Web-based application design for agile stakeholder communication

V P Rantung1*, C P C Munaisehe1, G C Rorimpandey1, F I Sangkopl, R H W Pardanus2 and S Hoppenbrouwers3

1 Department of Informatics Engineering, Universitas Negeri Manado, Manado, Indonesia
2 Department of Information Technology and Communication Education, Universitas Negeri Manado, Manado, Indonesia
3 Model-Based Information System Group, Faculty of Engineering, HAN University of Applied Sciences, Arnhem, Netherland

*vivirantung@unima.ac.id

Abstract. An effective communication comes from good communication management. Agile service development has principles regarding to the communication management. The principles focus communications into a situation, thus the communications are well organized in operation so the communication will be effective and efficient. Aims of this research are to create communication management system which is appropriate for agile stakeholder to manage their communication during project development. The method used in this research is software development life cycle (SDLC). This research presents a web-based application design for Agile stakeholder communication support in order to help project developers in organizing and planning communication activities during project development based on Agile service development principles.

1. Introduction

As principles and frameworks of a service development, Agile service development puts communication as a fundamental value. During project developments, the project developers and the stakeholders need to communicate effectively to share understanding, consensus, and commitment to achieve the project goals. Hence, one of Agile principles regards to stakeholder communications [1].

Many studies discuss about Agile principles. Some discussing the implementation and some the impact in using it [2-4], but current study in the fundamental value of Agile principles is rare. Current study regarding to the Agile communication discuss about the role of communication, communication challenges and impact of Agile practice on communication [5-7].

Consequently, this research aims to create communication management system following the Agile communication principles. The system builds for agile stakeholder to manage their communication during project development. This study in advance with the study about database design for Agile stakeholder communication [1].
2. Method
We are using Software Development Lifecycle (SDLC) through the study. SDLC methodology was used because it provides a systematically method that gives a framework of thinking in the direction of an application development [8]. SDLC itself consists of Project Initiation, Analysis, Design and Implementation. In each step we add communication iterations were it is very useful to manage communication with project team during project development to obtain successful goal [9].

![SDLC methodology](image)

**Figure 1.** The SDLC methodology.

3. Results and discussion

3.1. Analysis phase
The analysis phase aims to refine the project objectivities into defined functions of the information system. The analysis activities done are analyzing process and determining information conceptual model of Agile stakeholder communication principles. The analysis was conducted through interviews with client and then the interview results such as idea/fact/information/rules were translated into a model.

![Agile stakeholder communication process](image)

**Figure 2.** Agile stakeholder communication process in use case diagram.
Figure 2 shows a model of Agile stakeholder communication processes. As described before, the Agile service development has processes in line with the stakeholder communication. The model also shows actors as the user in the communication situation. The planner and the implementer can be either project manager or facilitator. Next, the model will be applied to the system as a basic standard for application processes and users.

According to the design, system users are defined. These users are: (1) Project manager/Facilitator, (2) Participant/Stakeholders, (3) Mediator. To know users’ role in the system, distribution of system access is determined. The system access distribution is called user privileges. The following Table 1 is the user privileges of the system that are specified by client.

| User | Requirements (input sessions, process sessions, result sessions) | Facilitator (Project manager/information modeler) | Participant | Mediator |
|------|---------------------------------------------------------------|--------------------------------------------------|-------------|---------|
| Create Communication Initiation and Planning | Yes | No | Yes |
| Read Communication Initiation and Planning | Yes | Yes | Yes |
| Update Communication Initiation and Planning | Yes | No | Yes |
| Delete Communication Initiation and Planning | Yes | No | Yes |
| Create Communication Execution | Yes | Yes | Yes |
| Read Communication Execution | Yes | Yes | Yes |
| Update Communication Execution | Yes | Yes | Yes |
| Delete Communication Execution | Yes | Yes | Yes |

3.2. Design phase

The basic standard of the design phase is retrieved from the analysis phase results. Looking forward to the results, the design of application architecture is taken in order to model structure and behavior of the web-based application. The application architecture shows the interaction between the web-based application and users as well as interaction within the application technologies. The following figure 3 is the application architecture design.

![Figure 3. The application architecture.](image-url)
After the application architecture design, application screen made. The design covers the Agile stakeholder communication processes which are the planning process and the execution process described in figure 2 use case diagram of Agile stakeholder communication process.

Firstly, the flow of user interface was designed. The purpose of the design was to put in structure the interfaces and thus a user interface design comes easy, clear and accurate. The design shows the menus will be provided in the web-based application prototype. Herewith the link from one page to other pages was shown. The design also shows the user interface design in general. Below is the diagram of the user interface flow.

![Figure 4. Flow of user interface.](image)

After it, the design application screen made. This stage was taken as a follow up of the result of the first stage in more specific design. The design put all the communication situation elements [10, 11]. Moreover, another consideration in term of human computer interaction is needed [12, 13]. The following are the main design of web pages.

3.2.1. Home page. This is the home page of the web-based application prototype. The home page consists of four main menus which are Initiation, Planning, Execution, and Report. The design foundation of the planning and the execution menu is the analysis phase result. The analysis result is agile stakeholder communication process shown in figure 2. The Initiation and Report menu are additions of database management requirement and client requirement.

![Figure 5. The user interface design of home page.](image)
3.2.2. The web-based application prototype. The web-based application prototype consists of pages. The pages are the points here to build. The pages retrieved from the user interface design. Each page includes some coding and the coding consists of five main codes.

After the coding is completely done, the following are the main results. The results consist of a web application prototype with around 40 pages of PHP files and some supporting files such as Java Script files, CSS file, DB file, and HTML file. The following are the main pages of the web application prototype.

The following figure 6 is the main page of the web-based application prototype. The page is delivered as a result of the implementation of the user interface design in figure 5 that is the user interface design of home page.

In this page, users can find system menus and choose sub menus. The menus are Initiation, Planning, Execution, Tracking, and Report. The first menu initiation had sub menus: (1) People, (2) Artifact Creation, (3) Communication Practices, and (4) Media. The second menu planning had sub menus: (1) Input, (2) Process, and (3) Results. The entire sub menu follows the communication situation in detail [14]. An extra menu is added here. The menu is tracking.

![Figure 6. The implementation of home page interface.](image)

4. Conclusion
This research presents a prototype of a web-based application that follows the Agile service development principles. To build the web-based application, the processes taken are: determining the user privileges of the system, designing the application architecture, designing the user interface flow and designing the user interfaces. The user interfaces were used as guidance for the implementation phase. Thus, the user interface design was translated into the HTML and PHP codes to obtain the prototype of the web-based application. Finally, the web-based application design could help project developer in planning a communication session, organizing and tracking a communication session plan during project development.
References

[1] V P Rantung and Q C Kainde 2016 Database design for agile stakeholder communication in Proceeding of 2015 1st International Conference on Wireless and Telematics, ICWT 2015

[2] P A G Permana 2015 Scrum method implementation in a software development project management International Journal of Advanced Computer Science and Applications 6(9) 198-204

[3] R Vallon, B J da Silva Estácio, R Prikladnicki and T Grechenig 2018 Systematic literature review on agile practices in global software development Inf. Softw. Technol. 96 161–180

[4] M Hummel and A Epp 2015 Success Factors of Agile Information Systems Development: A Qualitative Study Proceedings of the 48th Hawaii International Conference on System Sciences 5045–5054

[5] M Hummel, C Rosenkranz, R Holten and P Buxmann 2013 The Role of Communication in Agile Systems Development Bus. Inf. Syst. Eng. 5 5 343-355

[6] I Lehtonen 2009 Communication Challenges in Agile Global Software Development Communication 7–15

[7] M Pikkarainen, J Haikara, O Salo, P Abrahamsson and J Still 2008 The impact of agile practices on communication in software development Empir. Softw. Eng. 13 3 303–337

[8] D E Avison and V Taylor 1997 Information systems development methodologies: A classification according to problem situation J. Inf. Technol. 12 1 73–81

[9] Michalski and Liz 2000 Effective communication equals successful project management Pharm. Technol. Clevel. 24 5 84–88

[10] S Hoppenbrouwers and W van Stokkum 2013 From Dialogue Games to m-ThinkLets: Overview and Synthesis of a Collaborative Modeling Approach Int. J. e-Collaboration 9 4 32–44

[11] M Lankhorst 2012 Stakeholder Communication Agile Service Development 36

[12] A Sami and D K Kang 2011 Analysis of human factors in software application design for effective user experience Advanced Communication Technology (ICACT), 2011 13th International Conference on IEEE

[13] B Shneiderman and C Plaisant 2016 Designing the user interface: strategies for effective human-computer-interaction

[14] M Lankhorst 2012 Combining Adaptive Methods and Flexible Solutions Agile Service Development