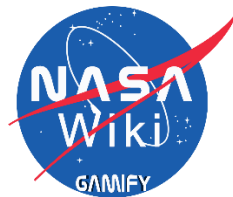


NASA EVA Gamification

SOFTWARE REQUIREMENTS SPECIFICATION

PHASE II



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Revision Table

Version Number	Description of Change	Author	Date
1.0	Initial Creation of Document	Kelli Corey	06/19/2018
1.1	Integrated Project Requirements document, added Appendix A-C	Kelli Corey	07/18/2018
1.2	Updated regulatory requirement	Adeola Odusola	07/20/2018

1. Introduction

1.1 Purpose

This software requirement document refers to the NASA Wiki Gamification Project, phase 2. These requirements describe features to be added on to the MediaWiki system and associated databases.

1.2 Document Conventions

In this document, NASA Wiki refers to the MediaWiki environment utilized by NASA for training and communication purposes.

As this is phase two of a multi-phase project, all requirements listed in this document are treated as having the same priority level.

1.3 Intended Audience and Reading Suggestions

The primary audience for this document is the project team, including developers and testers. This document is also meant to be used by the project manager, Dr. Michael Brown, and the client, Daren Welsh.

It is recommended that developers and testers focus on sections 3, 4, and 5 of this document, as they refer to the specific requirements in detail.

For the project manager and client, sections 2 and 4 are recommended, as they give a high-level overview of the project and details of the functional requirements.

1.4 Product Scope

This project is phase two of the NASA Wiki Gamification project. Phase two is a continuation of the work started by the phase one team. The primary focus of this phase is to build an extension that provides a consolidated infrastructure, allowing for the addition of gamification elements to the NASA Wiki environment. This phase of the project will focus on three areas of enhancement: point measurement, rewards and badges, and a leaderboard.

1.5 References

1. NASA Wiki Gamification: Phase 2 Project Management Plan
2. NASA Wiki Gamification: Phase 2 Stakeholder Analysis
3. NASA Wiki Gamification: Phase 2 Project Charter
4. NASA Wiki Gamification: Phase 1 Handover Documentation

2. Overall Description

2.1 Product Perspective

This project is phase two in a continuing project to add gamification elements to the NASA MediaWiki environment. Phase one of the project established basic data structures and initial gamification features.

All aspects of this project will be created independent of the actual NASA MediaWiki environment due to confidentiality and security concerns relating to the content contained therein.

2.2 Product Functions

The following key high level project requirements are set for this phase project, but not limited to any continuation of the work on this wiki project.

- All code should be open sourced at the end of the project.
- All back-end code should be written in PHP.
- Front-end code may be written in JavaScript, JQuery, and CSS.
- A relational database such as MySQL, MariaDB, PostgreSQL, SQLite and others should be supported.
- All code should be stored in GitHub.

2.3 User Classes and Characteristics

The NASA Wiki tool is used as a primary means of communicating detailed technical and operation information across departments at NASA. Therefore, it is of the utmost importance that the content in the wiki is up-to-date and accurate. Because of this focus, the various users have been grouped into two primary categories: Editors and Readers.

Editors are subject-matter experts who update and modify articles on the NASA Wiki that are related to their work assignment or knowledge area. This project focuses on encouraging engagement of these users to make more frequent and higher-quality updates.

Readers are users who access the NASA Wiki in order to learn about a particular topic. This project focuses on engaging these users with the content, and to allow these users to provide feedback on the quality of the content created by Editors.

At any given time, a particular user may be an Editor, a Reader, or both.

2.4 Operating Environment

- MediaWiki version 1.27.4
- Meza install bundle at <https://github.com/enterprisemediawiki>
- PHP version 5.6
- MariaDB/ MySQL 5.5.59
- Installation instructions will be provided for Linux and Windows platforms at the end of the last milestone.

2.5 Design and Implementation Constraints

- The project is bound to the requirement specifications highlighted under the project scope.
- The project must be executed within the timeframe under the project schedule.
- The actual NASA wiki is not available to the team due to firewalls and access-control mechanisms in place for security purposes. Consequently, the team has to download and install a local version in order to test.

2.6 User Documentation

This phase of the project will include handover documentation detailing how to utilize the product and recommendations for the next phase of the project.

2.7 Assumptions and Dependencies

- The project is a phase 2 project that depends on information from the previous phase 1 project and as such assumes that the information from the previous phase, in terms of code and documentation, are complete, tested, and working.
- The project will be focused on user activity as opposed to Wiki content.

3. External Interface Requirements

3.1 User Interfaces

All work for phase two of the project will be designed to operate with the MediaWiki user interface. The current MediaWiki user interface is the object oriented user interface, or OOUI. The OOUI library is integrated in all versions of MediaWiki since version 1.23. The library can be utilized through PHP. All aspects of this project must be compliant with the OOUI in order to ensure a smooth integration with the NASA Wiki environment.

3.2 Hardware Interfaces

The MediaWiki environment is designed to run via an internet connection. Hardware involved may include a modem, router, ethernet cable, and other hardware potentially necessary to connect with the internet.

3.3 Software Interfaces

The MediaWiki environment is designed to work with all modern web browsers such as Google Chrome, Safari, Microsoft Edge, Opera, or Mozilla Firefox because users may potentially access the final product using above web browsers. Therefore, all components of the NASA Wiki Gamification product must be compatible with all modern web browsers.

3.4 Communications Interfaces

Because this application is designed to work over the internet, it must be compatible with IPv4 and IPv6 standards. It also must be able to function over a WAN or LAN connection.

4. System Features

4.1 NASA Wiki Gamification

4.1.1 Description and Priority

The NASA Wiki Gamification extension provides a consolidated infrastructure allowing for adding different elements and approaches to gamification. This extension manages the simple point measurement, badge rewards system, and leaderboard ranks system. This project has a high priority because most users do not care much about points and badges but the most reliable knowledge base so it is difficult to increase the overall number of people viewing and contributing without increasing user awareness of why their contributions are important.

4.1.2 Stimulus/Response Sequences

- Determines if users create a page or edit a page
- Adds 100 points for creating a page or 50 points for editing a page into user's point store
- Adds badge into user's badge store based on the total of earned points in user's point store
- Determines user's position in the leaderboard based on total of earned points
- Displays the list of users in the leaderboard with edit count, total of earned point, and user's position information

- Allows users to view the name of the pages that users created and edited.

4.1.3 Functional Requirements

Points Allocation Requirements

ID	Requirement	Source of Requirement
F41	A user will be given points for creating a new wiki page	Summer 2018 Team
F42	A user will be given points for editing an existing wiki page	Summer 2018 Team
F43	Users shall earn 100 points when a page is created	Summer 2018 Team
F44	Users shall earn 50 points when a page is edited	Summer 2018 Team

Badge Requirements

ID	Requirement	Source of Requirement
F37	A user will progress through different badge levels by earning a configurable amount of points	Summer 2018 Team
F38	A user will earn badges in the following order: Bronze Silver Gold Platinum	Summer 2018 Team
F45	User with 50 total points shall earn a bronze badge	Summer 2018 Team
F46	User with 100 total points shall earn a silver badge	Summer 2018 Team
F47	User with 200 total points shall earn a gold badge	Summer 2018 Team
F48	User with 500 total points shall earn a platinum badge	Summer 2018 Team
F49	Badges shall be displayed on top of the user's profile page in a tabular form with the earned badge images	Summer 2018 Team

Leaderboard Requirements

ID	Requirement	Source of Requirement
F39	On navigating to the user's profile page, a leaderboard is displayed containing data related to the user's activity on the wiki and the user's status related to other users of the wiki	Summer 2018 Team

F50	Add count, edit count, points earned, and the user's position among others will be displayed in leaderboard	Summer 2018 Team
F51	Other users with 100 points more or less than the current user will be displayed in the leaderboard	Summer 2018 Team
F52	Users shall be able to click on the add or edit count to view the name of the pages created or edited	Summer 2018 Team
F53	Leaderboard will only be visible in user profile page	Summer 2018 Team

Profile Requirements

ID	Requirement	Source of Requirement
F40	The user will be able to display the name of the pages the user has created.	Summer 2018 Team

Database Requirements

ID	Requirement	Source of Requirement
F54	The database shall track the number of points generated each revision. This information shall be in the form of a 4 digit wide unsigned integer which cannot contain a null value.	Summer 2018 Team

5. Other Nonfunctional Requirements

5.1 Regulatory Requirements

ID	Requirement	Source of Requirement
R1	All work must be completed by August 12, 2018	Dr. Michael Brown
R2	All work should be contained in a single extension. Configuration instructions will be provided on any external files used by the extension.	Daren Welsh

5.2 User Requirements

ID	Requirement	Source of Requirement
U2	Support many different personality types in a unified system	Daren Welsh
U3	System should be scalable to allow for other personality types, for example socialites and explorers	Daren Welsh
U4	Include point based games	Daren Welsh
U5	Include Leaderboards	Daren Welsh
U6	Include Badges	Daren Welsh

5.3 Business Requirements

ID	Requirement	Source of Requirement
B1	The NASA EVA wiki must be the best, most reliable knowledge base available for astronauts and those who support them.	Daren Welsh
B2	Increase the overall number of people viewing and contributing to the NASA EVA wiki.	Daren Welsh
B4	Increase user awareness of why their contributions are important (revisions, discussion, pending reviews).	Daren Welsh
B5	This extension should work with any MediaWiki installation.	Daren Welsh
B6	The NASA EVA Wiki should be a reliable and trustworthy knowledge base which will enable the users to know how to do their jobs. For the astronauts, this means knowing how to manipulate hardware within limits. For the instructors, this means knowing how to properly teach the astronauts.	Daren Welsh

5.4 Software Quality Attributes

The features shall fulfill the following quality attributes: Adaptability, usability, and traceability. The points, badges and leaderboard should be adaptable based on different users with different amount of points. The user Interface aspect of the features should be accessible and usable in different browsers including Internet Explorer, Google Chrome, and Mozilla Firefox. All the changes in points, and badges for users should be traceable through the database.

5.5 Business Rules

- User Business Rules

- User will earn points toward contributions
- User will earn badge toward the total of earned points
- User will have ability to see a scaled leaderboard with the edit count, total of earned points, the user's position, and other users 100 points over and below information
- User will have ability to view the name of the pages that user created or edited
- Administrator Business Rules
 - Admin will have ability to add, edit, or remove the pre-defined point measurement rules
 - Admin will have ability to add, edit, or remove the pre-defined badge reward rules

Appendix A: Glossary

Requirement Categories -

The following definitions were taken from the "Project Management Skills for All Careers" document by Project Management Open Resources and TAP-a-PM.

Regulatory Requirements - Regulatory requirements can be internal or external and are usually non-negotiable. They are the restrictions, licenses and laws, applicable to a product or business, imposed by the government.

User Requirements - User requirements describe what the users need to do with the system or product. They focus is on the user experience with the system under all scenarios. These requirements are the input for the next development phases: user-interface design and system test cases design.

Business Requirements - Business requirements are the needs of the sponsoring organization, always from a management perspective. Business requirements are statements of the business rationale for the project. They are usually expressed in broad outcomes, satisfying the business needs, rather than specific functions the system may perform. These requirements grow out of the vision for the product that, in turn, is driven by mission (or business) goals and objectives.

Functional Requirements - Functional requirements describe the characteristics of the final deliverable, what emerges from the project in ordinary non-technical language. They should be understandable to the customers, and the customers should play a direct role in their development. Functional requirements are what you want the deliverable to do.

Non-Functional Requirements - Non-functional requirements specify criteria that can be used to judge the final product or service that your project delivers. They are restrictions or constraints to be placed on the deliverable and how to build it.

Based on these categories, requirement prefixes were assigned to identify the particular category to which the requirement belongs as shown in the table below:

Requirement Type	Prefix
Regulatory	R
User	U
Business	B
Functional	F
Non Functional	NF

Appendix B: Phase 1 Requirements

Regulatory Requirements

ID	Requirement	Source of Requirement
R3	All code should be open source	Daren Welsh
R4	All back-end code should be PHP	https://github.com/darenwelsh/Profiler
R5	Relational database should be MariaDB/MySQL	https://github.com/darenwelsh/Profiler
R6	Support for PostgreSQL, SQLite and others should be provided.	https://github.com/darenwelsh/Profiler
R7	All code is stored in GitHub	Daren Welsh

User Requirements

ID	Requirement	Source of Requirement
U1	Build an extension that provides a consolidated infrastructure allowing for adding different elements and approaches to gamification.	Daren Welsh
U7	Include Once-And-Done Games	Daren Welsh

Functional Requirements

Points Allocation Requirements

ID	Requirement	Source of Requirement
F01	Be able to instantly update score as activities are done	Daren Welsh

Badge Requirements

ID	Requirement	Source of Requirement
F05	User will get a badge for verifying his/her user name	Spring 2018 Team

Profile Requirements

ID	Requirement	Source of Requirement
F02	User Profile will display all badges earned	Daren Welsh
F03	User Profile will display user name	Daren Welsh
F04	User Profile will display full name	Daren Welsh

Database Requirements

ID	Requirement	Source of Requirement
F06	A database should be used to track metadata and calculate metrics	https://github.com/darenwelsh/Profile

Non-Functional Requirements

ID	Requirement	Source of Requirement
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NF1	Allow for the wiki system administrator(s) to configure variables via a configurable PHP File	https://github.com/darenwelsh/Profiler
NF3	All events and hooks used should be clearly documented	https://github.com/darenwelsh/Profiler

Appendix C: Future Requirements

User Requirements

ID	Requirement	Source of Requirement
U8	Make games scalable	Daren Welsh
U9	Front-end code can be in JavaScript	https://github.com/darenwelsh/Profiler
U10	Include collaborative games	Daren Welsh
U11	Include competitive games	Daren Welsh
U12	Design and build an extension to make use of real-time events through the use of hooks for immediate feedback while also making use of the entire history of the wiki	https://github.com/darenwelsh/Profiler

Functional Requirements

Points Allocation Requirements

ID	Requirement	Source of Requirement
F35	Be able to get points for activities done before extension is installed	Daren Welsh

Profile Requirements

ID	Requirement	Source of Requirement
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F07	User Profile should display date of first page viewed	https://github.com/darenwelsh/Profiler
F08	User Profile should calculate the number of days being a viewer	https://github.com/darenwelsh/Profiler
F09	User Profile should display unique pages viewed ever	https://github.com/darenwelsh/Profiler
F10	User Profile should display unique pages viewed over a specified period of time	https://github.com/darenwelsh/Profiler
F11	User Profile should display the number of unique pages revised ever	https://github.com/darenwelsh/Profiler
F12	User Profile should display the number of unique pages revised over a specified period of time	https://github.com/darenwelsh/Profiler
F13	User Profile should display a list of categories of pages revised in descending order by percentage of pages in that category that the user has revised	https://github.com/darenwelsh/Profiler
F14	User Profile should display a list of friends/colleagues based upon categories of pages that both users heavily contribute to, in descending order	https://github.com/darenwelsh/Profiler
F15	User Profile should display the Page Diversity Percentage - defined as percentage of all pages the user has edited - over all time and over a specified period of time	https://github.com/darenwelsh/Profiler
F16	User Profile should display the Category Diversity Percentage - defined as percentage of all categories the user has edited - over all time and over a specified period of time	https://github.com/darenwelsh/Profiler
F17	User Profile should determine colleagues by similar technical content based on similarities in words used	https://github.com/darenwelsh/Profiler
F18	User Profile should display a graph displaying revisions over time in one color and discussion page revisions in another color	https://github.com/darenwelsh/Profiler
F19	User Profile should display a GitHub-like contribution visualization showing how much a user contributes each day	https://github.com/darenwelsh/Profiler
F20	User Profile should display streaks (for example, how many days in a row has the user contributed?)	https://github.com/darenwelsh/Profiler
F21	User Profile should display the pages that the current user has edited that others view the most	https://github.com/darenwelsh/Profiler
F22	User Profile should display the User's score-view ratio - current value and plot over time which would be used to see the number of pages viewed versus which pages were edited	https://github.com/darenwelsh/Profiler

F23	User Profile should plot user activity and average activity over time with standard deviation (box plot over time) which would track a user's revisions over time as compared to the average contribution for the wiki	https://github.com/darenwelsh/Profiler
F24	User Profile should display the date of first revision	https://github.com/darenwelsh/Profiler
F25	User Profile should calculate the number of days being a contributor	https://github.com/darenwelsh/Profiler
F26	User Profile should display the number of unique page view per day	https://github.com/darenwelsh/Profiler
F27	User Profile should display the number of recent revisions to pages	https://github.com/darenwelsh/Profiler
F28	User Profile should display the number of thanks by other users	https://github.com/darenwelsh/Profiler
F29	User Profile should display type cast which designates revising size frequency (large edits versus small edits), number of pages revised, grammar correctors, source documentation citers – breaking these behaviors out can allow for user comparison/grouping	https://github.com/darenwelsh/Profiler
F36	User Profile should analyze text added in revisions by person over time and compare users with similarly used words who may share common backgrounds, job roles, or interests	https://github.com/darenwelsh/Profiler

Database Requirements

ID	Requirement	Source of Requirement
F30	Be able to show page contributor diversity over time on every page - plot showing how many people have contributed to the page as a function of time	https://github.com/darenwelsh/Profile
F31	Be able to show Next Page to revise suggestions on every page to provide calculated pages that the user may wish to revise based on historical information	https://github.com/darenwelsh/Profile
F32	Be able to show the history page revisions on every page	https://github.com/darenwelsh/Profile
F33	Be able to show the history of viewer count on every page	https://github.com/darenwelsh/Profile
F34	Be able to show the history of user diversity count on every page	https://github.com/darenwelsh/Profile

Non-Functional Requirements

ID	Requirement	Source of Requirement
NF2	Clear documentation should be created documenting how to install, configure and use the extension; it should include screenshots and animated GIFs	https://github.com/darenwelsh/Profiler