Case study document

Introduction

As part of my master's thesis, I developed a Glossary Management Tool called TEM4Jira which provides a central platform for semi-automatically creating and editing a glossary in a software team. A section of my thesis will include an evaluation of TEM4Jira regarding its usability and utility.

Your expert opinion is needed for this evaluation.

You will be asked to perform some tasks with TEM4Jira. While performing the tasks you should work in a think-aloud manner. It means that you should say everything you are thinking, looking at, doing and feeling while you are working on the tasks. Afterwards, we kindly ask you to fill out a short questionnaire regarding your experience with TEM4Jira and its usability. At the beginning a consent for further processing should be signed by you. The tasks should take about 1 hour to complete.

Thank you in advance for your participation!

Structure

This document is structured as follows:

Section 1 contains the consent for further processing. Section 2 gives background information about domain-specific glossaries in requirements specifications and describes the problem tackled by TEM4Jira. Section 3 explains the key concepts of TEM4Jira which are necessary to perform the study tasks. Section 4 describes the context of the user study and tasks to be performed. Section 5 contains a usability questionnaire.

1. Consent to further processing

Thank you for your time today! This one-hour study is part of a research study conducted by Aram Khachatouri at the Johannes Kepler University Linz. The goal of this study is to better understand how software engineers use TEM4Jira and to evaluate their usability and utility. The information will be used to derive suggestions to improve the development of such tools.

Procedures

You will be asked to work in a think-aloud manner with TEM4Jira and to fill out a short questionnaire regarding your experience with it (based on usability). The whole study should take about 1 hour to complete. The zoom session will be recorded and the video will be deleted after analyzing it for evaluation purposes.

Participant Requirements

Participation in this study is limited to individuals age 18 and older. You are being invited to participate because you have experience with requirements engineering.

Risks

The risks and discomfort associated with participation in this study are no greater than those ordinarily encountered in daily life or during other online activities. While we will only store and work with the results in an anonymized manner, using external data, the data could be de-anonymized and your identity could be uncovered.

Benefits

There no personal benefit from your participation in this study.

Compensation & Costs

There is no compensation for participation in this study.

There will be no cost to you if you participate in this study.

Future Use of Information

In the future, once we have removed all identifiable information from your data, we may use the data for our future research studies, or we may distribute the data to other researchers for their research studies. We would do this without getting additional informed consent from you (or your legally authorized representative). Sharing of data with other researchers will only be done in such a manner that you will not be identified.

Confidentiality

By participating in this research, you understand and agree that the Johannes Kepler University Linz may be required to disclose your consent form, data and other personally identifiable information as required by law, regulation, subpoena or court order. Otherwise, your confidentiality will be maintained in the following manner:

Your data and your consent form will be kept separate. Your consent form will be stored in a secure location on the Johannes Kepler University Linz property and will not be disclosed to third parties. By participating, you understand and agree that the data and information gathered during this study may be used by the Johannes Kepler University Linz and published and/or disclosed by the Johannes Kepler University Linz to others outside of the Johannes Kepler University Linz. However, your name, address, contact information and other direct personal identifiers will not be mentioned in any such publication or dissemination of the research data and/or results by the Johannes Kepler University Linz.

Voluntary Participation

Your participation in this research is voluntary. You may discontinue participation at any time during the research activity. You may print a copy of this consent form for your records. **By opting to continue below, I confirm that I am age 18 or older; that I have read and understand the information above; and that I do want to participate in this research and continue with the study.**

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2. Motivation

Requirements specifications contain domain-specific terms that may be incomprehensible or ambiguous to people who are not familiar with the particular domain. This may have negative impact on the shared understanding of requirements within a team, which is essential for the execution of successful software projects. To prevent such problems, glossaries are frequently created to define the domain-specific terms.

Table 1 shows a partial example of a glossary in the field of web hosting.

Term	**Definition**
Browser	A browser is a program for accessing Internet pages.
HTML	HTML is a text-based markup language primarily used to create web pages with static content.

Table 1. partial example of a glossary

In many projects, glossaries are not created and maintained continuously. Finding the domain-specific terms in specifications then becomes a cumbersome task taking a lot of time. Our tool TEM4Jira automates this process by automatically extracting domain-specific terms from so-called user stories, i.e., software requirements formulated compactly from the perspective of project stakeholders, such as:

As an author, I want to see my last edited document after launching the application to save time.

Once the terms are extracted, project members can add definitions to the terms.

3. Specification of TEM4Jira

TEM4Jira provides a central platform for working with glossary terms in a software team. In doing so, the platform supports collaboration among project members for the joint creation and editing of a glossary.

To simplify task coordination, a project member can assign a glossary term to a co-worker who will then edit and review it.

In order for project members to know whether a term definition is valid, approval from a requirements engineer with knowledge of the domain is required. The approval process is also supported by the software.

All accepted glossary terms can be summarized in one document by TEM4Jira. This can be useful for new project members to familiarize themselves with the domain.

In addition to the collaborative functions, TEM4Jira also extracts domain-specific terms as soon as user stories are entered and automatically inserts them as tentative items in the glossary. TEM4Jira automatically assigns the glossary term to the requirements engineer, who must accept the term and propose or reject a definition.

The software solution distinguishes the following two roles:

- Project members can create and edit glossary terms and also assign them to other project members. Furthermore, each project member can confirm that the team agrees with a glossary term definition.
- Requirements Engineers in addition can approve glossary terms.

Our tool TEM4Jira is realized as extension to the project management tool Jira.
In Jira, glossary terms are defined as issues.
After a user story is created in Jira, the automatic extraction of terms starts. The terms are created as issues in Jira and linked to the created user story.
The attributes of a glossary term are:

- **Summary**, i.e., the actual domain-specific term.
- **Description**, i.e., the definition of the term.
- **Assigned project member**, i.e., the project member responsible for the glossary term.
- **Include in glossary**, i.e., a flag indicating whether the term is part of the domain-specific glossary.

A glossary term is considered by a project member as agreed, if and only if he/she regards the values of all attributes as correct.

A glossary term can be in one of the following states:
Created. The glossary term is created.
Assigned. The glossary term has been assigned to a project member.
In work. The glossary term is edited by the responsible project member.
Under discussion. The glossary term is under discussion.
Proposed. The team has agreed on the glossary term.
Approved. Both the team and the requirements engineer have agreed on the glossary term.

For understanding the states better, you can find a board with some glossary terms in Figure 1.

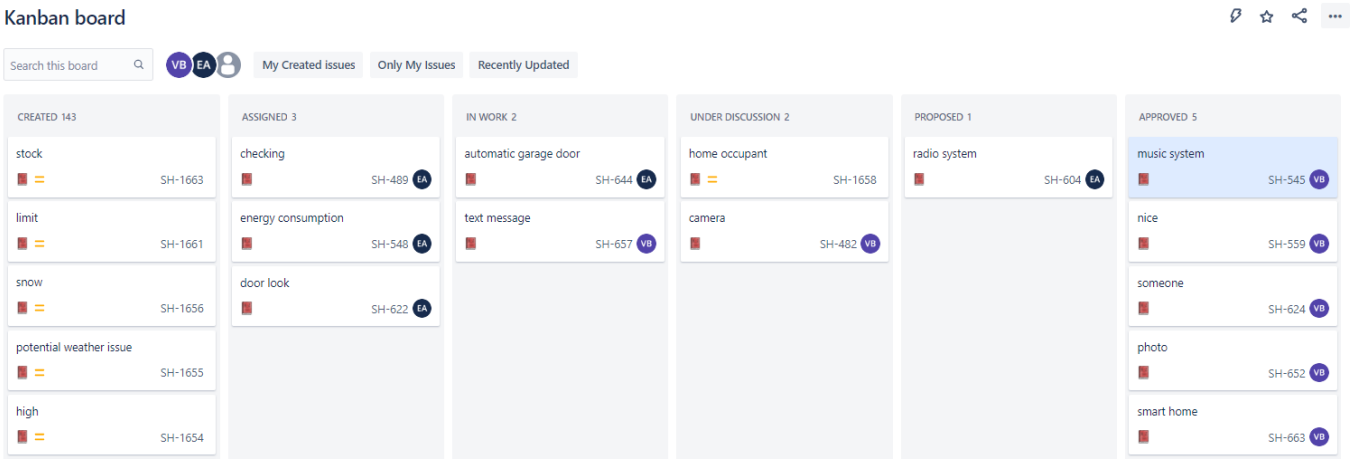

Figure 1: Kanban board

For the term to be part of the glossary, it must have the "Approved" state and the value of the "Include in glossary" attribute must be set to "Yes".
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4. User Study Context

Imagine that you are working in a project developing a smart home system. The team that realizes the project consists of 3 members. The roles and names of the members are depicted in Figure 2. The project has been conducted for several weeks and contains several glossary terms.

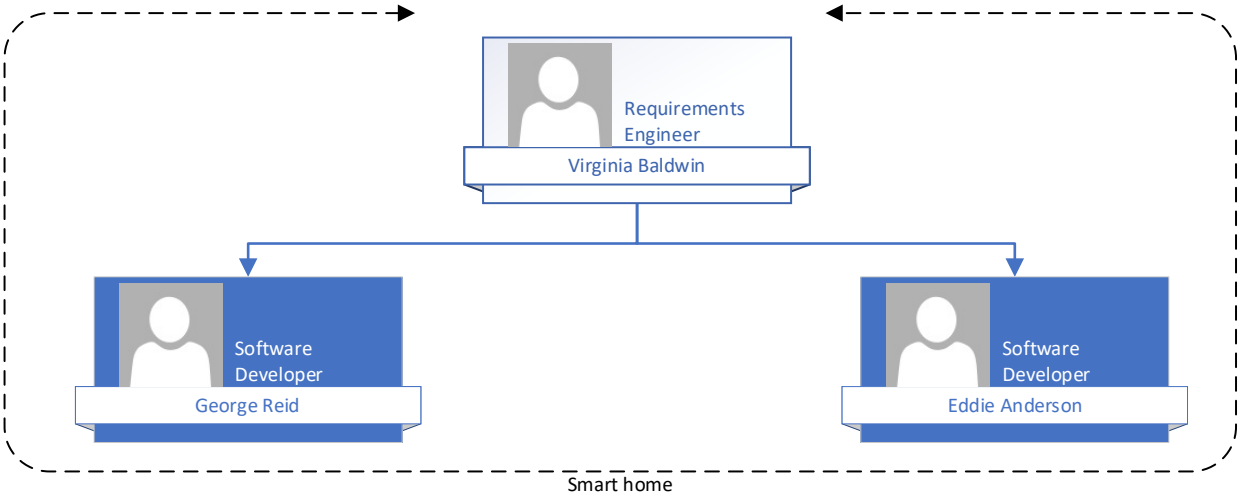

Figure 2. project members

5. Your Tasks

The project you need to work on is called "*smart home*". Please perform all tasks in the same order as specified in this document. During the study you must carry out different tasks on behalf of different users. This means that you will be asked to switch between accounts.

Task 0: Familiarizing with Jira

Goal

Some user stories and glossary terms with their definitions have already been added to the project. The goal of the first step is to get familiar with Jira and the dashboard by looking into these already existing user stories and glossary terms.

User credentials

Virginia Baldwin
E-Mail: virginia.baldwin@mailfence.com
Password: baldwin#virginia-2022

Task

Open the platform by entering the URL https://smart-home-system.atlassian.net/ into the browser. For this step the user credentials of the Requirements Engineer must be used. To get to the user stories and glossary terms, you need to select the appropriate project and then click on “issues”, which is located on the left sidebar. By using the dropdown field with the label „Type“, you can filter the issues by glossary terms or user stories.
To get to the dashboard, you have to click the button “Back to project” which is located on the left top area and afterwards you have to click on the button „Kanban board” that is located on the left sidebar. The board represents the glossary terms with their states. Glossary terms can be transitioned to other states via Drag&Drop. Try to change the state of any glossary term.

Important

Please don’t change, add or delete User Stories because this will influence the extraction results. Please also don’t change the glossary term "music system".

Task 1: Adding new glossary terms

Goal

In a project meeting, some glossary terms in Jira are checked for correctness. Virginia, the requirements engineer, notices that the terms "*motion detector*" and "*home occupant*" have not been entered into the system. Everyone in the team agrees on the glossary term "motion detector", so Virginia makes an approval. For the term "*home occupant* no agreed definition could be found, so Virginia makes a proposal.
The definitions can be found in the table below.

Term (summary)	Definition (description)
motion detector	Motion detectors are a vital component of alarm systems and they are already incorporated into your Reliant home security system. When the motion detector senses motion, a security camera will be triggered to record a potential home intrusion.
home occupant	Home occupant means a homeowner, a member of the homeowner's family, a tenant, an operator, a member of the operator's family, an on-site manager or a member of the on-site manager's family.

Task

Login with the user credentials. Since all project members agree with the definition of "*motion detector*", you should create a glossary term. For creating a glossary term, you must click the "Create" button that is placed on the top. Please make sure that the issue type is selected correctly.
After creating the glossary term you should approve it. This can be done by viewing the glossary term, clicking on the current state that is depicted on the right top area of the window and selecting the new state. In Figure 3 it is shown how to set the new transition state.
Due to the disagreement regarding the definition of "home occupant", you should create a glossary term and set the state under discussion.

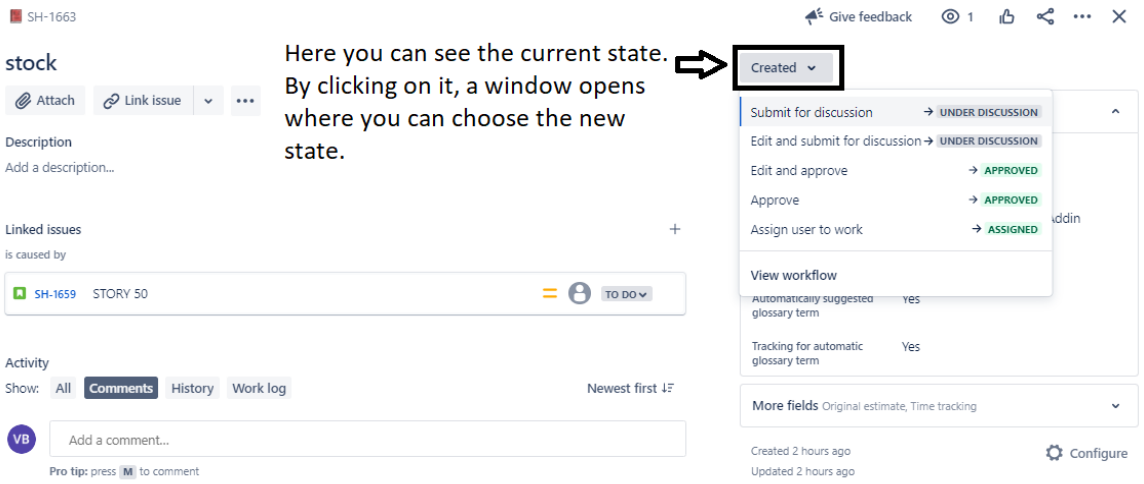

Figure 3: Opening the transition window

Task 2: Extract new glossary terms from story

Goal

Virginia, the requirements engineer, works with a customer in a meeting to capture a new requirement and formulate it as a user story. The RE informs the customer that he will capture the user story in Jira.
The summary and description of the user story are given in the table below.
After entering the user story into Jira, some glossary terms are extracted and linked to the user story. For instance, the terms "*order*", "*item*" are created and linked to the user story. The requirements engineer Virginia has the opinion that the terms "*order*", "*item*" are not domain specific for smart home systems. This is so obvious for the requirements engineer, that it does not need to be discussed in the team.

Summary	**Description**
STORY 50	As a home occupant, I want a device that organizes the kitchen items and gives an alarm or places the order when it falls below the limit so that i benefit of not forgetting to stock the fruits and vegetables.

Task

Please create the user story and look afterwards which glossary terms are extracted. For creating a user story, you must click the "Create" button that is placed on the top. Please make sure that the issue type is selected correctly. You can look at the extracted glossary terms by opening the user story.
Edit the terms "order", "item" such that they are not included in the glossary and set the state to approved. You can do that by clicking on the status and pressing the button "Edit and approve".

Task 3: Reassign glossary term for rework

Goal

Now the requirements engineer Virginia defines a second requirement together with the customer and formulates this as a user story. You can find the summary and the description of the user story in the table below. The requirements engineer enters the user story in Jira.

Summary	Description
STORY 51	As a home occupant, I want a music system so that it automatically detects my mood and plays background music according to it.

By looking at the linked glossary terms of the created user story, she finds out that the glossary term "*music system*" was already captured in the system.
The requirements engineer opens the glossary term and sees the following definition of the term "music system":

A collection of equipment for playing recorded sound.

He is not satisfied with the definition of "*music system*", as in his opinion a music system can also be a radio. For this reason, she assigns the project member "*George*" to the glossary term "*music system*" and enters the following comment:

Please check the definition. In my opinion a radio is also a music system.

Task

Please create the user story mentioned above. Afterwards assign the glossary term "*music system*" to the project member George and set the state to assigned.

Task 4: Edit and resubmit a glossary term

Goal

The project member George sees the glossary term "*music system*" on his Kanban board, which has been assigned to him. He looks at the comment and the definition. He has the same opinion as the requirements engineer. A change of the definition is necessary. He therefore enters the following definition:

A collection of equipment for playing recorded sound or live music (eg.: from a network stream for instance or an AM/FM tuner).

Now he opens the glossary term on the Kanban board and submit the above definition to discussion.

User credentials

George Reid
E-Mail: george.reid@mailfence.com
Password: reid#george-2022

Task

Login with the user credentials stated above. Please open the Kanban board and submit the new definition to discussion.

Task 5: Propose glossary term for approval

Goal

The project member Eddie sets up a meeting to discuss the glossary term ”*music system*”. All project members agree to this definition. Now the term shall be proposed for approval in Jira.

User credentials

Eddie Anderson
E-Mail: eddie.anderson@mailfence.com
Password: anderson#eddie-2022

Task

Login with the user credentials. Set the state of the glossary term to proposal.

Task 6: Approve proposed glossary term

Goal

The requirements engineer sees on the Kanban Board that the glossary term ”*music system*” has been set to "Proposed". He looks at the new definition and approves it.

User credentials

Virginia Baldwin
E-Mail: virginia.baldwin@mailfence.com
Password: baldwin#virginia-2022

Task

Login with the user credentials stated above. Set the state of the glossary term to approved.

Task 7: View glossary document

Goal

To check if the new definition of “music system” has been added to the glossary document, the requirements engineer opens the glossary.

Task

Please click on "Glossary Document" within the project on the left sidebar.

6. Questionnaire for the evaluation of TEM4Jira

Demographic Information

- What education do you have?
- How many years have you worked as a requirements engineer?
- Do you already have experience using Jira?
    - If so, how many years?
- Is Jira used in your company for planning software activities?
    - Do you use team-managed projects or company-managed projects?

Utility

Answer the following questions using free text.

- Using the software would allow me to complete tasks more efficiently.
- The use of the software would be useful in our company.
- Using the software would bring an improvement in quality in terms of work output.
- Do you see any risks in using the software in your company?
- Do you see any advantages for your company when using the software?
- Does the Jira extension limit your company in any activity?

Usability

- For each task below, indicate the ease of first-time use of TEM4Jira.
  Please use the following scale (1: very easy - 5: very difficult).
    - Creating glossary terms in Jira (Part of task 1)
    - Determining glossary terms that are extracted from a user story (Part of task 2,3)
    - Changing attributes for glossary terms (Part of task 2, 4)
    - Performing state transitions (Part of task 1, 2, 3, 4, 5, 6)
    - Assigning a glossary term to a project member (Part of task 3)
    - Proposing glossary terms (Part of task 5)
    - Approving glossary terms (Part of task 1, 6)
    - Performing tasks in the dashboard (Part of task 4)
    - Viewing the entire glossary document (Part of task 7)

1.) Indicate how efficiently TEM4Jira can be used on a day-to-day basis, assuming that you already understand the application.
Please use the following scale (1: very easy - 5: very difficult).

2.) Indicate how easy it would be for you to use the Jira extension if you stopped using the application for a longer period of time (approx. 2 weeks).
Please use the following scale (1: very easy - 5: very difficult).