

Research of Standardized Design and Reusable Management of User Story in Agile Testing

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Abstract. The research is based on the background of high efficiency in test requirement acquisition for user stories in agile testing. As an example of the user story of "payment online" for an e-commerce system, this study is devoted to exploring a feasible and standardized design method of a user story for reusable management process, which it has positive advantages of reusability in the Springs of agile testing for various categories of complex testing projects. Furthermore, further work of standardized user stories designing for non-functional requirements, development of a system for reusable process management of user stories, and bugs detection for relationship of user stories are put forward in the future.

Keywords: user story; agile testing; standardized design; reusable management

1 Introduction

Agile testing is a rapid testing practice that follows the agile manifesto, emphasizing testing systems from the user's perspective, focusing on the newly developed capabilities of iterative testing instead of emphasizing the rigorous testing phase of traditional testing [1-2]. Actually, agile testing is neither existed independently nor an independent activity in software life cycle. It is distributed through the software development process for each iteration. Scrum is a quintessential agile framework with iterative incremental software development process for completing complex projects [3], and agile testing based on Scrum is also positive in practice. Figure 1 demonstrates an agile testing process, and Figure 2 demonstrates a shared Scrum model for agile testing [4].

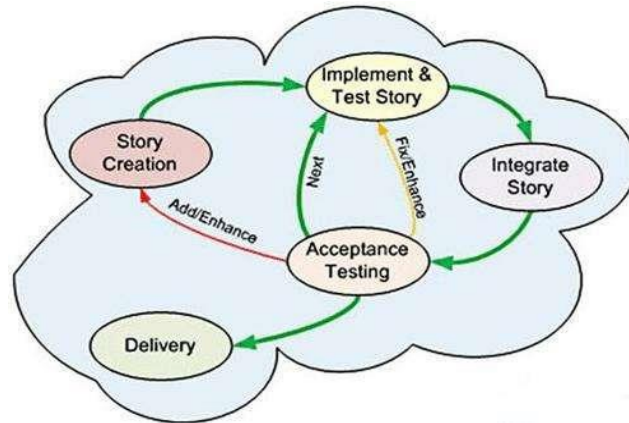


Figure 1. Agile testing process.

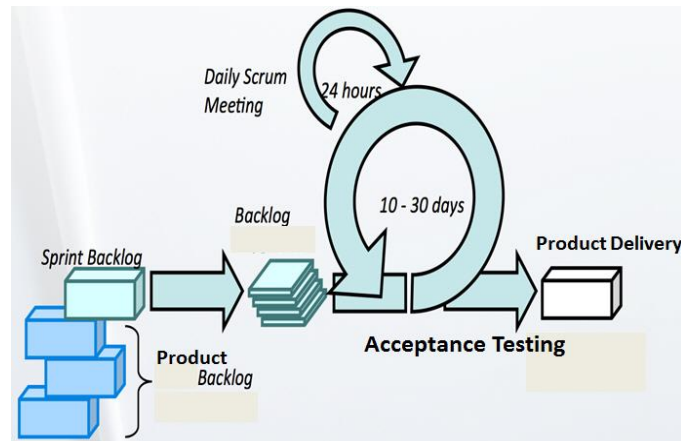


Figure 2. Scrum model for agile testing.

In agile testing, the idea of test requirement acquisition is changed rapidly, and the content of test requirement is in the form of user story. User stories describe the function points which are proposed by the users of the system or software. The acquisition method, priority, estimation point, definition of completion, acceptance criteria, and management process of a user story are crucial that testers need to complete. Agile testing is not recommended to develop of a multitude of test documents, including test plans, test cases, etc. Test cases in agile testing are substituted for user stories. Testers and users confirm each user story together, and no deviation in understanding is allowed [5]. Previous studies of agile testing had emphasized positive advantages of Scrum model for application of various categories of complex testing projects, but lacking of research of standardized design and management of user story in agile testing.

This paper devotes to exploring a standardized design and management method of user stories in agile testing. The structure of the paper is organized as the following: Section 2 describes the characteristics of a user story. A feasible method of standardized design and management

of user stories with an application case in agile testing are given in Section 3. Section 4 concludes the paper and puts forward the further work.

2 Characteristics of a user story in agile testing

A user completes a valuable goal through the system, and this process is called a user story or a user case. In agile testing, user stories are accurately described for user requirement from the perspective of achievement of user business value. A user story must be an independently and deliverable test unit which is suitable for iterative development to obtain quick feedback from users. Assuredly, each user story must be corresponded an acceptance test case.

2.1 Description of a user story

Elements of “Who”, “What” and “Goal” are composed of the description of a user story. For example, as a student, I need a pen for writing these words. It is considered as a description of this user story. Qualitativeness needs to be poured more attention to in user stories, and developers interact with users to confirm progressive content details through rapid delivery for user value [6].

2.2 Design of a standardized user story

Table 1 demonstrates a quintessential template of a user story, which description of content, estimation point and priority are included. Discovering quality defects in user stories is the key factor to ensuring the quality of user story requirements and the implementation of agile development successfully, as an example, the INVEST criterion is a story quality analysis criterion which is widely used [7].

However, technology of BDD (Behaviour Driven Development) in agile development is not reflected and the content of user story needs to be further refined for description of user value. Consequently, Table 2 demonstrates a standardized template of a user story which is referenced to [6].

Table 1. A quintessential template of a user story.

Element	Description
Description of content	Essential description of the content of a user story.
Estimation point	Workload of estimation point.
Priority	Priority of working.

2.3 Characteristics of a reusable user story

In addition to the common characteristics of a standardized user story, following characteristics of commonality, effectiveness, independence, standardization and completeness

are indispensable for a reusable user story, which are demonstrated in Table 3. These characteristics can be used as criteria for judging whether a user story is reusable.

2.4 Management of a user story

User stories are composed of multiple user requirements. Precisely, the application of a functionality module of the software is composed of multiple user stories. In agile environment, multiple user stories need to be developed and implemented iteratively, and an executable software version needs to be delivered after each Spring. Therefore, effective management and reuse of user stories is extremely crucial.

Table 2. A standardized template of a user story.

Element	Description		
Id	Identification of a user story.		
Title	Title of a user story.		
Description of content	Essential description of the content of a user story.		
Description of regulation	Refinement of the content description of a user story.		
	Regulation 1#	Given.....When.....Then.....	
	Regulation 2#	Given.....When.....Then.....	
	
Definition of done	The content that needs to be verified when the entire user story is completed delivering.		
Acceptance criteria	It is acceptance criteria for specific operation events in a user story, and it is also the basis for test cases design in acceptance testing.		
Status	Draft/Active/Changed/Closed		
Estimation point	Workload of estimation point.		
Priority	Priority of working. (In each Sprint of Scrum, the priority of functions is the only criterion for the development team to select user stories.)		
Attachment		Online checklist	

In agile testing, with the continuous release of new versions of the software, testing requirements will be changed rapidly according to user requirements. From the perspective of software testing efficiency in management, user stories need to be updated repeatedly, and user stories are not unchanged. After a stage of the testing process is over, it will be more or less found that some user stories are designed unreasonably or lack test acceptance criteria to cover some user application scenarios. Moreover, when previous user stories are used for next version in agile testing, some of the functions may be changed. At this time, it is also

indispensable to modify the user stories which are affected by the function changes for positive continuity [8].

Table 3. Characteristics of a reusable user story.

Characteristic	Description
Commonality	It is not limited to the application of a specific user test item, and can be widely used in a certain type and a certain field of similar software test iterations.
Effectiveness	It must be accurately oriented to a certain user's value, and it can be reliable and efficient.
Independence	For any two user stories of U1 and U2, the test environment on which the two user stories depended and the targeted for user value and acceptance criteria should be independent as possible.
Completeness	All the necessary elements should be included in each reusable user story, and the description of each element is sufficient.

Therefore, management and reuse of a user story is to apply an executed user story to varying degrees in the new testing of the software or the testing process of other software. Avoid re-designing a large number of non-reusable user stories, and improve the quality and efficiency of testing. Design of a user story in agile testing needs to be standardized and reusable highly. It can be applied to the new test iteration of the software or the testing of similar software to different degrees, so as to shorten the test iteration cycle and improve the test efficiency. Figure 3 demonstrates a reusable process of a user story, which can be better used in the practice of various user stories reusing in agile environment, and it has been adopted by most software companies in domestic.

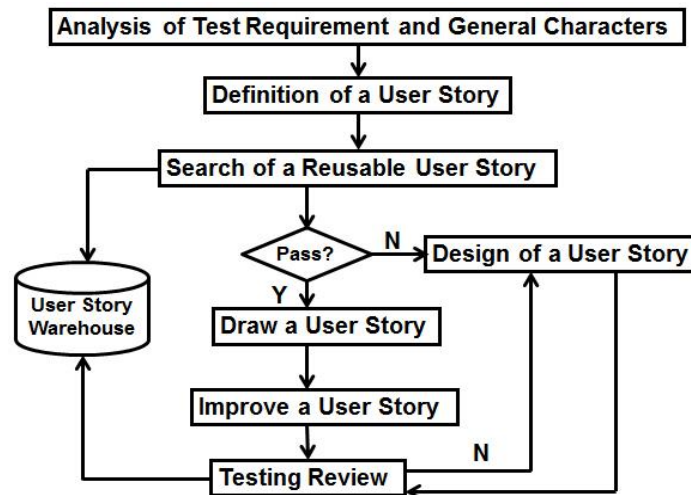


Figure 3. A reusable process of a user story.

3 Application

As an application case in this section, a reusable process of a user story of "payment online" for an e-commerce system is given. The function of "payment online" is a crucial function of varieties of essential e-commerce systems or platforms, such as websites of www.meituan.com, www.tmall.com, www.pinduoduo.com, etc.

Table 4 demonstrates this standardized and reusable user story which can be reused positively in the Springs of agile testing. Table 5 demonstrates a list of user stories for the management process of reusability.

Table 4. A standardized and reusable user story of "payment online".

Id	023				
Title	Payment online				
Description of content	A registered customer makes online payment for the purchased commodity.				
Description of regulation	Regulation #	Given: "The commodity can be purchased on line." When: "The commodity is selected by a registered customer." Then: "Payment successful"			
Definition of done	1. Choose payment tool. 2. Enter the purchase amount and complete the payment. 3. Click the "Finish" button, the page shows that the payment is successful.				
Acceptance criteria	The purchased commodity amount is paid from the bank card of customer.				
Status	Active	Estimation point		4h	
Priority	M	Attachment		Online checklist	

Table 5. A list of management process for reusability of a reusable user story.

User story ID	Numbers of reusability	System/Test Springs	Modified?
.....
023	2	An E-commerce system/4	N
		A shopping system/3	Y
024	5
025	3
.....

4 Conclusions and further work

A standardized design method of a user story is given in this paper which the management process is reusable. Management and reuse of a standardized user story is crucial and indispensable for test items with common characteristics in agile testing. As an example, a distinguished user story of "payment online" for various categories of e-commerce system which illustrates this point.

However, from my own perspective, further work will be done in the future. Firstly, how to design standardized user stories for non-functional requirements should be poured attention into. In the early stage of agile development, non-functional requirements are able to attach great importance to, which it can help the development team improve the probability of project success and customer satisfaction. Secondly, development of a standardized design and reusable management system for user stories will improve the reuse efficiency in agile testing. Thirdly, how to detect bugs of user stories in response to user story testing and quality issues that are related to the relationship between user stories is also the content of future research.

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