ISS-EWATUS

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no [619228]

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ICT - Information and Communication Technologies

D5.3 Final version of the platform

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Organisation Name	Short Name	Country
UNIWERSYTET SLASKI	US	Poland
INSTYTUT EKOLOGII TERENOW UPRZEMYSLOWIONYCH	IETU	Poland
Rejonowe Przedsiębiorstwo Wodociągów i Kanalizacji w Sosnowcu Spółka Akcyjna	RPWiK	Poland
LOUGHBOROUGH UNIVERSITY	LU	United Kingdom
BRUNEL UNIVERSITY	BU	United Kingdom
CENTRE FOR RESEARCH AND TECHNOLOGY HELLAS	CERTH	Greece
Dimotiki epixirisi Ydreusis - apoxeutesis Skiathou	DEYASK	Greece
DOTSOFT OLOKLIROMENES EFARMOGES DIADIKTIOY KAI VASEON DEDOMENON AE	DOTSOFT	Greece

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History

Version	Author	Date	Status
0.1	Zhenchen Wang	Jan 13th , 2016	initial draft
1	Foteini Giannaropoulou	Feb 9th 2016	Mobile app
2	Andrea Capiluppi	Feb 12th 2016	Modification
3	Foteini Giannaropoulou	Feb 15th 2016	Mobile app
4	Zhenchen Wang	Feb 16th 2016	Final version

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Table of Contents

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no [619228]

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List of Acronyms

API	Application Programming Interface
SMP	Social Media Platform
GUI	Graphical User Interface
JSON	Javascript Object Notation (format)
enum	Enumeration (data type)
ISNP	ISS-EWATUS social-media platform Web Portal
ID	ISS-EWATUS social-media platform Dashboard
IDS	ISNP data sensing
RS	Reward store
GCP	Gamification content presenter
ES	Evaluation support
WUV	Water Use Visualizer
WUVP	Water Use Pattern Visualisation

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List of Figures

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no [619228]

List of Tables

1. Introduction

This report presents supporting documentation for the social media platform developed for D5.3 "Final version of the platform". It is also the software documentation for Task 5.3 "Implementation and deployment of the social-media platform".

A final version of SMP (social media platform) is online at http://watersocial.org. The platform is developed in an iterative method and is developed according to the plan provided in the Appendix A.

The goal of this deliverable is to fulfil the tasks defined in Task 5.3 which includes:

- The software of the SMP and deploy it on an accessible Web server
- Detailed design documentation and APIs specification of the core features of the SMP.

The final SMP software consists of a set of components that were developed based on the requirements, design and architecture specification from Deliverable D5.1[1] and the final version of the software is a further development of D5.2 prototype system.

The rest of this report is organised as follows:

- Section 2 summarises how the platform addresses the requirements from Deliverable D5.1.
- Section 3 describes the final design and implementation of the software components that are integrated in the SMP.
- Section 4 describes deployment details for the SMP platform.
- Section 5 summarises the testing protocols and process conducted so far on the platform.
- Appendix A provides the release map of the SMP from first version to the final version.
- Appendix B documents the essential User guide of using the SMP.
- Appendix C documents a cross-platform gamification mobile phone application that is an extension to the SMP by levering SMP APIs.

1.1. Requirements Addressed

Deliverable D5.1 outlined a set of use cases under different scenarios for the SMP platform.

[1] http://issewatus.eu

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The following table (see Table 1) summarises how the current version of the SMP as of Month 16 addresses the use case requirements and the expected releases (see release plan in Appendix A).

ID	Name	Description of how current version addressed the requirements / When to be addressed
U-HS1-1	Joining ISS-EWATUS social-media platform	The **IDS APIs** allows a user to register as a new user. There is also a **user registration interface** we presented in section 6.3 that can be used by user to do the registration. This feature is addressed in Release 0.
U-HS2-1	Social network reuse – contact import	This feature is supported by the site wide friend invitation function and social invitation function underpinned by **IDS APIs**. This feature is fully addressed in Release 2.
U-HS2-2	Social network reuse – send invitations	This feature is supported by social invitation function via **IDS APIs**. This feature is fully addressed in Release 2.
U-HS2-3	Social network reuse – recommending friends to users	This feature is able to recommend friends based upon user's friendship status and earned points profile via **IDS** and **RS APIs**. This feature is fully addressed in Release 2.
U-HS3-1	Social network increase experience level	The **RS APIs** allows users to create a reward for a user. This feature is fully addressed in Release 0.
U-HS4-1	Water consumption leader board	This feature is supported by the **RS APIs. T**he leader board is based upon the defined points within a time frame. The feature is addressed in Release 2.
U-HS4-2	Water consumption rewards claim	The feature is site-wide supported by **IDS, WUV** and **RS APIs** on different water related social networking activities and it is also supported on different mobile devices. This feature is addressed in Release 2.

U-HS4-3	Water consumption visualisation and comparison	This feature is supported by the **WUV APIs.** This feature is addressed in Release 3.
U-HS5-1	Voting other users based upon posted content on the Web.	This feature is supported by **voting function** and users can get rewarded upon each vote. This feature is addressed in Release 3.
U-HS6-1	Validating information	This feature is supported by the **voting function**. The validation is based upon the number of votes. Its implementation is can be found in the use cases U-HS7-1 and U-SS3-1. This feature is addressed in Release 3.
U-HS7-1	Water consumption tips seeking	The **Questions and Answer function** allows a user to retrieve a **forum post** or an **activity post** to the SMP. This feature is also supported by the **site-wide tip rotating widget** which randomly push the water use tips companied with a cartoon image on the web pages. This feature is addressed in Release 2.
U-HS7-2	Water consumption tips post	The **forums** and **activity wall** on landing allow user to post ideas and to reply other users. This feature is addressed in Release 0.
U-HS8-1	Initiate Discussions	The **forum** allows a user to initiate a topic for discussion. This feature is addressed in Release 0.
U-SS1-1	Pushing information to app users	The feature is supported by the **messaging service** allows a manager user to send messages to others. This feature is addressed in Release 3.
U-SS1-2	Receiving notifications	The **message notification** allows a user to view notifications and **user's own email system** can always receive messages from the platform. This feature is addressed in Release 0.

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U-SS2-1	Conducting Online Surveys	This feature is supported by the **RES APIs** which allows manager to manage the publication of the survey. This feature is addressed in Release 3.
U-SS2-2	Participate in Online Surveys	This feature is supported by the **RES APIs** where users can access the survey directly from website page. The feature is addressed in Release 3
U-SS3-1	Social Network Mashup	The feature is partially supported by the **best practise page** on the website where the most voted water use knowledge and tips and useful information from outside the platform are also presented. This feature is addressed in Release 3.

Table 1 Requirements addressed by the current version and to be addressed in the target releases

2. Design and Implementation of SMP

The software components, as identified in the deliverable D5.1, are shown in the Figure 1 (with the indication of which of the WP tasks are implemented in). These components seek to fulfil the scenarios and the associated use cases defined in the D5.1 via three **modules**. The modules are associated to three types of inter-component interactions, defined below:

1. Social Network Activity and Water Use Visualization
2. Gamification and
3. Evaluation.

In order to support iterative development strategy, we also created an online version in the form of wiki pages [2]which is available for all project consortium members and we periodically updated the online version as the development progresses. In the next few sections, each of the modules is presented in terms of process model, data model and their current deployment status in the system.

[2] https://bitbucket.org/issewatuswp5/social-media-platform/wiki/Home

user name: issewatusreviewer

password: reviewerissewatus

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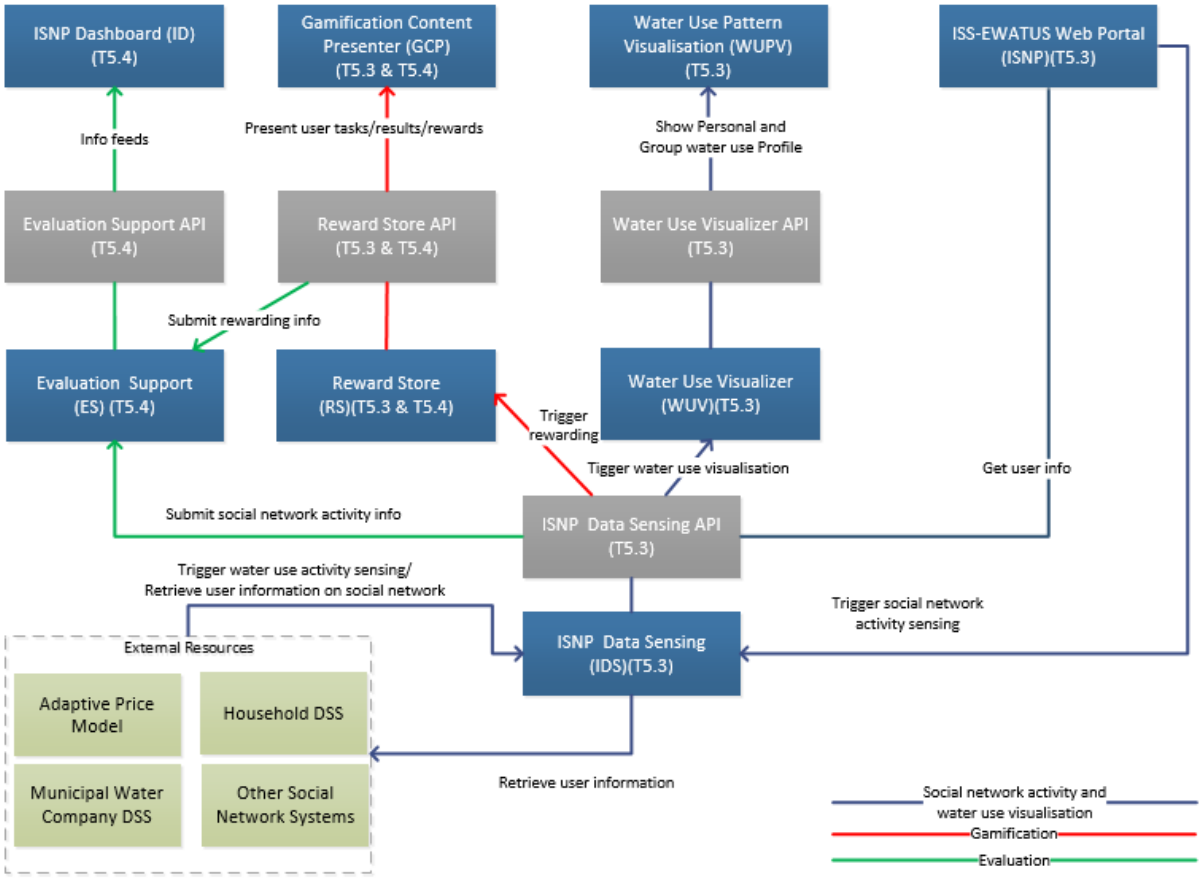

Figure 1 ISS-EWATUS SMP Components

2.1. Social Network Activity and Water Use Visualization

This inter-component interaction has the purpose of handling, for each user account, the **user account management**; the **social network activity management**; and the **water use visualization**. The interactions that are allowed are two-fold:

1. **internally** to the SMP, its components interact through this layer at the user-level;
2. **externally**, the interactions also extend to components outside the SMP, such as the household DSS (within the ISS-EWATUS scope) and the other social network systems (outside the ISS-EWATUS scope) to allow them to retrieve information provided by the platform.

The components *internal* to the SMP that are involved in the interactions are

- ISS-EWATUS Web Portal (ISNP):

This is the landing Web page for the whole system.

- ISNP Data Sensing (IDS):

IDS detects social networking activities including sharing and inter-user communication and individual user water use input to the system. IDS is cross-platform which means it also can receive data from multiple devices such as mobile phones and laptops. In addition, it also stores and dispenses the pre-processed data flows to other expected SMP components.

- Water Use Visualizer (WUV):

It performs the visualisation features which enable the system to present the water use patterns in different media forms such as charts, histograms from different dimensions such as temporal, , and activity.

- Water Use Pattern Visualization (WUPV)

This is front end component handles user input from WUV.

2.1.1. Process Model

Below we display the process model of the cluster of interactions named "Social Network Activity and Water Use Visualization". It is presented in a UML Sequence Diagram, where the main components are shown in their box, and the interactions are the arrows that travel between them.

At current implementation, we have enable the new user registration, post/reply and water use diagram request processes.

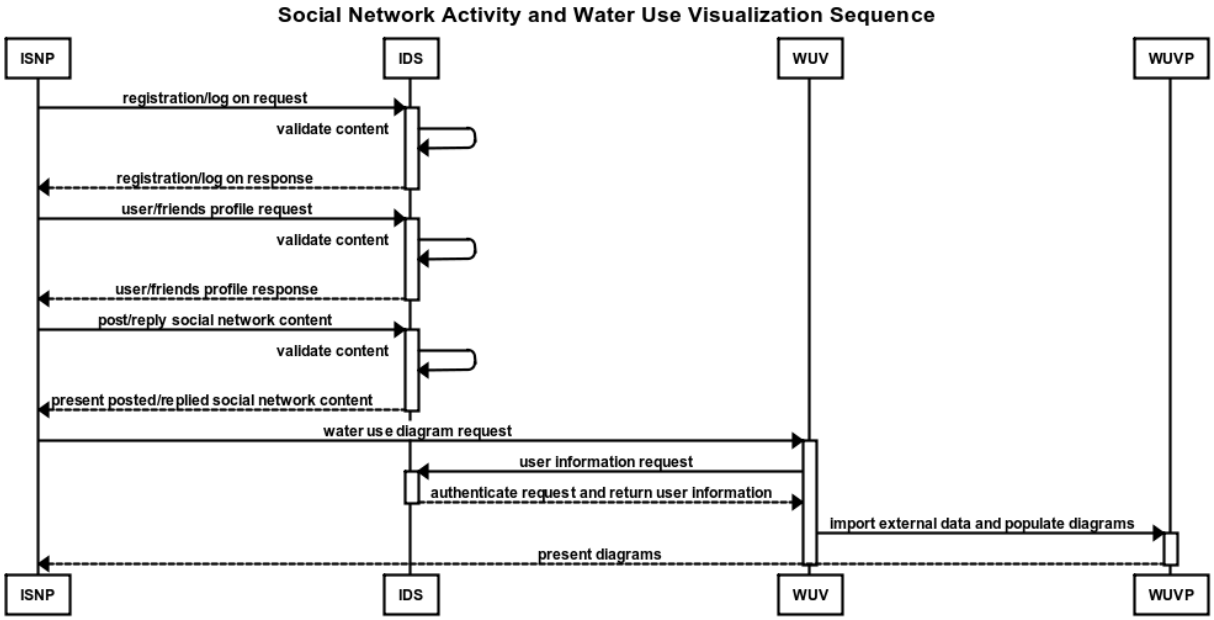

Figure 2 Process model for social network activity and water use visualisation

2.1.2. Data Model

The data model used in the platform customises and extends the data structure supplied in the WordPress database framework. There are mainly **three** types of data types used in this module.

1. user: contains user information that comprises the **use profile**
2. posts: defined as a base data structure used to be extended and implemented **to define user input** and other **component data input** to SMP
3. postmeta: used to define the **additional data fields** in forms of key-value pairs of an extended posts type

Figure 3 shows the **user** data structure, the full details of data field definition can be viewed on http://watersocial.org/extensions-json/rest/api/users/schema.

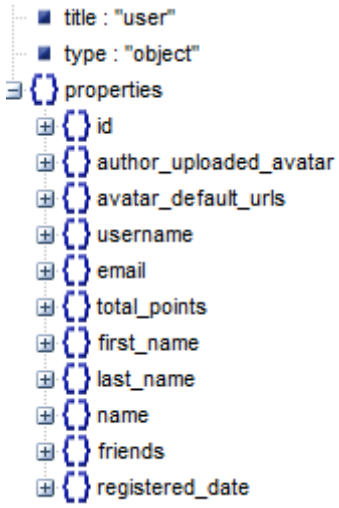

Figure 3 user type data structure

Figure 4 and Figure 5 show the base posts type and post meta data type data structures. In the platform we particularly extended the base posts type in terms of the **post_type** data field which allow the platform to handle different social networking activities input (see Table 2). We also implemented three platform original data types used to handle user input of water use, water use tips and water use images, namely the tips object (see Figure 6), media object (see Figure 7) and diary object (see Figure 8). The descriptions of data fields of these two objects can also be found at http://watersocial.org/extensions-json/rest/api/tips/schema and http://watersocial.org/extensions-json/rest/api/media/schema and http://watersocial.org/extensions-json/rest/api/diary/schema.

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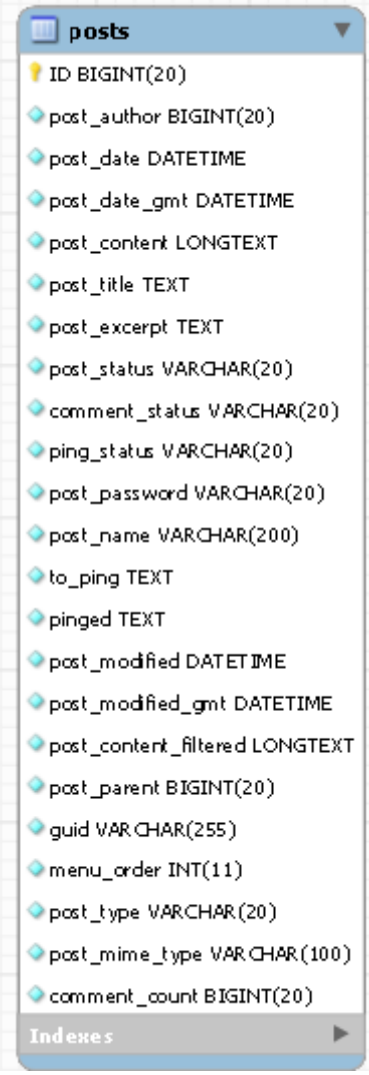

Figure 4 posts type data structure

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Figure 5 post meta data structure

Post Type Used in the Platform	Use
achievement-type	To store different types of the gamification tasks
answer	To store users answers in the Questions and Answers activities
attachment	To store user uploaded content such as images
badge-log-entry	To log users' rewarding transactions
bgmp	To store geo-related content such as tips and photos
faq	To store FAQs of website
forum	To store different types of forums
mobilechallenge	One of the achievement-type defined for mobile users
question	To store users' questions in the Questions and Answers activities
reply	To store users' replies for a forum topic
title	One of the achievement-type defined for all users
topic	To store users' topics in a forum
watersocial_survey	To store survey answers
wateruse	To store water use diary input from individual users
contact_form	To log messages sent to users from manager

Table 2 Customized post type used the platform

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Figure 6 tips object, the full schema definition can be found at http://watersocial.org/extensions-json/rest/api/tips/schema

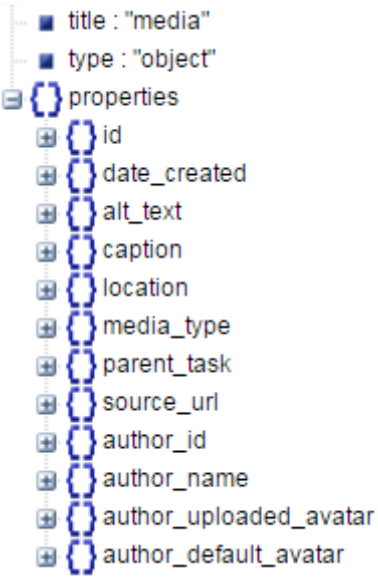

Figure 7 media object, the full schema definition can found at http://watersocial.org/extensions-json/rest/api/media/schema

Figure 8 diary object, the full schema definition can be found at http://watersocial.org/extensions-json/rest/api/diary/schema

2.1.3. APIs

As the platform by nature is a Web application based system, we developed a set of Web APIs (application programming interface) which allow the platform data can be accessed and managed within and outside the platform. The Web API here is defined as an API for either a Web server or a Web browser.

The INSP and IDS components expose a set of Web APIs by using Restful Web services. This allows the SMP to be flexibly integrated with heterogeneous systems including Android and/or iOS apps. The APIs are well documented in the http://watersocial.org/extensions-json/rest/api where IDS and WUV APIs are included and general descriptions of these APIs are given below (see Table 3 and Table 4).

URL	Method	Description
/rest/api/users	GET	Get all users and users can be sorted by id, total earned points, registered date and user name.
	POST	Create a user object.
/rest/api/tips	GET	Get a collection of tips objects
/rest/api/tips/{taskid}/{longitude})/{latitude}	POST	Upload a tip under a particular gaming task at current geographical location. The tip can also be automatically published to forum topic and twitter once approved by the platform via this API.

/rest/api/users/{id}/friends	GET	Get a user's friends of watersocial by user id, the retrieved friends can be further sorted by id, total earned points, registered date and user name.
/rest/api/users/{id}	POST	Update a user's profile by user id.
	GET	Get a user's profile
/rest/api/media	GET	Get all media files uploaded by users
/rest/api/media/{taskid}/{longitude})/{latitude}	POST	Upload a media file under a particular gaming task at current geographical location. The tip can also be automatically published to forum topic and twitter once approved by the platform via this API.
/rest/api/media/tasks/{taskid}/	GET	Get all media files under one task
/rest/api/media/{id}	GET	Get all a particular media file by media id

Table 3 IDS APIs

URL	Method	Description
/rest/api/diary/{taskid}/{longitude})/{latitude}	POST	Record a water use under a particular gaming task at current geographical location. The tip can also be automatically published to forum topic and twitter once approved by the platform via this API.
/rest/api/diary/tasks/{taskid}/	GET	Get all diary records of a user from that requesting user.

Table 4 WUV APIs

2.2. Gamification

The gamification enables the whole SMP to be used as a platform with gaming elements, which involve game task, competition and rewarding. The game tasks can be any user tasks on the social networks or any water use related offline activities such as recording down water use activities. Each of these user tasks can be rewarded upon its accomplishment. The gamification mechanism provided here allows managers to design user tasks and to reward points/badges as the user task progresses. The components involved include:

- Reward Store (RS):

  It plays a pivotal role in incentivising users participating in the whole system. The features of RS include calculation of rewards such as points, experience level, ranking etc. for each gamified social network activity. RS outputs the rewarding results in the forms of leaderboard of users and notification of rewards on an individual basis
- Gamification Content Presenter (GCP):

This is front end component handles information from RS.

2.2.1. Process Model

The gamification process involves user task design, task status check and rewarding procedures (see Figure 9).

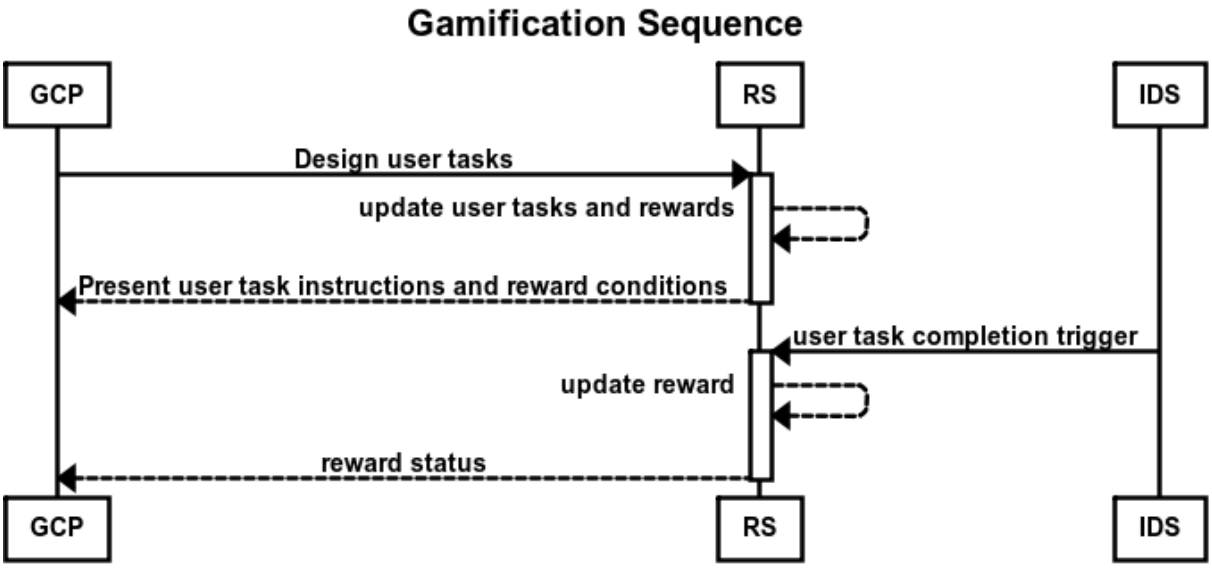

Figure 9 Process model for gamification

2.2.2. Data Model

There are two data objects defined in this module namely the task object and reward object. The specifications of two objects are defined online. The tasks object is defined in http://watersocial.org/extensions-json/rest/api/tasks/schema (see Figure 10) and the reward object is defined in http://watersocial.org/extensions-json/rest/api/rewards/schema (see Figure 11)

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Figure 10 Task object, the full schema definition can be found at http://watersocial.org/extensions-json/rest/api/tasks/schema

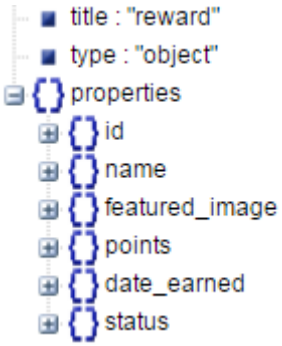

Figure 11 Reward object, the full schema definition can be found at http://watersocial.org/extensions-json/rest/api/rewards/schema

2.2.3. APIs

The Web APIs for RS include those used to retrieve the points from the platform and those from the external game service providers (see Table 5)

URL	Method	Description
/rest/api/rewards/{userid}	GET	Get a rewards of a user
/rest/api/rewards/game	GET	Get point redemption code from watersocial,

		this API is used to integrate the games from outside the platform.
/rest/api/rewards/game/decrypt/{code}	GET	Get points value from a rewarding code. This code is generated from watersocial for external game service provider.

Table 5 RS APIs

In addition to the Web APIs, there are also APIs that used to specifically target the game tasks. In the platform, the following task actions APIs are developed to support gamified social networking tasks and water use tasks. The use of these APIs can follow the pattern *add_action(ACTION_NAME, CUSTOMISED_FUNCTION)* in a WordPress plugin.

Action Name	Description
publish_wateruse	It can be used if a user uploads a water use diary.
publish_question	It can be used if a user posts a new question in Q&A feature.
publish_answer	It can be used if a user posts an answer in Q&A feature.
bp_activity_comment_posted	It can be used if a user commented in social activity stream.
wp_ulike_mycred_like	It can be used if a user unlike or like a topic.
ap_vote_casted	It can be used if a user vote for an answer/question in Q&A feature.
publish_bgmp	It can be used if a user posts some information on the map, e.g. a photo or a tip
publish_reply	It can be used if a user replies a topic.
send_friend_invitation	It can be used if a user sends invitation of join water social on other social networks.

Table 6 Game task actions APIs

2.3. Evaluation

Evaluation allows managers and researchers to continuously monitor and get the statistics of users, social network activities and rewards information. There are two components designed to handle these tasks, namely:

- Evaluation support (ES):

ES is the component serves dashboard, it collects data from RS and IDS so that it can produces summative results of rewarding and all other social network activities occurred. ES performs different statistical features to produce the meaningful results.

- ISNP Dashboard (ID):

This is a Web based application that presents the results generated from ES based upon a user's privilege.

2.3.1. Process Model

The evaluation support process is shown below (see Figure 12) which involves data request call to the IDS and RS.

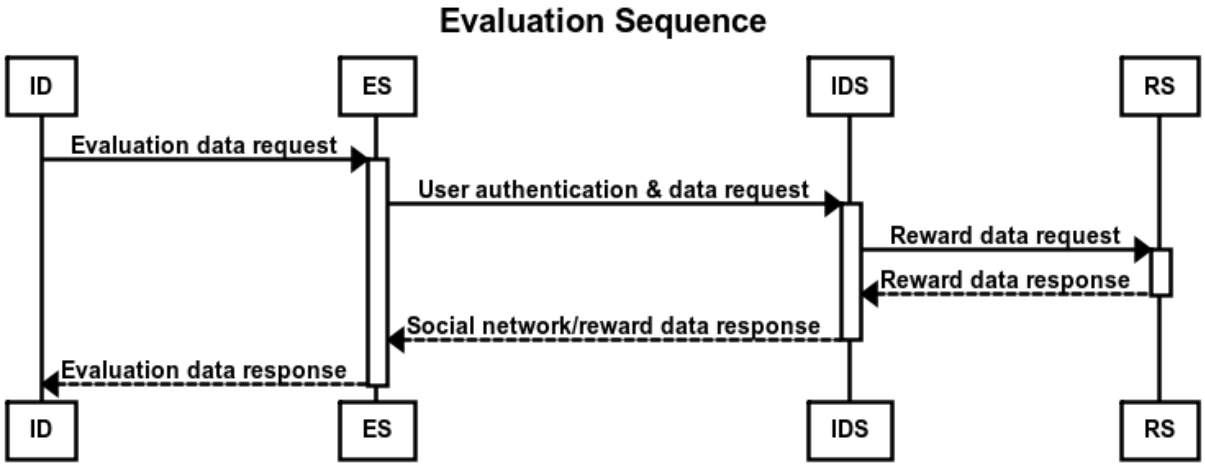

Figure 12 Process model for evaluation support

2.3.2. Data Model

The data model for ES is largely relying on the data models defined in 2.2.2 and 2.3.2. In addition, there are also

- rewarding log data model
- water use data model
- survey data model

used for evaluation.

The **rewarding log data model** is based on the post model (see Figure 4) where a select data fields are used and it also combines with the user data model (see Figure 3) to store the rewarding information.

Data Field	Description
ID	Log id
post_author	The user being rewarded
post_date	The time being rewarded, the date is in MYSQL date format
post_title	The reason for reward

post_content_filtered	The points added
total_points	The total points of a user

Table 7 Rewarding log data model with data fields

The **water use data model** is produced via a database view based on the wateruse type post

Data Field	Description
ID	Water use record id
post_date	The time of record, the date is in MYSQL date format
post_author	The user being rewarded
hours	Duration of a water use activity
activity	Activity name for those activity can be easily measured by duration
duration	Measured by minutes
other_activity	Activity name for those activity can be easily measured by uses frequency
times	Water use frequency
wu_date	water use record date

Table 8 Water use data model with data fields

The survey data model is based upon post data model (see Figure 4) and post meta data model (Figure 5), where a select data fields are used. The survey data model represents an instance of answers from a survey.

Data Field	Description
ID	Survey answer id
post_date	The time of record, the date is in MYSQL date format
post_author	The survey user
post_title	Survey title
meta_key	Question id, note this data field is joined from post meta data
meta_value	answer, note this data field is joined from post meta data

Table 9 Survey data model with data fields

2.3.3. APIs

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ES APIs are a set of short codes that can be directly used by wordpress plugins, pages, other forms of visual components and the short codes are rendered as data table or forms or list of records on an end user's screen. The short code can be directly used in html form, e.g. **[UGF id=1],** or it can be used in the php code form e.g. <?php do_shortcode('**[UGF id=1]**')?>

These short codes are empowered by the developed database queries on the platform, e.g. the water use instances are based on a database view which is a direct manipulation of database tables and their data records. As the platform evaluation progresses, we will continuously adjust and add short codes as required.

Short code	Description
[UGF id=1]	This is used to present a survey form issued from manager.
[wpdatatable id=1]	This is used to present the rewarding stats of a user in a table form.
[wpdatatable id=2]	This is used to present the users ordered by their total points.
[wpdatatable id=3]	This is used to present the water use record of a user in a table form.
[wpdatachart id=1]	This is used to present the water use record of a user in a bar chart.

3. Deployment Status

The deployment of the platform is taking an open and iterative approach as development progresses and hence the platform is hosted in a public Web server. We deployed our first version on February 1st 2015 and the Web domain is **www.watersocial.org**. We redeploy the whole platform upon each major update.

In case redeployment is required, the following instructions are provided to facilitate this.

The fundamental system environment of deploying the platform are listed below

1. Apache or Nginx as the server
2. PHP 5.6 or greater
3. MySQL 5.6 or greater
4. The mod_rewrite Apache module

Once the environment is setup, the following two files are needed to put in your **public_html** folder under apache Web server. These two files can be found at https://bitbucket.org/issewatuswp5/social-media-platform/src/, 'final version' folder.

- Install.php
- Install.zip

After placing the two files under the **public_html** folder, go to your browser and enter the address

http://youdomain/install.php, and then you will see the deployment screen (see Figure 13) from where you can start your deployment process.

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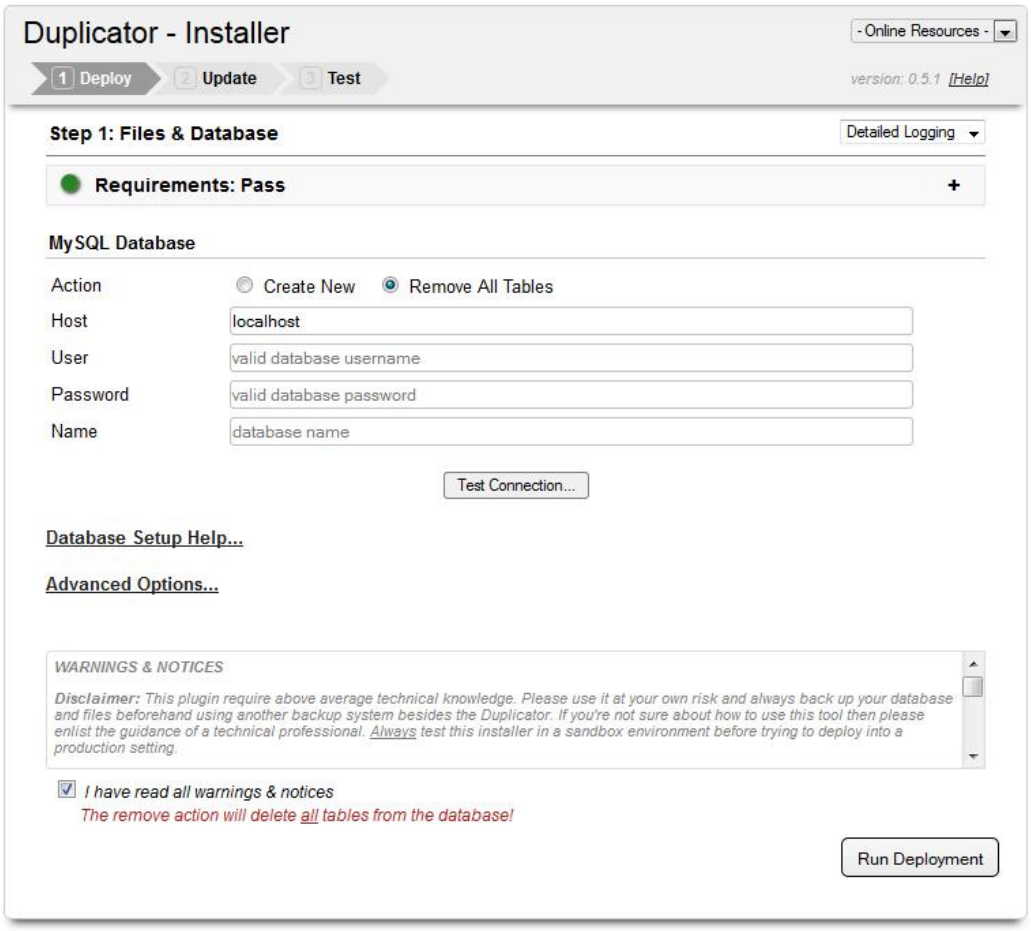

Figure 13 Platform deployment screen

4. Testing Status

An iterative testing approach is carried out by leveraging the online software project management system. Here, we use bitbucket as our software repository and issue tracking system. Each commitment to the update or change of the platform source code can be recorded and monitored at https://bitbucket.org/issewatuswp5/social-media-platform/src/. Figure 14 shows our commitment to the platform update since our first online commitment in May 2015 recorded at the bitbucket.

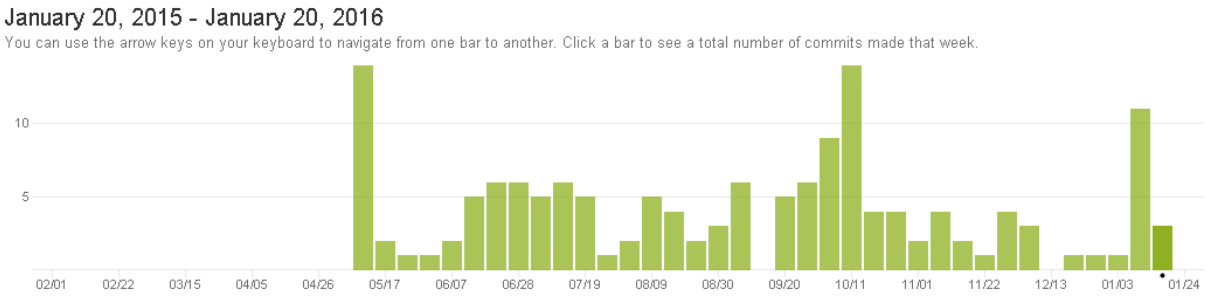

Figure 14 Commitment stats

And the tracked software issues can be found at https://bitbucket.org/zhenchenwang/issewatus_wp5_social-media-platform/issues. Figure 15 shows part of the tracked issues in action.

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Issues (1–25 of 80)

Title	T	P	Status	Votes	Assignee	Milestone	Created	Updated
#1: REST API |User access to routes	ISWP		RESOLVED		Zhenchen Wang	Releas...	2015-10-01	2015-10-08
#2: REST API | User registration	ISWP		RESOLVED		Zhenchen Wang	Releas...	2015-10-01	2015-10-08
#3: REST API | Task field: child_media_ids	ISWP		RESOLVED		Zhenchen Wang	Releas...	2015-10-01	2015-10-08
#4: UI | Activity screen line overlapps elements	ISWP		RESOLVED		Zhenchen Wang	Releas...	2015-10-01	2015-10-19
#5: Password change	ISWP		RESOLVED		Zhenchen Wang	Releas...	2015-10-02	2015-10-08
#6: REST API | Media	ISWP		RESOLVED		Zhenchen Wang	Releas...	2015-10-05	2015-10-08
#7: Greek language translation validation	ISWP		RESOLVED		Stavros Tekes	Releas...	2015-10-06	2015-10-19
#8: Greek language translation validation	ISWP		RESOLVED		Dper	Releas...	2015-10-06	2015-10-19
#9: Polish language translation validation	ISWP		RESOLVED		Tomasz Jach	Releas...	2015-10-06	2015-10-13
#10: Polish language translation validation	ISWP		DUPLICATE		Ewa Magiera	Releas...	2015-10-06	2015-10-13
#11: reset password	ISWP		RESOLVED		Zhenchen Wang	Releas...	2015-10-06	2015-10-08
#12: Reset_password_2	ISWP		RESOLVED		Zhenchen Wang	Releas...	2015-10-06	2015-11-02
#13: Create endpoints to retreve all media ids for a task	ISWP		RESOLVED		Zhenchen Wang	Releas...	2015-10-06	2015-10-08
#14: REST API | File upload			RESOLVED		Zhenchen Wang		2015-10-07	2015-10-08
#15: media, tip and task api update	Mobile App		RESOLVED		fgiannar	Releas...	2015-10-07	2015-10-08
#16: user data structure update	Mobile App		RESOLVED		fgiannar	Releas...	2015-10-07	2015-10-08
#17: REST API | users/me	ISWP		RESOLVED		Zhenchen Wang	Releas...	2015-10-08	2015-10-08
#18: REST API | Gravatar	ISWP		RESOLVED		Zhenchen Wang	Releas...	2015-10-08	2015-10-08

Figure 15 Tracked issues at Bitbucket

4.1. Testing Protocols and Testing Events

Within the work package 5, responsible developers are assigned software tasks, proposal, bugs, or improvement by platform users. These users are either developers themselves or project internal non-technical users or external users we invited.

For **wp5 internal user tests**, project internal users and developers are the main target users. Issues will be directly input to the issue tracking system and the responsible developers will receive the input directly via their emails. The reported issues will be further discussed on work package routine meetings every week. This testing procedures are continuing since **October 8th 2015** and will last until to the end of project, i.e. month 36.

For **wp5 external user tests,** each involved partner organization will have one representative to recruit the users within or outside their organizations. These representatives are responsible for reporting back the feedback to the bitbucket issue tracking system on behalf of users they recruited. As of today, we have conducted a two-week long external user tests on **November 11th 2015**. Another one-week long wp5 external user tests were conducted on **December 8th 2015** to test the mobile app which is an extension to the platform. For both tests, the reported issues were discussed within consortium and were addressed later. Detailed issue descriptions and solutions can be found at bitbucket.

4.2. Platform and Social Network Analytics

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The platform is put online along its development lifecycle so that network traffic information is always tracked. We use google analytics (see Figure 16) to find out more about our platform users and Twitter analytics (see Figure 17) to find out information on awareness of the water social. Bothe analytics tool are also used to promote our platform to more target audience.

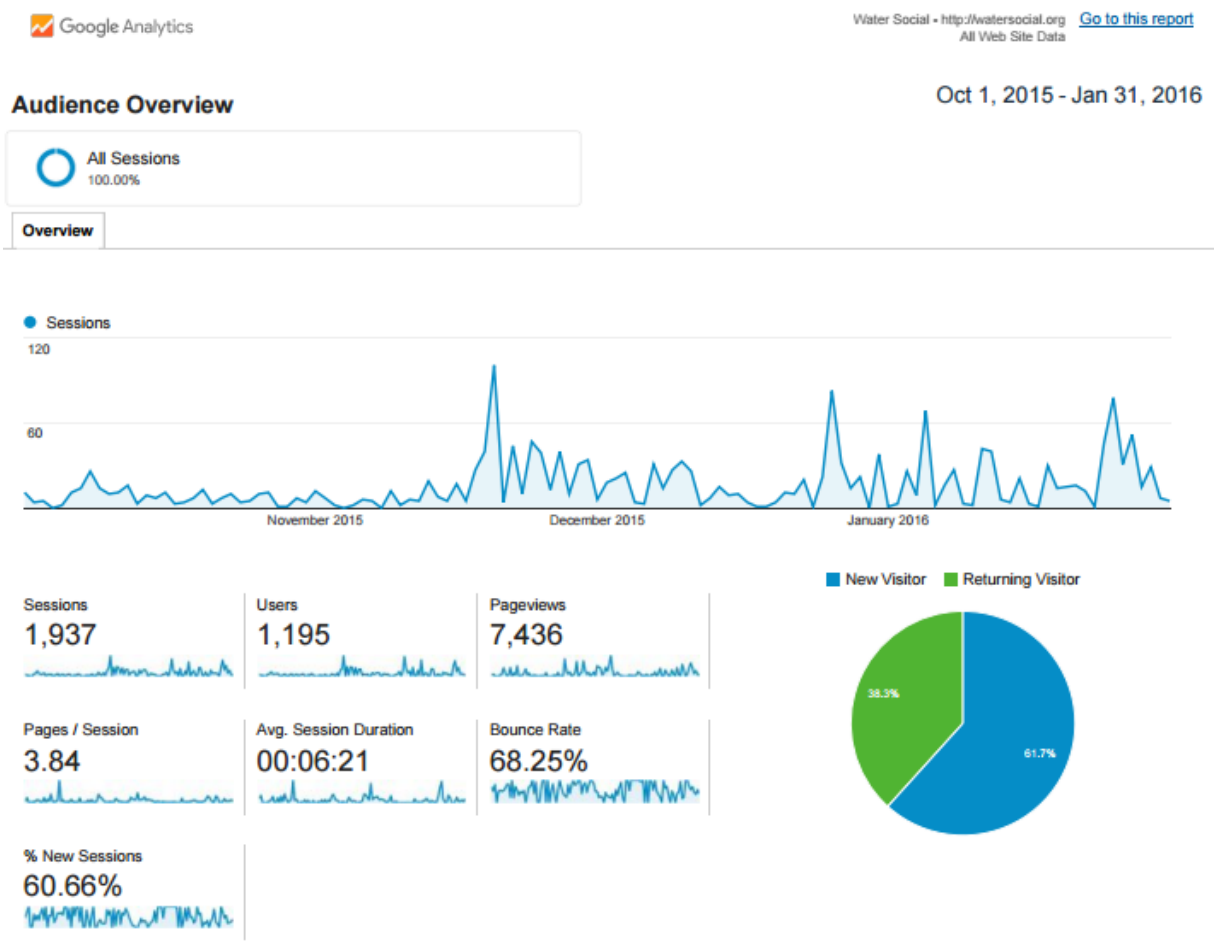

Figure 16 Summary of google analytics from October 2015 to January 2016

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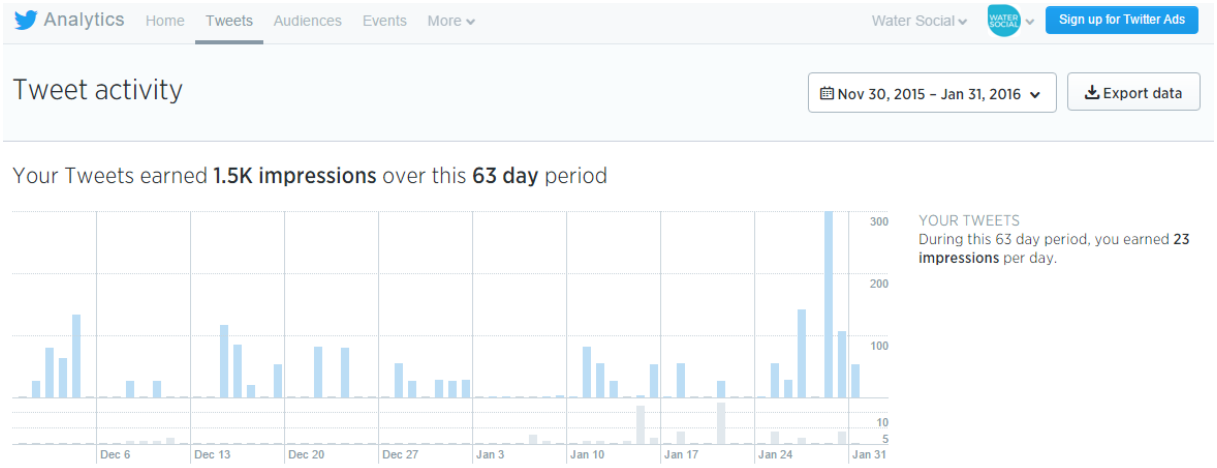

Figure 17 Twitter activity analytics from November 2015 to January 2016

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5. Appendix A: SMP Release Agenda

As planned in the Task 5.3, the SMP takes an iterative approach based on a modular architecture, where existing components were composed and integrated into a new software system. The development of the social-media platform was based on an iterative and incremental development, where the whole platform was developed and delivered as long as they become available. A release plan is presented in Table 10.

Release	Objectives	Planned Development Duration	Status
R0	• User access control • Social network activities support	Month 12-14	Done
R1	• Richer social network activity • Data visualisation support • Rewarding service	Month 15-17	Done
R2	• Gamification (including mobile gamification app in Appendix C) • Water use user input	Month 18-20	Done
R3	• Evaluation support service	Month 21-22	Done
R4	• Localisation and Web site theme styling	Month 23-24	Done

Table 10 SMP release plan

6. Appendix B: User Guide for SMP

This section provides the user guide for the social media platform. There is also an online FAQ section in the watersocial.org website for answering most asked questions regarding platform uses.

http://watersocial.org/about/

6.1. Site Map

The platform is structured in a two-level manner in which the first level is consisted of main features the platform provide (see Figure 18) and the second level allows the users to further explore each of the main features (see Figure 19, Figure 20).

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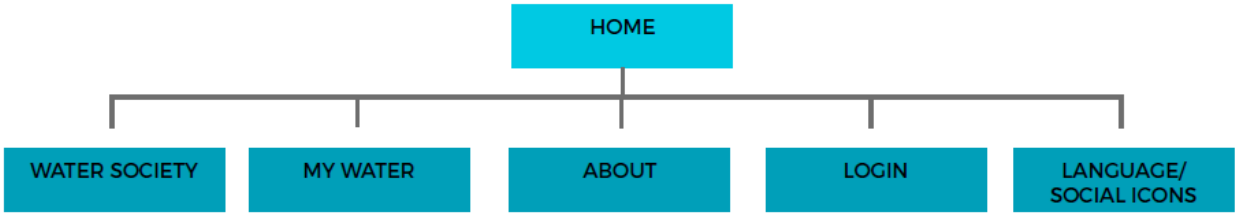

Figure 18 Root Level

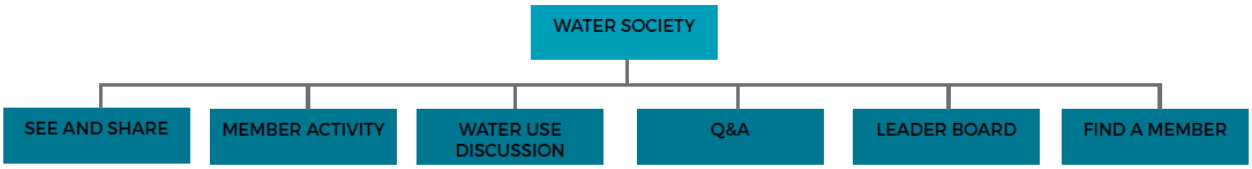

Figure 19 Water Society Level

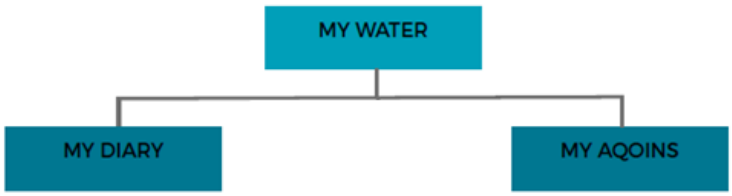

Figure 20 My Water Level

6.2. Home -> Login

Figure 21: the user login options, where the user can choose to register, log in or ask the system to resend the password.

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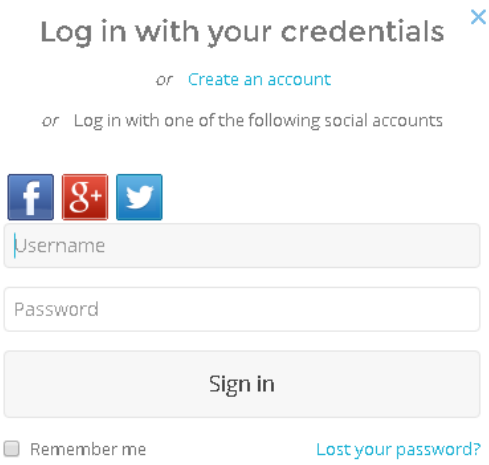

Figure 21 user login form

6.3. Home -> Registration

Figure 22 : In the case that a user registers via the Website, all the required fields in this form need to be completed.

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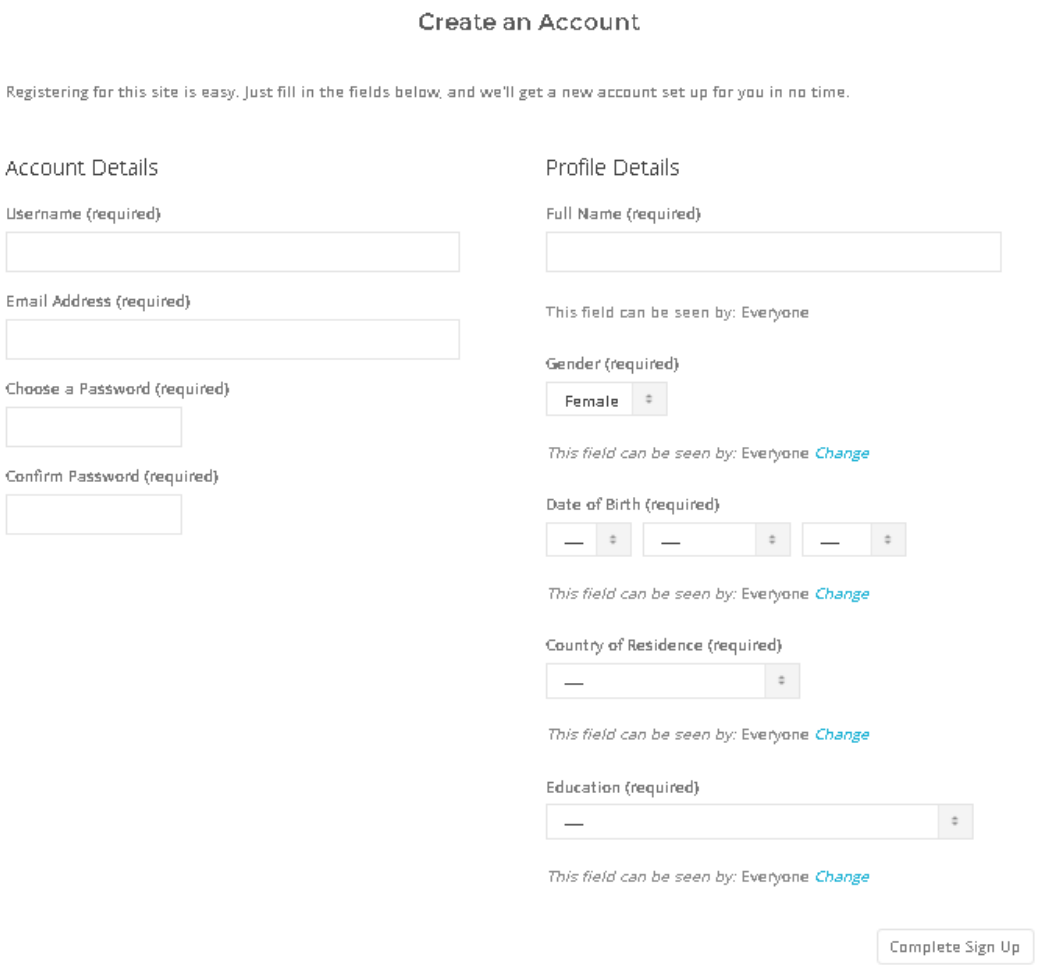

Figure 22 user registration page

6.4. Home ->Water Society->See and Share

Figure 23: See and share page shows the photos, tips shared by platforms on a global map. On the map, users can click on the content and explore further.

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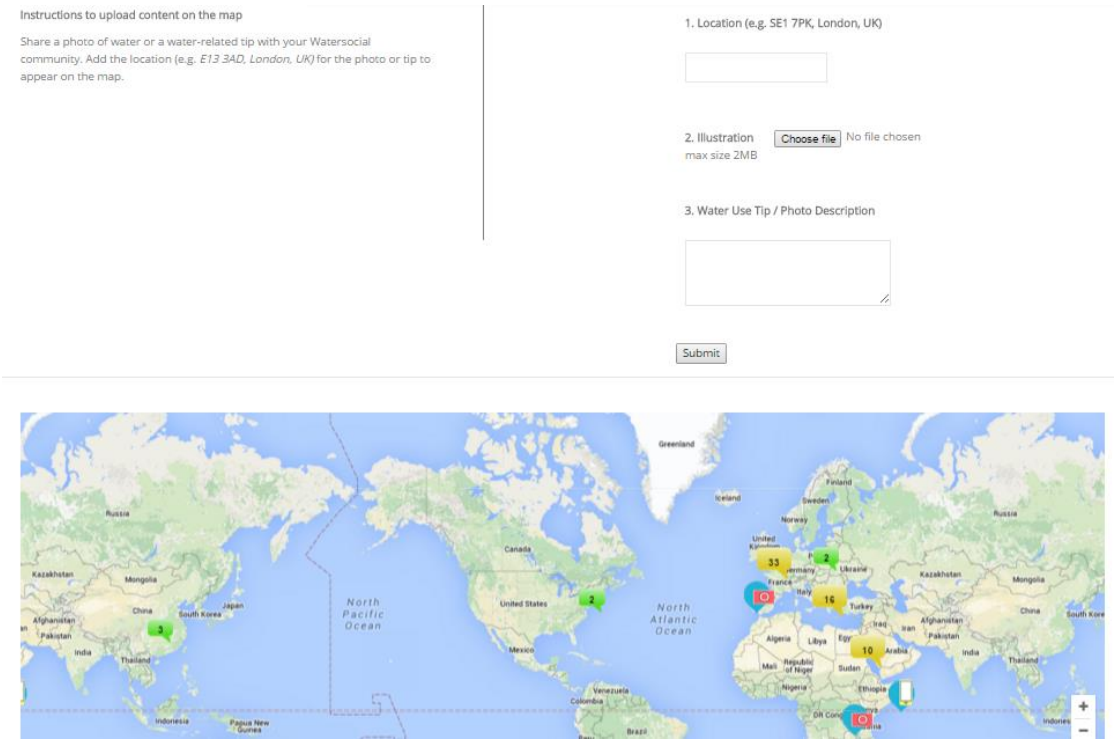

Figure 23 see and share page

6.5. Home ->Water Society->Member Activity

Figure 24: The page shows the recent activities on the platform. These activities including sharing, comments, topics discussions and etc.

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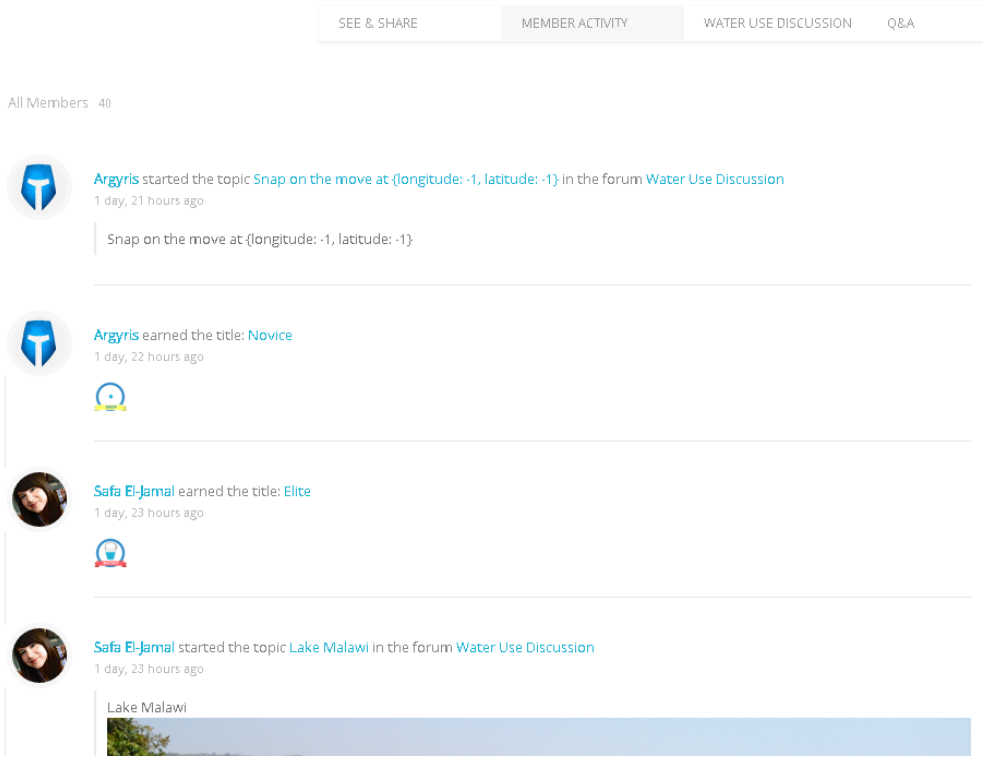

Figure 24 activity page

6.6. Home ->Water Society->Water Use Discussion

Figure 25: the page shows the discussion topics within the platform

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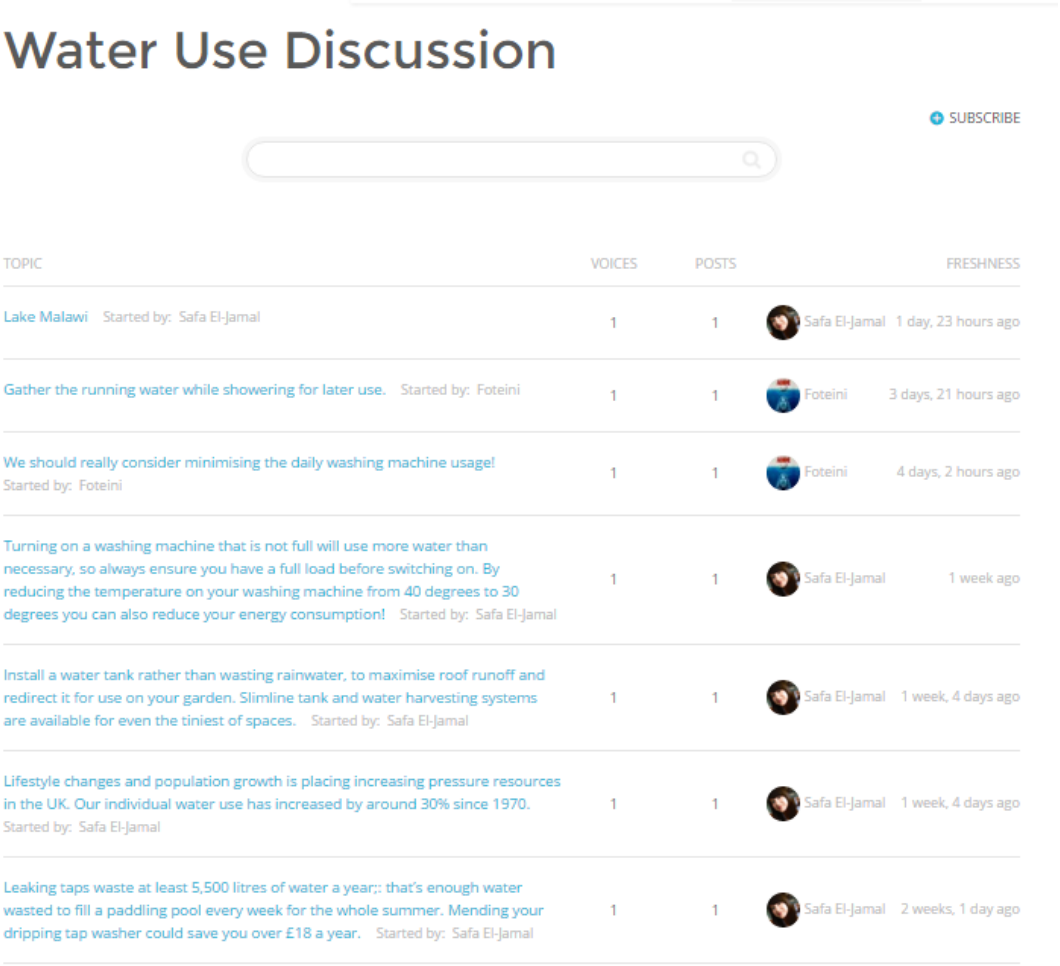

Figure 25 water use discussion page

6.7. Home ->Water Society->Q&A

Figure 26: the page shows the questions and answers from platform users

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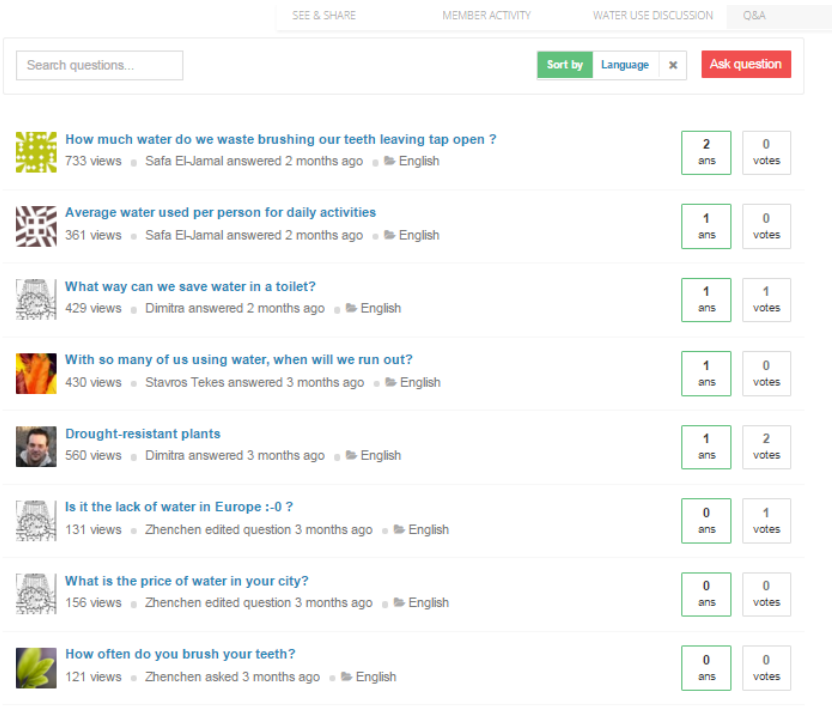

Figure 26 Q&A page

6.8. Home ->Water Society->Leader Board

Figure 27: the page shows the leader board in terms of users' aqoins. The leader board is organised by week, month and overall. The leader board can also be tailored to specific sponsor's timeframe requirements.

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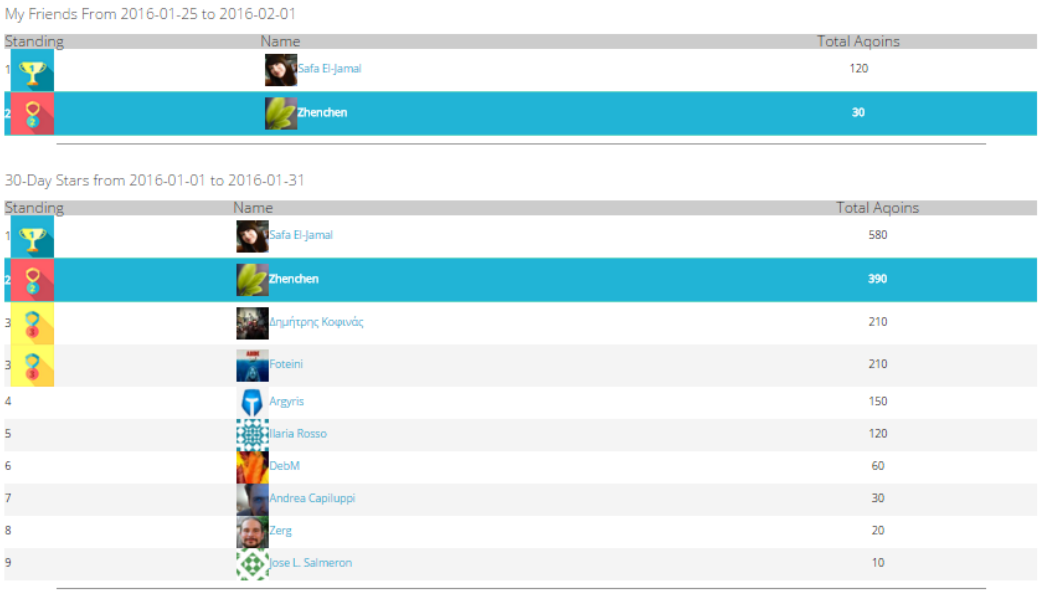

Figure 27 leader board page

6.9. Home ->Water Society->Find a member

Figure 28: the page allows users to find other users and take further actions such as make a friend request.

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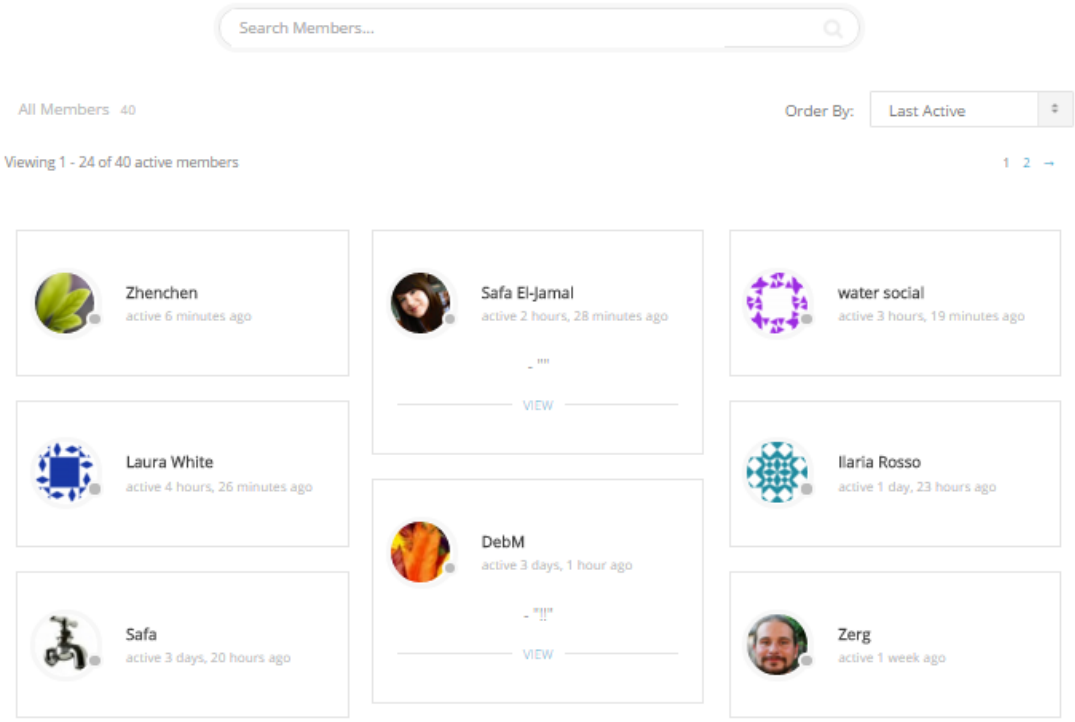

Figure 28 find a member page

6.10. Home ->My Water->My Diary

Figure 29: the page allows a user to record and monitor his/her daily water use. There are also diagrams on side to visualise the personal water use along the timeline.

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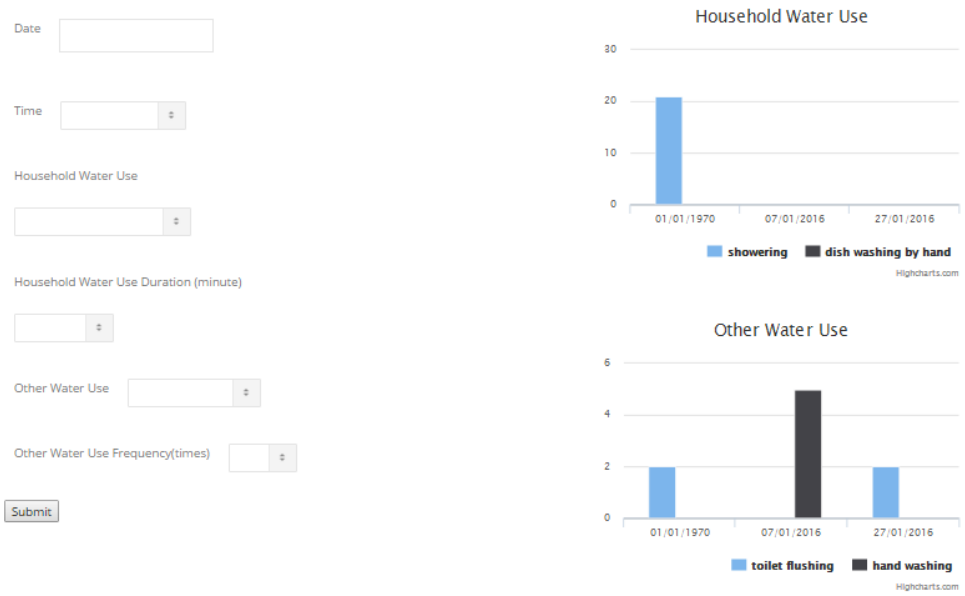

Figure 29 my diary page

6.11. Home ->My Water->My Aqoins

Figure 30: the page shows the user's earned aqoins stats and the titles unlocked.

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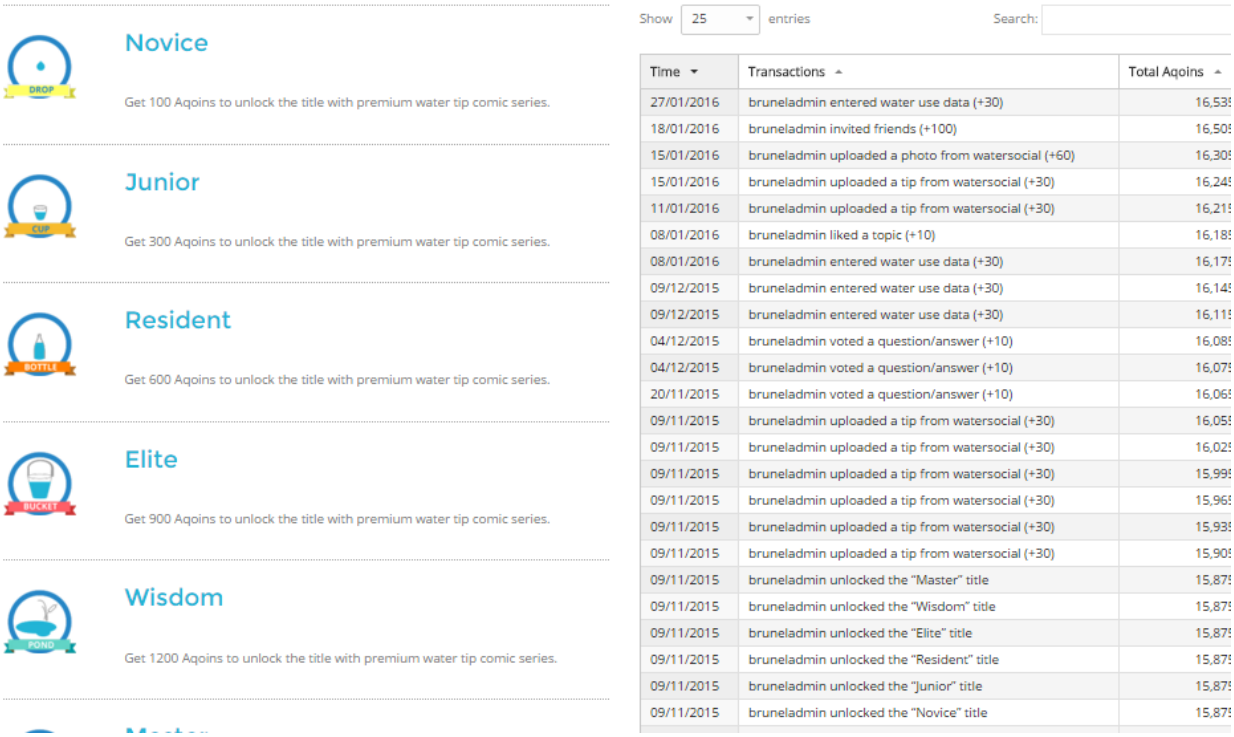

Figure 30 my aqoins page

6.12. Home ->About

Figure 31: the page shows the description of the platform among other content such as reward tariffs and FAQs.

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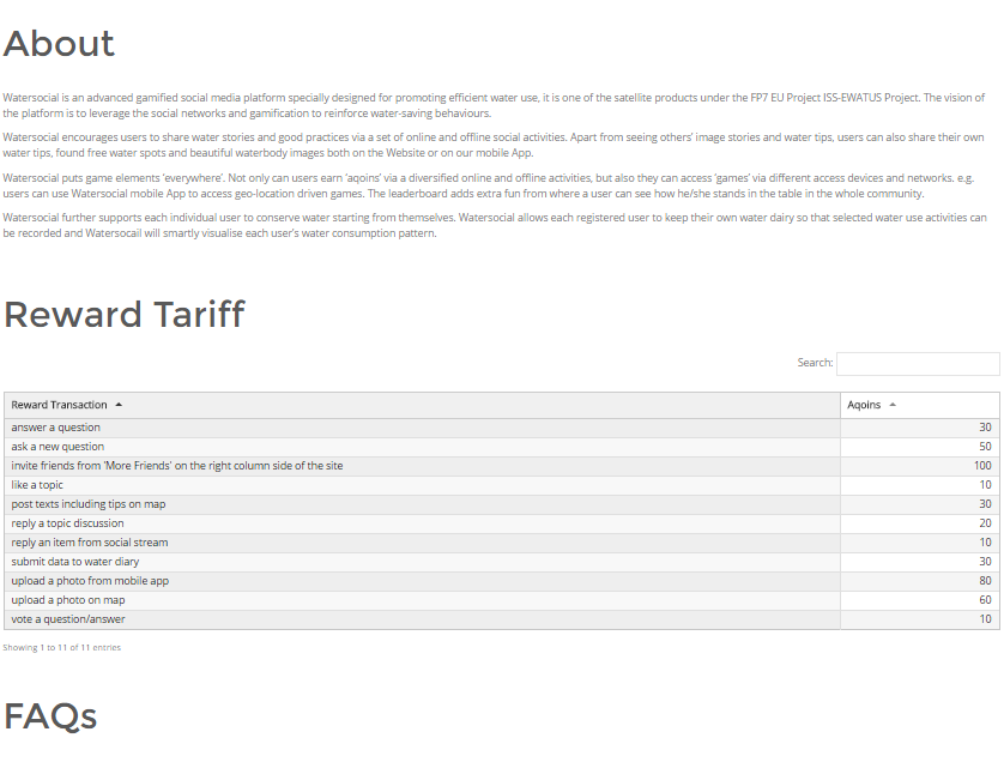

About

Watersocial is an advanced gamified social media platform specially designed for promoting efficient water use, it is one of the satellite products under the FP7 EU Project ISS-EWATUS Project. The vision of the platform is to leverage the social networks and gamification to reinforce water-saving behaviours.

Watersocial encourages users to share water stories and good practices via a set of online and offline social activities. Apart from seeing others' image stories and water tips, users can also share their own water tips, found free water spots and beautiful waterbody images both on the Website or on our mobile App.

Watersocial puts game elements 'everywhere'. Not only can users earn 'aqoins' via a diversified online and offline activities, but also they can access 'games' via different access devices and networks. e.g. users can use Watersocial mobile App to access geo-location driven games. The leaderboard adds extra fun from where a user can see how he/she stands in the table in the whole community.

Watersocial further supports each individual user to conserve water starting from themselves. Watersocial allows each registered user to keep their own water dairy so that selected water use activities can be recorded and Watersocail will smartly visualise each user's water consumption pattern.

Reward Tariff

Search:

Reward Transaction	Aqoins
answer a question	30
ask a new question	50
invite friends from 'More Friends' on the right column side of the site	100
like a topic	10
post texts including tips on map	30
reply a topic discussion	20
reply an item from social stream	10
submit data to water diary	30
upload a photo from mobile app	80
upload a photo on map	60
vote a question/answer	10

Showing 1 to 11 of 11 entries

FAQs

Figure 31 about page

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7. Appendix C: EGA (EWATUS Gamification Application) Mobile Phone Application Design

In order to increase the user participation and engagement in the SMP, the consortium decided to build a mobile application (EWATUS Gamification Application - EGA). The EGA can act as an educational social game, allowing users to take part in missions and performing tasks of varying difficulty. The objectives are

- the minimization of water consumption in their household / municipality,
- the reduction on the household water bill and
- the awareness of the users on water preservation.

The Gamification app presented in this section is a mobile version of the GCP and RS components (see Gamification 2.2). Apart from the app's internal business logic and data processing, the EGA will follow the same process model and use the APIs of the RS component to communicate with the central SMP.

The vision for EGA is to enable household users to participate in various missions, involving several tasks. Tasks can vary from (i) inputing household water consumption statistical data, (ii) uploading water related images, (iii) uploading water related tips, (iv) checking in certain locations of interest around their location etc. The completion of each mission awards users with points (aqoins) which are transferred to a leaderboard where users can view their general ranking among other users but also compared to their friends.

Points (aqoins) awarded from missions in the EGA will be transferred to the social network which will maintain the user profile centrally. Users will be awarded points (aqoins) for activities in both mobile application and SMP, thus increasing their recognisability within the EWATUS ecosystem.

The EGA also enables water authorities to (i) gather water consumption data from households, (ii) get anonymous information on users' water preservation awareness activities, and (iii) promote water-saving campaigns from the respective missions that will be setup in the EGA.

7.1. EGA Architecture

The EGA application was built based on web technologies (HTML5/Javascript). In order to be deployed onto mobile devices, the code was wrapped via PhoneGap to produce native Android and iPhone applications. The choice of PhoneGap for the application was made to accelerate development and to be able to quickly build and ship the app on multiple platforms.

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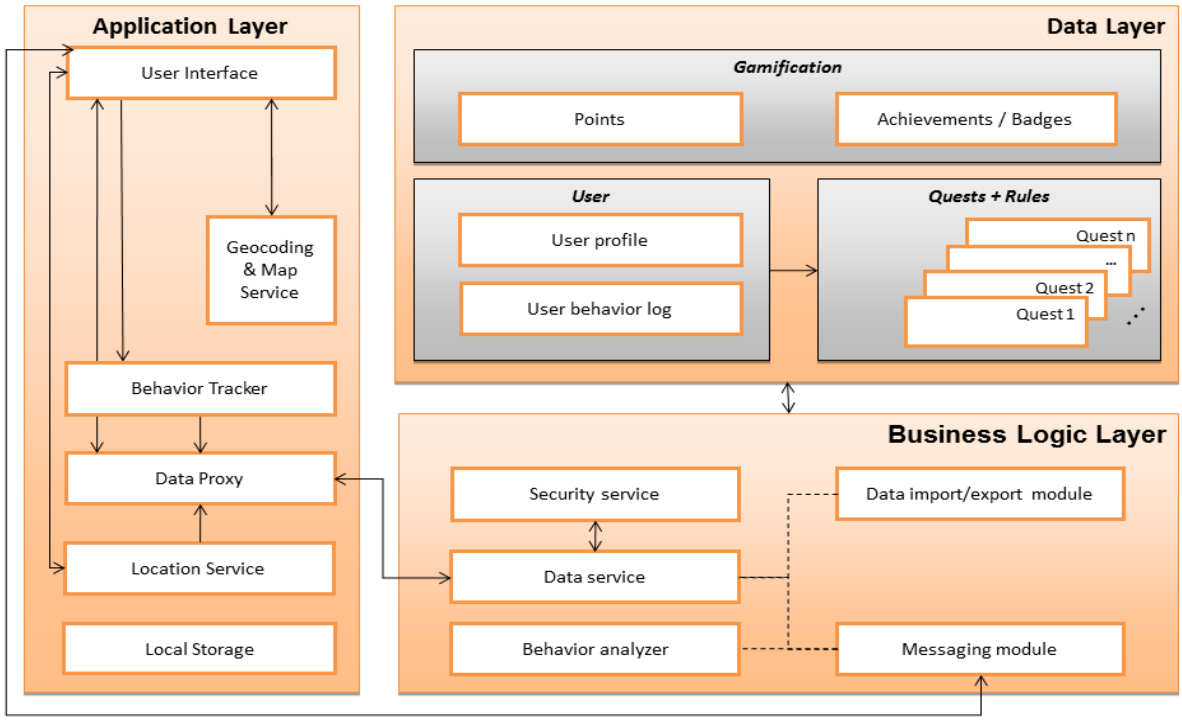

Figure 28 EGA Architecture

The different EGA architecture layers are detailed in the sections below:

Data & storage layer – this layer contains the user profiles with the associated descriptive information (e.g. the users characteristics, age etc.), as well as a detailed audit of their actions in the EGA app. Mission-related data is saved in this layer, and containing the essential rules (e.g., the missions that the user has to accomplish), the user activity data for each mission and the geographical related information which is essential in order to improve the EGA user experience. Leaderboards with aqoins that users have accumulated in each mission are also stored here.

Business logic layer – this layer responds to requests that follow the application logic and passing the appropriate content, securely, to the client application (as defined below in the "application layer"). This communication can be achieved via a Restful API which can be accessed through the http protocol.

The API handles the requests and data exchange with third party services and the data layer in order to provide a uniform interface to the clients. This layer's services perform logic procedures like:

Identity management, authentication, and authorization to allow data access only to authorized users;

Creation of alert notifications, according to the user's preferences or actions via the Notification and Pub/Sub Messaging module

Filter and serve data according to e.g. user location and also act as a proxy to synchronize data push/requests to/from the applications in the application layer (Data Service).

User behaviour analyser module analyses user's actions collected by the front end applications and push certain actions back to the application layer via http requests in order to better suit the application to the user needs.

The *Application Layer* hosts the user's interaction interface which is available as a mobile application. This layer offers full end-user access to all EGA services. Via the EGA, the mobile users can participate in the missions that have been predefined for them and provide valuable behaviour tracking data through the use of the app to the administrator that is monitoring them. A number of client (frontend) services can interact in this layer, using data that Business Logic (server side) layer provides and also providies data back to it. Such services are:

User's interaction logging (via the Behaviour tracker module) observes user's interplay and forward certain actions to business layer via http requests.

Validation of a user's GPS location when participating in geographic related missions (via the Location Service module).

Geocoding and map data representations (via the Geocoding & Map Service module) are used via Google Maps.

Temporary user's data storage (via the Local Storage module). In order to reduce the user's required actions, some data related to user profile and missions will be stored in user's device and will be used repetitively.

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7.2. EGA interfaces and features

The initial EGA screen (once a user has connected with their credentials to the application) presents the user with a list all the available mission types to choose from. Currently the available mission types are:

1. **Water Diary**: Missions which are usually repeated daily and the users are requested to input water usage related information, such as how many times they washed their hands or how long they spent in the shower.
2. **Share Images**: Missions where the users are requested to take and share water related images, such as images of water bodies in their countries.
3. **Share Tips**: Missions where the users are requested to share tips related to water preserving behaviour.
4. Location Missions: These missions are a combination of the above two mission types (Images and Tips) but add one more level of complexity / fun in the mission, since users can only complete it once they have checked in to a certain point of interest close to their current location.

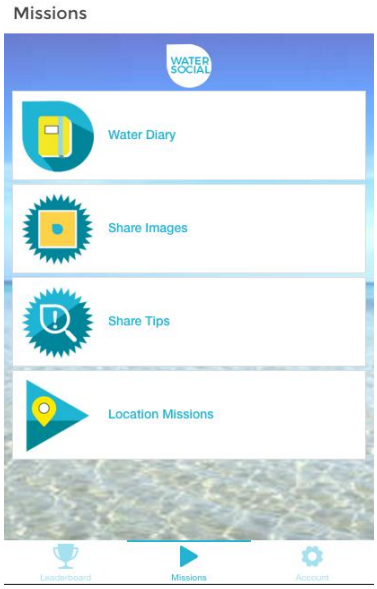

Figure 32 The EGA starting screen

After choosing a certain mission type, the user is presented with a summary of all the available missions of the current type along with their title, description, image, aqoins to earn upon completion, current submissions and various stimulating messages.

When clicking on one of the missions, the user is presented with all the mission details as well as already submitted data from players that have already completed this mission. The presented data can be images or tips according to the mission type together with each player's display name as well

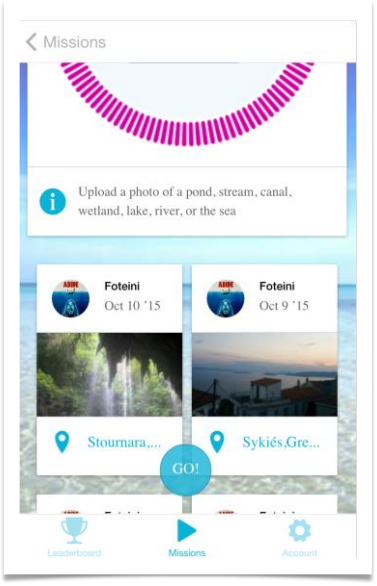

Figure 33 Mission

as location at the time of submission (Figure 33).

7.2.1. Missions and mission types

The EGA can have a number of missions depending on the purpose that each mission intends to serve. Missions were designed to be dynamic, and organisations (e.g. water companies) will be able to create their own missions. Some missions might be built to serve educational purposes while others will require users to perform certain tasks in order to fulfil another purpose (e.g. collect best practices, or improve water usage habits).

Each mission can be of a specific type and require the use of one or more player's mobile phone capabilities (GPS, Camera, etc.). Whenever users accomplish a mission, they are awarded with aqoins.

A Mission can have a number of restrictions

- Time limited (e.g. you have 2 days to upload a picture of your water meter reading)
- Location limited (e.g. can be completed after a user checks in a certain location)

- A combination of the above (e.g. upload a photo from a water leakage in your municipality after checking in to one of your cities historical places)

A mission can be, as stated above, of a specific type (see Figures 34 to 37). Namely those types could be described as follows:

- Take a picture of something (e.g. water bodies in your town)
- Share a useful tip (e.g. don't leave the water running while brushing your teeth)
- Check in to a certain location
- Upload water consumption statistics

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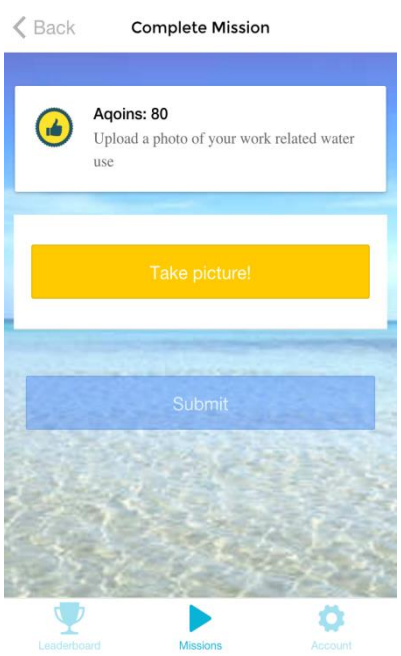

Figure 34 Take picture

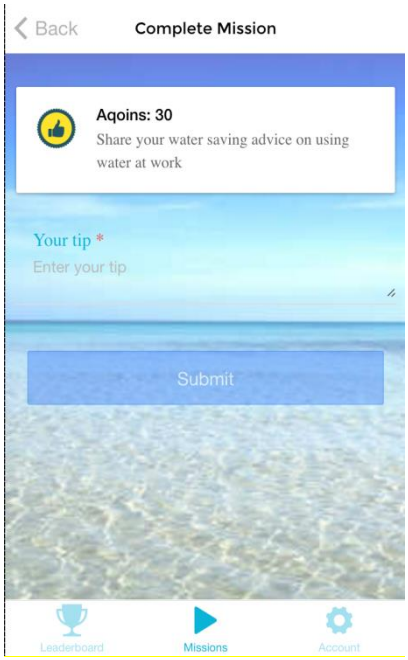

Figure 35 Share a tip

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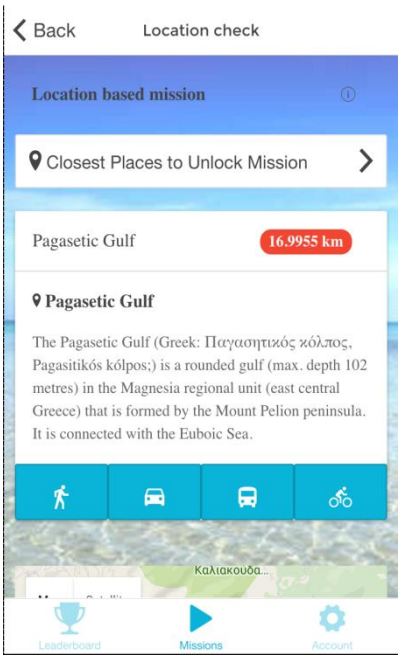

Figure 36 Check in

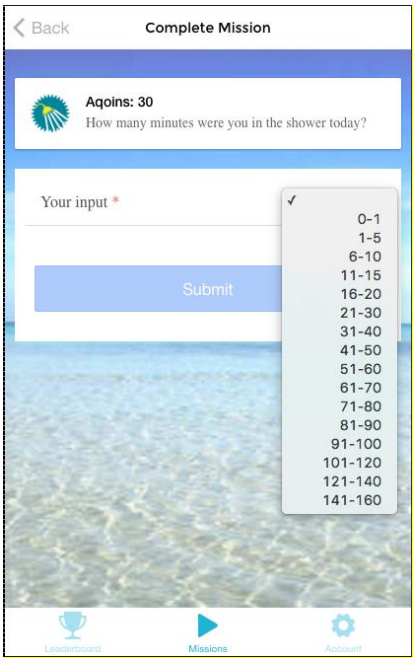

Figure 37 Upload water consumption data

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no [619228]

7.2.2. Leaderboards

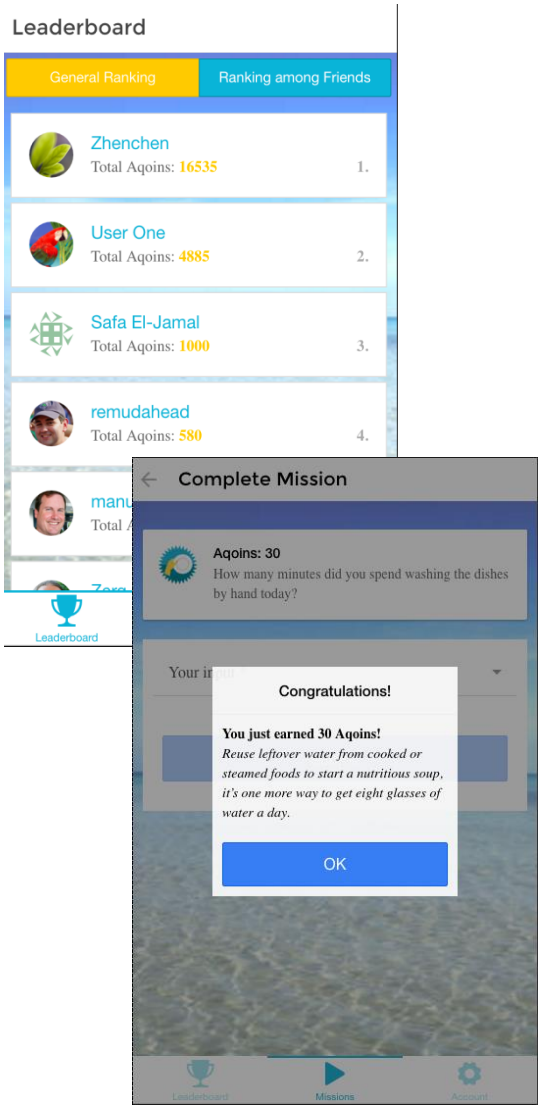

Figure 39 Aqoins awarded for mission completion

EGA has its own leaderboard (Figure 38) where users can see how all players participating in the missions are doing. Apart from the general ranking, users can also see an additional ranking among friends, aka other users who they have befriended through the SMP. As participation increases and players complete more missions, they are awarded with more points changing the leaderboard balances. The leaderboard can become a more competitive place when top rated players receive real life rewards, apart from the virtual ones which are points (called Aqoins - Figure 39).

7.2.3. EGA mission scenarios

7.2.3.1. Group Scenario 1: Track your water consumption

This particular group of missions will give players the chance to increase (or decrease) their rankings but also help them update their water diary, accessed in the WSP and help them improve their water consumption behavior. The data inputted by users will help constructing general observations on user behavior upon water consumption over time and validate their engagement in consuming less water resources.

Mission #1	How much time did you spent in the shower today?
Small Description	Upload daily water usage data about your bathing activity.
Description	Users are requested to select from a list of time ranges the one reflecting their daily amount of time spent while showering.
Outcome	Update your water diary. Watch your progress over time.
Achievements	Earn aqoins!

Mission #2	How much time did you spent doing the dishes today?
Small Description	Upload daily water usage data about your dish washing activity.

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Description	Users are requested to select from a list of time ranges the one reflecting their daily amount of time spent while doing the dishes.
Outcome	Update your water diary. Watch your progress over time.
Achievements	Earn aqoins!

Mission #3	For how much time was your washing machine operating today?
Small Description	Upload daily water usage data about your water machine sctivity.
Description	Users are requested to select from a list of time ranges the one reflecting the daily amount of washing machine operation time.
Outcome	Update your water diary. Watch your progress over time.
Achievements	Earn aqoins!

Mission #4	How many times did you wash your hands today?
Small Description	Upload daily water usage data about your hand washing activity.
Description	Users are requested to select from a list of numerical options the one reflecting the total times they washed their hands
Outcome	Update your water diary. Watch your progress over time.
Achievements	Earn aqoins!

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7.2.3.2. Group Scenario 2: Share tips

Mission #1	Share tips of water use at work
Small Description	Share your water saving advice on using water at work
Description	Users are requested to share various tips about saving water at their work environment.
Outcome	Contribute in sharing useful tips about saving water at work and gain wisdom by viewing other players' contribution. Make your work a better and eco-friendlier place!
Achievements	Earn aqoins!

Mission #2	Share tips on gardening water use
Small Description	Share your water saving advice on using water while gardening
Description	Users are requested to share various tips about saving water while gardening
Outcome	Contribute in sharing useful tips about saving water while gardening and gain wisdom by viewing other players' contribution. Make your yard a better and eco-friendlier place!
Achievements	Earn aqoins!

7.2.3.3. Group Scenario 3: Take photos

Mission #1	Take photos of water leakages in your neighbourhood

Small Description	Report water leakages in your neighbourhood or city
Description	Users are requested to report any water leakages occurring close to them by uploading related photos
Outcome	Contribute in publicising bad watering practises around you. Make your neighbourhood a better place!
Achievements	Earn aqoins!

Mission #2	Take photos of your beautiful garden.
Small Description	Share photos of your garden.
Description	Users are requested to take photos of their garden. All user uploaded photos will be displayed in the task screen.
Outcome	Share photos of your garden and take useful ideas on how to make it even better by viewing other people's corresponding photos.
Achievements	Earn aqoins!

7.2.3.4. Group Scenario 4: Geolocation missions

Mission #1	Check in a specific location around you and share photos of waterbodies
Small Description	Share photos of water bodies. Check in first to unlock the mission.

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Description	Users are requested to check in to one of the suggested (by EGA) points of interest around their current location. Only after successfully checking in the mission is unlocked and they can proceed with uploading their images.
Outcome	A chance to take a walk and view one (or more) of the historical / famous places around your current location.
Achievements	Earn aqoins!

Mission #2	Check in a specific location around you and share thoughts on water tips in the city.
Small Description	Share thoughts on water use in the city. Check in first to unlock the mission.
Description	Users are requested to check in to one of the suggested (by EGA) points of interest around their current location. Only after successfully checking in the mission is unlocked and they can proceed with submitting their thoughts.
Outcome	A chance to take a walk and view one (or more) of the historical / famous places around your current location.
Achievements	Earn aqoins!