epics" tap in Figure20 which contains a list extracted from the file. A manager can delete, edit or "Expand the epic"to display user stories related to the epic as shown in Figure21.

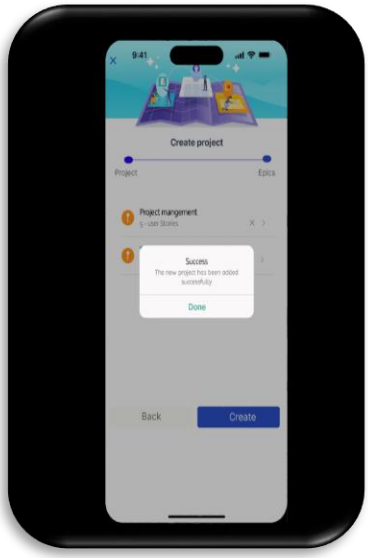


Figure22 .Success message when a project is successfully created

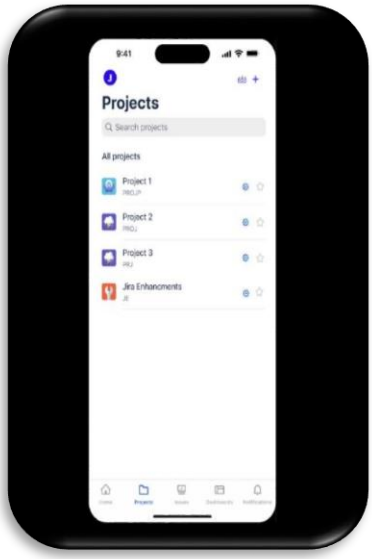


Figure23 .Projects

In Figure22 the application displays a successfully message after creation. Then the new project will be displayed in the list as in Figure23.

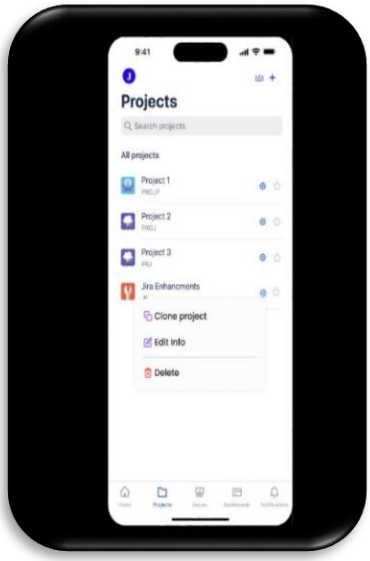


Figure25 .Option list of project

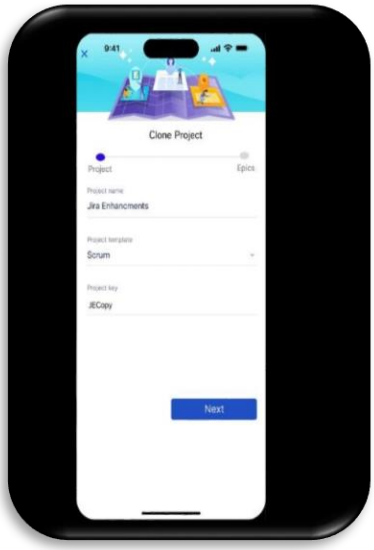


Figure24 .Clone project form

Figure24 shows the available options for each project. Figure25 Shows a clone form for managers that copies all the information from a selected project.

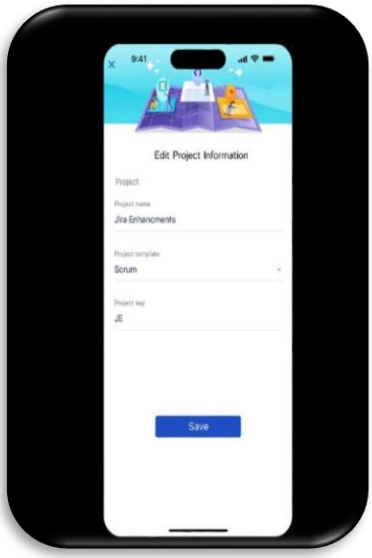


Figure27 .Edit form project

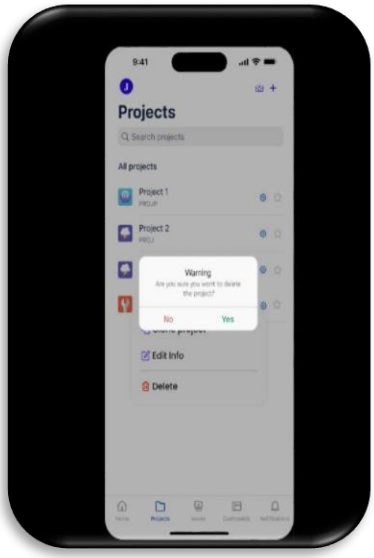


Figure26 .Delete confirmation message for a project

Figure26 Shows an edit form for managers to modify project information. Figure27 When the manager deletes a project, a confirmation message appears.

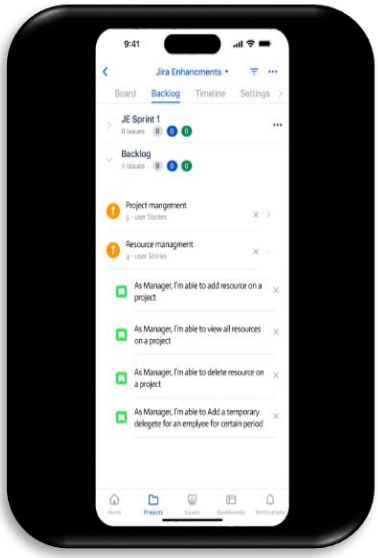


Figure29 .Backlog part one

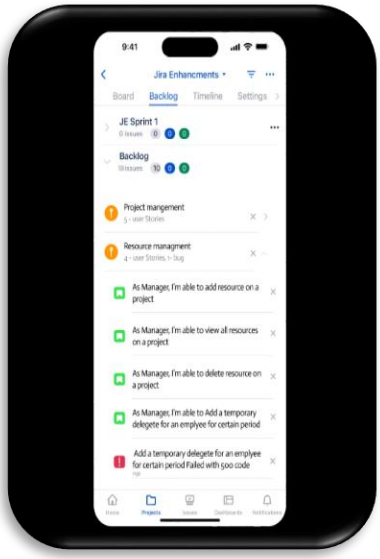


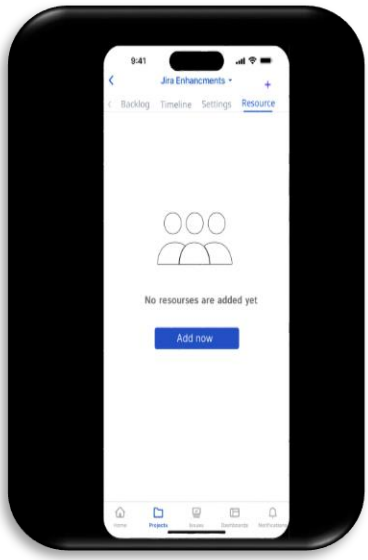
Figure28 .Backlog part two

When manager clicks a project, the application shows related tabs for it. Figure28 Shows epics and bugs with priority in backlog tab as shown in Figure29.

5.1.1 Resource Management Mock-Up

These functions include adding, deleting, and editing employee information, delegating an employee, which facilitates handover to the newly appointed employee. All user stories, bugs, and tasks are automatically assigned to the new employee, Table4 shows each mock-up screen with their description.

Table**3** . Resource management mock-up screen summary

Mock-up screen	Description
 *Figure 30 .Resource*	Figure30 shows a view list of resources that are currently assigned to a project. Additionally, it allows manager to add new resources.

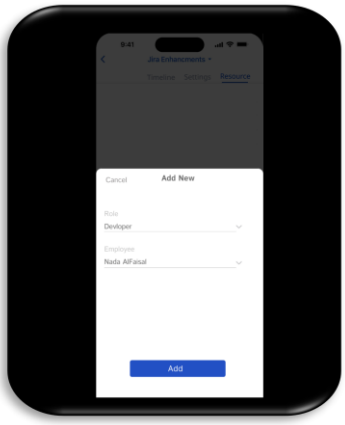


Figure 1.Add new resource

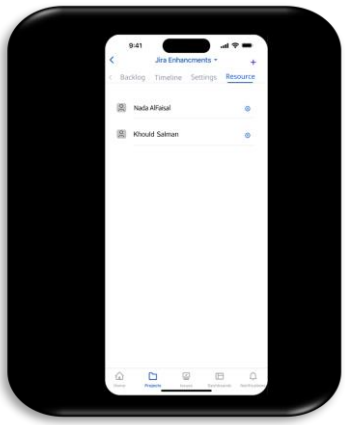


Figure 2.View list of resource

Figure31 shows the form to add a new resource,the information about them will be displayed in the resource tab of the project as in Figure32.

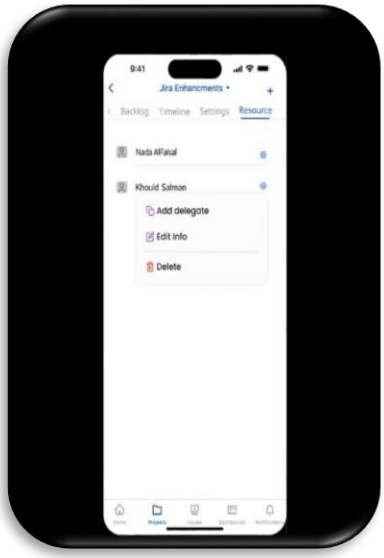


Figure32 .Options list of resource

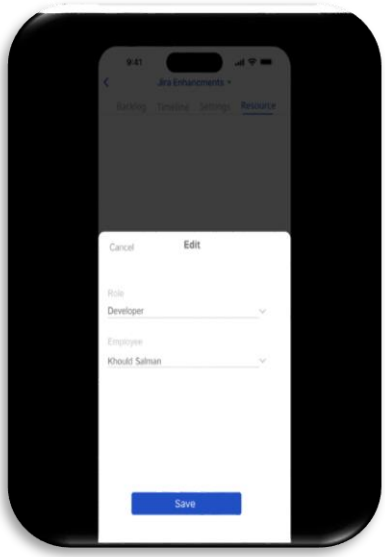


Figure31 .Edit resource information

Figure33 shows the available options for each resource. Figure34 Shows a form for editing employee role and name.

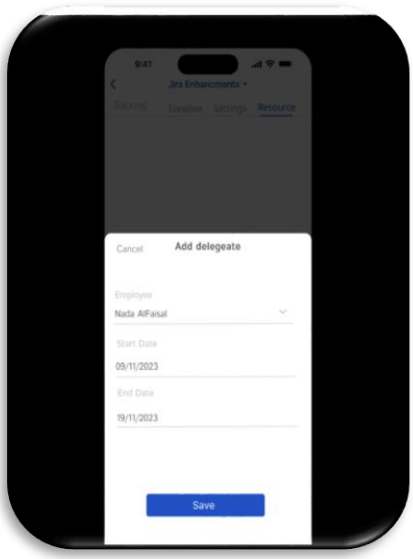


Figure34 .Add delegation form

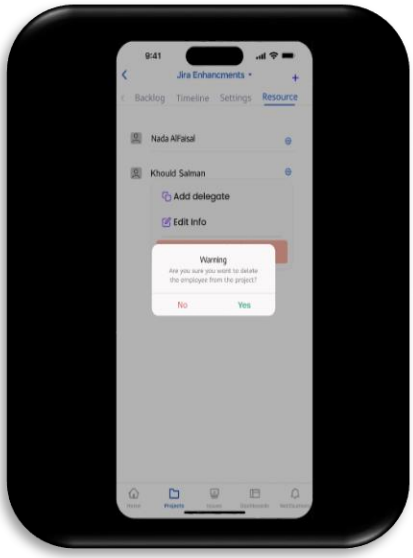


Figure33 .Delete confirmation message

Figure35 shows a delegation form to set a start and end date for delegation for an employee. Figure36 displays a confirmation message indicating the deletion of the resource selected.

6. LIMITATIONS AND FUTURE WORK

The focus of this study is to explore the areas for improvement with Jira tool, and to assist the overall satisfaction level. However, this study did not explore the extent to which the use of Jira tools affects a project's success, such as ensuring the project is delivered on time, within budget and on schedule. The authors administered the usability test to a total of six project managers and six developers, achieving the initial target of six

developers and six project managers. However, it would be beneficial to increase the sample size of to include project managers and developers from different Saudi Arabian companies with varying levels of experience to ensure the validity of the results. An extensive study is required to determine the characteristics and specific needs of each role. In addition, comparing the effectiveness of two popular software management tools which are TFS and Jira could provide valuable insights for the study, since the authors noted based on the conducted survey that TFS it widely used as well. The next usability testing should include a new role as part of the usability testing to assess the satisfaction level of users of the Jira software management tool, such as DevOps and software quality assurance testers, to better understand how people are satisfied with using the tool.For additional examination,it is necessary to examine Jira project management tools in conjunction with the use of Kanban for example or any other Agile methods that currently supported by Jira.

7. CONCLUSION

In conclusion, the increasing use of software tools has transformed the way that projects are planned, executed, and monitored. Digital solutions have replaced traditional manual processes and analog tools as a result of technological advances, especially those associated with Agile methodologies, which have emerged as a popular approach to accommodating rapid changes in requirements through flexibility and collaboration. which is the leading application in this area. In this study, three key research questions were addressed to evaluate the satisfaction of project managers and developers with Jira Software's project management tool as well as finding any improvements that may improve the outcome of the tool. According to the findings, Jira was found to be an easy and efficient tool to use by most project managers and developers. Although improvements have been suggested, such as the ability to edit, delete, or clone projects, a dedicated resource management system, and automatically assigning tasks to assignees.

As mentioned by the authors, the authors intended to enhance Jira to provide project team with effective management capabilities. However, further research is required to explore whether Jira has a direct impact on project success, as well as to establish a larger sample size to validate the results and to resolve any remaining issues.

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