

Pilot: Collaborative Glossary Platform

CI Context Viewpoint

1. As-Is Workflow Model

Workflow Name:

Term / Definition Collection

Domain Context:

Typically each group / community has its own list of terms and definitions.

An individual is a member of multiple groups and communities. Thus, choosing appropriate terms and definitions is ambiguous and requires coordinated discussion and deliberation efforts by the group / community in order to create a common base of knowledge.

Objective of this workflow:

To provide all stakeholders with a common foundation of terms and their definitions and to agree on definitions that are relevant in the research context.

Benefits (quality measures) of a common foundation of terms and definitions would be

- a. easier articulation of needs, concerns and risks.
- b. reduce ambiguity of the meaning of abstract concepts.
- c. agreed basis of references.

Stakeholders:

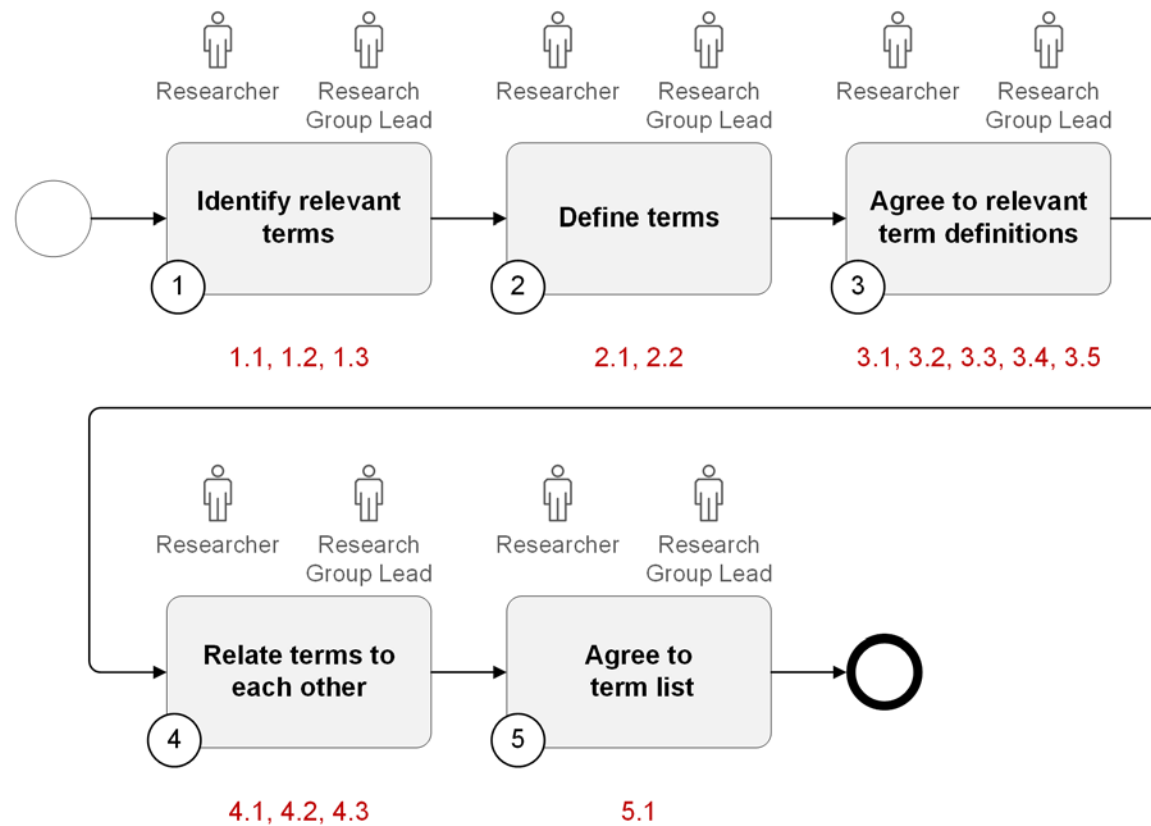
- Researchers

A person who is part of a group of researchers (e.g. in an academic institution, industrial company), has specialized knowledge or expertise in a scientific field and investigates interesting topics to generate and communicate new insights. In scientific environments

researchers from multiple domains with varying levels of expertise regularly need to collaborate on research projects in groups and communities towards a certain topic. The members of such research cooperations are often geographically distributed and need tools to organize their collaboration.

- **Research Group Leader**
A person who is responsible for the administration, organization and research goals of a research group.

Current Business Process:



List of Activities:

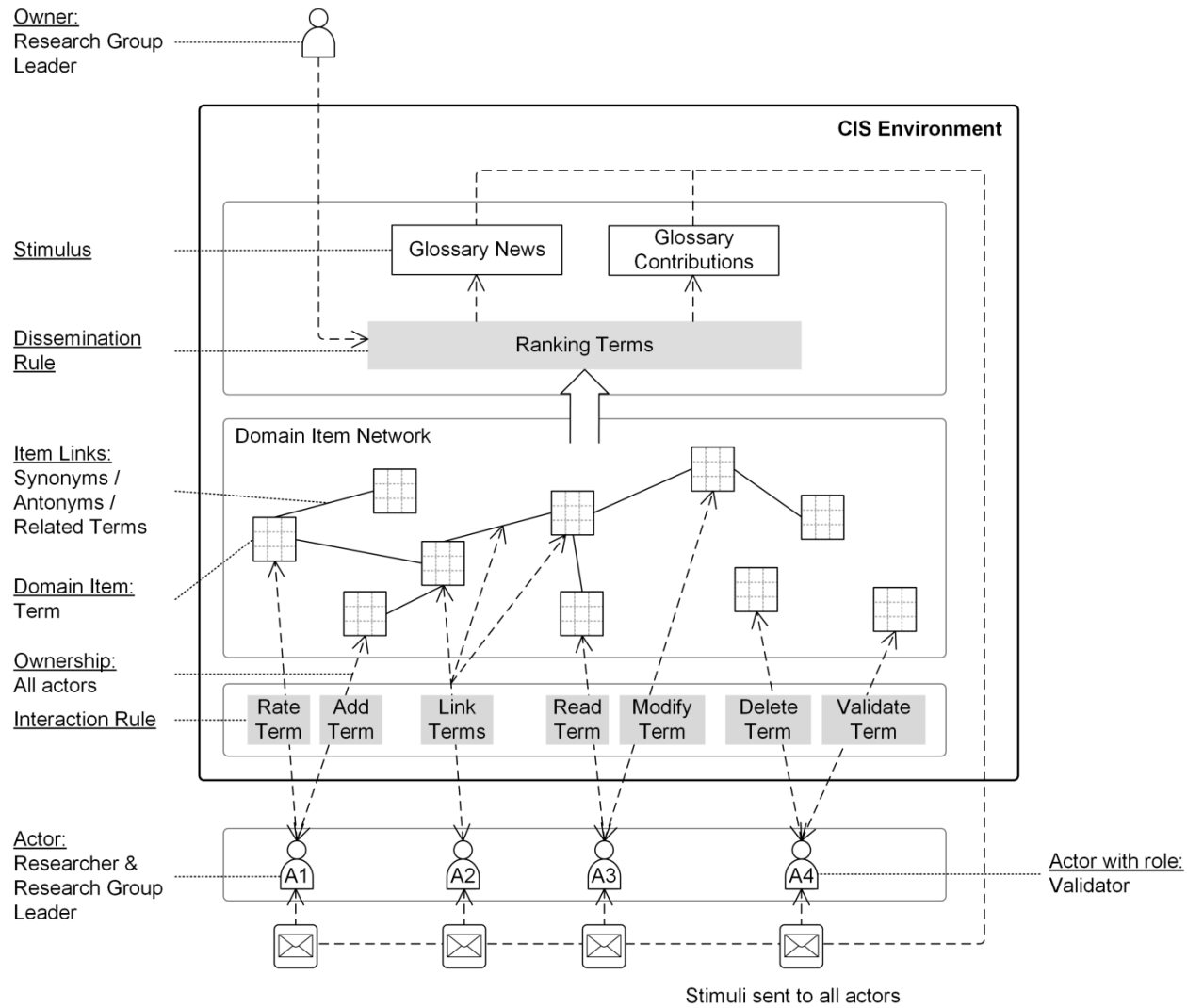
A#	Activity Name	Activity Description	Stakeholders	Communication Channels
1	Identify relevant terms	Each researcher has a local collection of terms and definitions that he/she needs. Sharing of new identified terms with collaborators rely mainly on email, wiki or face-to-face.	Researcher, Research Group Leader	local, f2f, email, wiki
2	Define terms	Each researcher adds one or more definitions to the collected terms that he/she finds useful for his/her research work.	Researcher, Research Group Leader	local
3	Agree to relevant term definitions	Since typically a term has multiple definitions dependent on the context in which it is used, it is important that researchers collaborating with each other agree together to appropriate definition(s) for the terms they use.	Researcher, Research Group Leader	f2f, email, phone, shared online document, wiki
4	Relate terms to each other	It is important to identify and document which terms of the collected base are synonyms or are related to each other to avoid any misunderstanding.	Researcher, Research Group Leader	f2f, email, phone, shared online document, wiki
5	Agree to term list	The appropriate choice of relevant domain-specific terms and their definitions is important to have a mutual basis for articulation and interpretation of approaches and models.	Researcher, Research Group Leader	f2f, email, phone, shared online document, wiki

List of Limitations:

ID	A#	Description	Stakeholders	Impact (1-low, 5-high)
1.1	1	Each user organizes locally his/her private collection of terms and definitions.	Researcher, Research Group Leader	4
1.2	1	Insufficient communication and coordination lead to no awareness of already identified terms and thus to duplication of effort.	Researcher, Research Group Leader	4
1.3	1	Lack of discoverability of existing terms to use and tools to find terms of interest for a given context is challenging.	Researcher, Research Group Leader	4
2.1	2	Each user deems a different set of terms relevant which requires a coordinated process to negotiate a potential relevant term set.	Researcher, Research Group Leader	3
2.2	2	Direct negotiations of relevant terms by users lead to a time consuming and effort intensive process.	Researcher, Research Group Leader	4
3.1	3	Collection of appropriate definitions for each term and integration of them in a common database.	Researcher, Research Group Leader	2
3.2	3	For a single term multiple definitions can exist. Thus users need to agree to relevant definition(s) with respect to research topic.	Researcher, Research Group Leader	2
3.3	3	Capturing of distributed contributions in a structured manner is required to support entry completeness and a common format of data representation.	Researcher, Research Group Leader	3
3.4	3	Definitions are distributed in references across multiple digital libraries/platforms. In the definition it is important to refer to this reference location in order to look quickly details up and use the reference in your publications.	Researcher, Research Group Leader	3
3.5	3	Quality of terms and definitions need to be validated before using in research context.	Researcher, Research Group Leader	5
4.1	4	No support for discussion and agreement mechanisms of term relations.	Researcher, Research Group Leader	4

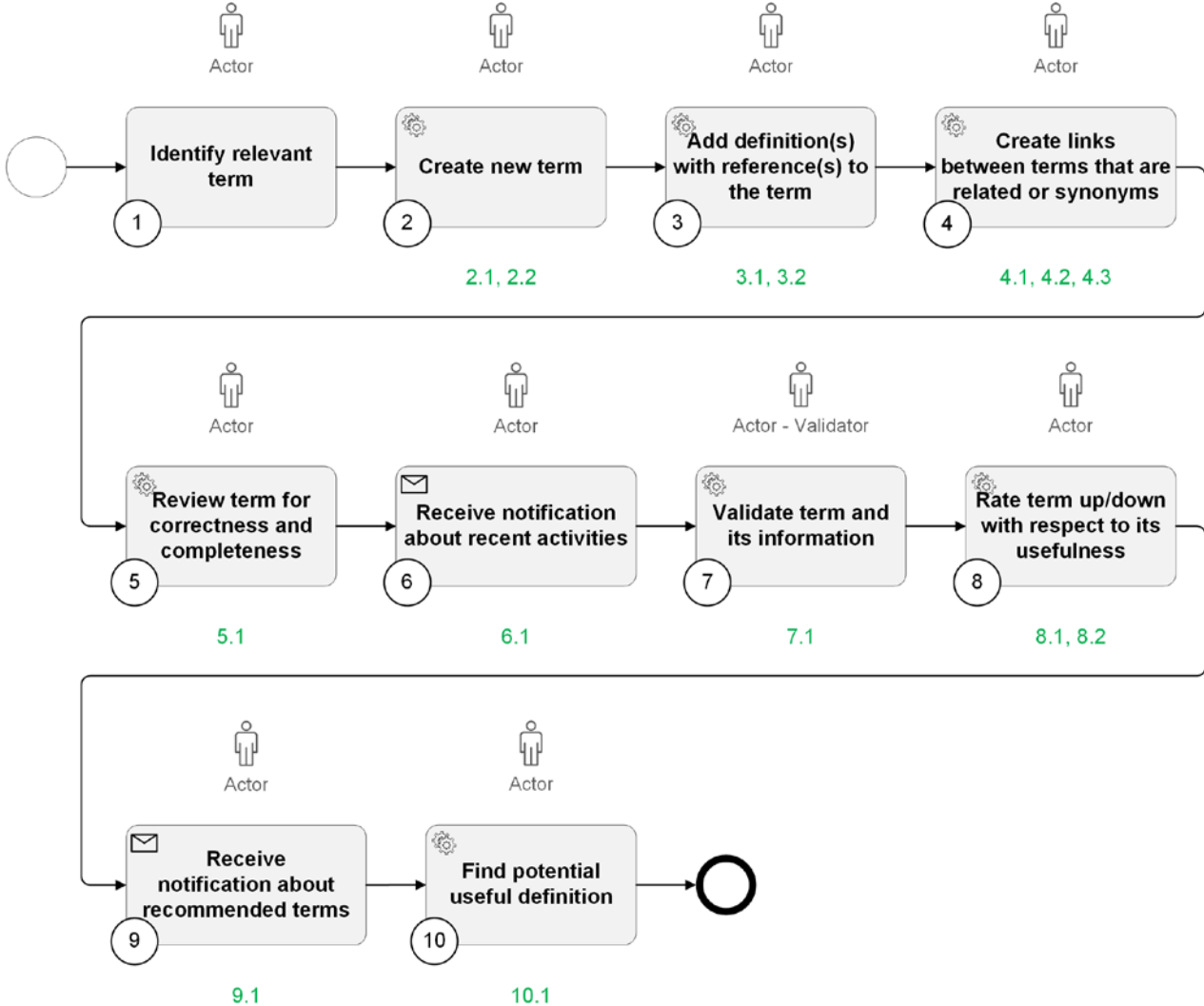
4.2	4	No support for identifying and document synonyms for terms.	Researcher, Research Group Leader	4
4.3	4	Missing support to collaborate to create links and mutually agree on the created relationships between terms.	Researcher, Research Group Leader	4
5.1	5	The bigger and more locally distributed the research group is, the less effective is managing relevant terms.	Researcher, Research Group Leader	3

2. Stigmergic Coordination Model



3. To-Be Workflow Model

Planned Business Process with CIS:



Improvement-Limitation Mapping Table:

ID	A#	Improve provided by the CIS	Issue (with associated ID)	Agent	Actor Role	System
2.1	2	All actors have access to one shared environment with information about relevant terms in the research context.	ID 1.1: Each user organizes locally his/her private collection of terms and definitions.	Actor		
2.2	2	Actors create new terms and thereby make them visible to other collaborators by sharing potential interesting terms to the system.	ID 1.2: Insufficient communication and coordination lead to no awareness of already identified terms and thus to duplication of effort.	Actor		
3.1	3	Actors add definitions for each term in a shared space in order to discuss their relevance in the research context with other collaborators.	ID 3.1: Collection of appropriate definitions for each term and integration of them in a common database.	Actor		
3.2	3	All definitions are captured with a required reference information.	ID 3.4: Definitions are distributed in references across multiple digital libraries/platforms. In the definition it is important to refer to this reference location in order to look quickly details up and use the reference in your publications.	Actor		
4.1	4	By browsing through identified terms relations between terms can be easily identified and added such as synonyms or related terms.	ID 4.2: No support for identifying and document synonyms for terms.	Actor		
4.2	4	Each actor can create and modify term links on their own. Thus, the bottleneck of an actor's limited resources to coordinate term relation building efforts are reduced.	ID 4.3: Missing support to collaborate to create links and mutually agree on the created relationships between terms.	Actor		
4.3	4	By discussing terms and updating their relationships, actors can mutually agree on created links.	ID 4.1: No support for discussion and agreement mechanisms of term relations.	Actor		
5.1	5	All terms are collected in one shared space and stored in a pre-defined, structured manner to	ID 3.3: Capturing of distributed contributions in a structured manner is required to support entry	Actor		

		support entry completeness and a common format of data. Actors can always update term details on their own.	completeness and a common format of data representation.			
6.1	6	The CIS regularly notifies actors about recent activities by other collaborators to support awareness and motivate them for contributing new content.	ID 1.2: Insufficient communication and coordination lead to no awareness of already identified terms and thus to duplication of effort.			CIS
7.1	7	A validator is allowed to review and set the quality status of a term and its definitions to make other collaborators aware about required rework.	ID 3.5: Quality of terms and definitions need to be validated before using in research context.	Actor	Validator	
8.1	8	The rating mechanism allows actors to review and mark definitions and terms as more or less relevant with respect to research topic.	ID 2.1: Each user deems a different set of terms relevant which requires a coordinated process to negotiate a potential relevant term set. ID 3.2: For a single term multiple definitions can exist. Thus users need to agree to relevant definition(s) with respect to research topic.	Actor		
8.2	8	Terms / definitions rated as very relevant are put to the top of the list so that every actor is immediately aware of the current quality status and negotiated importance.	ID 2.2: Direct negotiations of relevant terms by users lead to a time consuming and effort intensive process.	Actor		
9.1	9	The CIS regularly notifies actors about recommended terms and definitions that could be interesting for an individual actor.	ID 1.3: Lack of discoverability of existing terms to use and tools to find terms of interest for a given context is challenging.			CIS
10.1	10	A result list of collected and defined terms is created implicitly and reflects always the current state of the glossary's content. In this way dispersed versions of a shared glossary is avoided and can be accessed across the world via Internet.	ID 5.1: The bigger and more locally distributed the research group is, the less effective is managing relevant terms.	Actor		

In the CIS Actors cover both Researchers and Research Group Leaders.

CI Technical Realization Viewpoint

1. Artifact Definition Model

CI Artifact:

Term

Artifact Links:

- Tag
- Synonym relationship
- Related-Term relationship

Artifact Content:

Attribute Name	Attribute Type	Attribute Description
term name	string	unique name
term quality status	["Not Validated", "Needs Validation", "Needs Rework", "Validated"]	pre-defined life-cycle stage that describes the current quality status of this term
term author	string	name of the actor who created the term
term creation timestamp	timestamp	date and time when the term was created in the system
term editor	string	name of the actor who last modified the term
term modification timestamp	timestamp	date and time when the term was last modified in the system
term validator	string	name of the actor who last validated the term

term validation timestamp	timestamp	date and time when the term was last validated
notes	text	notes added to the term
definitions	set<definition>	set of definitions that each defines the term with respect to a research context
tags	set<string>	tagging enables actors to categorize terms using their own keywords
synonyms	set<term>	set of terms that are synonyms of this term
related terms	set<term>	set of terms that are related to this term in some context
revisions	set<term>	set of former versions of this term's content
discussion	set<comment>	discussion about the term
rating	integer	rating to mark the term's relevance with respect to the research topic

For each definition:

Attribute Name	Attribute Type	Attribute Description
definition text	text	a definition of the associated term
definition quality status	["Not Validated", "Needs Validation", "Needs Rework", "Validated"]	pre-defined life-cycle stage that describes the current quality status of this definition
definition author	string	name of the actor who added the definition to the term
definition creation timestamp	timestamp	date and time when the definition was added to the term
definition editor	string	name of the actor who last modified the definition
definition modification timestamp	timestamp	date and time when the definition was last modified
definition validator	string	name of the actor who last validated the definition

definition validation timestamp	timestamp	date and time when the definition was last validated
reference	reference metadata	reference to an external source where to find this definition
rating	integer	rating to mark the definition's relevance in comparison to other added term definitions with with respect to the research topic

For each reference:

Attribute Name	Attribute Type	Attribute Description
description	string	information about the literature reference like author, publication date, book, etc.
reference url	string	url where to find the reference
reference url description	string	information about the url

Operation Specifications:

- CREATE
- READ
- UPDATE
- DELETE
- VALIDATE
- COMMENT
- RATE
- LINK

2. Aggregation Model

Actors:

Agent	Actor Role	Actor Role Description
Actor	Validator	A validator is allowed to review and set the quality status of a term and its definitions to make other collaborators aware about required rework and validated terms/definitions.

Actor Record (AR):

Attribute Name	Attribute Type	Attribute Description
actor	string	actor who is the owner of this actor record
actor activity	string	activity performed by the actor and logged by the actor record
term	string	term on which the actor activity was performed
activity captured timestamp	timestamp	date and time when the actor activity was performed
ip address	string	ip address used by the actor to perform the activity
user agent	string	user agent used by the actor to perform the activity

List of Actor Activities and Artifact Input/Output Flows:

Client	Actor Role	Type	Activity	Activity Description	Artifact Input	Artifact Output	AR Log
Browser Client		W	Create term	Add a new term with one definition.	*) name (string) *) quality status (pre-defined string) *) notes (text) *) definition (definition description: text, definition quality status: string, reference information: string, reference url: string, reference url description: string, definition tags: string) *) list of tags (string) *) list of synonyms (string) *) list of related terms (string)		YES
Browser Client		W	Add definition	Add a new definition to a term.	*) definition description (text) *) quality status (pre-defined string) *) reference information (string) *) reference url (string) *) reference url description (string) *) list of tags (string)		YES
Browser Client		W	Modify term	Modify metadata of an existing term including updating term links.	*) name (string) *) quality status (pre-defined string) *) notes (text) *) list of tags (string) *) list of synonyms (string) *) list of related terms (string) *) revision comment (string)		YES
Browser Client		W	Modify definition	Modify metadata of an existing definition.	*) definition description (text) *) quality status (pre-defined string) *) reference information (string) *) reference url (string) *) reference url description (string)		YES

					*) list of tags (string) *) revision comment (string)	
Browser Client	Validator	W	Validate term	Validate quality of term by updating the quality status.	*) quality status („Validated“)	YES
Browser Client	Validator	W	Validate definition	Validate quality of definition by updating the quality status.	*) quality status („Validated“)	YES
Browser Client		R	Show term	Access a specific term and show its details.	*) name (string) *) quality status (pre-defined string) *) notes (text) *) average rating (integer) *) list of tags (string) *) list of synonyms (string) *) list of related terms (string) *) latest revision editor (string) *) last_modified_at (timestamp) *) list of definitions (for each: definition description: text, definition quality status: string, reference information: string, reference url: string, reference url description: string, definition tags: string, last definition editor: string, last_modified_at: timestamp, average definition rating: integer)	YES
Browser Client		R	Show term revisions	Access a specific term and show its revisions.	list of term revisions, for each revision: *) revision number (integer) *) revision editor (string) *) revision comment (string)	

						*) revision_created_at (timestamp)	
Browser Client		R	Show term discussion	Access a specific term and show its discussion.		list of term comments, for each comment: *) comment author (string) *) comment text (text) *) comment_created_at (timestamp)	
Browser Client		R	Overview all terms	Access and show a list of all terms.		list of terms, for each term: *) term name (string)	
Browser Client		R	Overview of all tags	Access and show a list of all tags assigned to terms or definitions.		list of all tags, for each tag: *) tag name (string)	
Browser Client		W	Delete term	Delete an existing term so that it is not available anymore.			YES
Browser Client		W	Delete definition	Delete an existing definition so that it is not available anymore.			YES
Browser Client		W	Rate term	Add a rating to the term to assess its relevance / usefulness.	*) rating (integer: 1-5)		YES
Browser		W	Rate	Add a rating to	*) rating (integer: 1-5)		YES

Client			definition	the definition to assess its relevance / usefulness.			
Browser Client		R	Show details of a tag	Access a specific tag and show a list of terms and definitions that are linked via the tag.		*) tag name (string) *) list of assigned terms with their name and definitions with their descriptions (text)	
Browser Client		R	Show statistics	Access and show detailed statistics about weakly/monthly activities and active users.		*) List of interesting statistics (monthly/weekly) about terms, definitions, actors	
Browser Client		R	Show terms that need rework	Access and show list of terms and definitions that have quality status „Need Rework“		*) list of terms with their name and definitions with their descriptions with quality status = „Need Rework“ (text)	
Browser Client		W	Add comment	Add a new comment to the discussion of a term.	*) comment text (text)		YES

Activity Types: Write Activity (W), Read Activity (R)

3. Dissemination Model

List of Dissemination Rules (push-based):

ID	Trigger	Schedule	Analyzer	Data Source / Filtered Output	Channel	Purpose	Recipient
1	Digest Notification	once a week	<ul style="list-style-type: none"> *) Recommender System *) Data Mining Component *) Notification Builder 	Data Source: *) Actor Records *) Artifact Contents Filtered Output: *) Recent Activities (for each activity: actor name, timestamp, term / definition, activity type)	Email	<ul style="list-style-type: none"> *) Support awareness about news & updates *) Increase engagement level of actors *) Stimulate actors to improve quality of existing terms / definitions 	All actors
2	Ranking Notification	once a week	<ul style="list-style-type: none"> *) Data Mining Component *) Notification Builder 	Data Source: *) Actor Records Filtered Output: *) Leaderboard of the most active actors *) List of all actors with their number of contributions	Email	<ul style="list-style-type: none"> *) Increase the motivation of all actors to contribute *) Support awareness & reputation 	All actors

CI Operation Viewpoint

1. Initial Content Acquisition Model

Initial Data:

Artifact Content	Transformation	External Source	Initial Data
*) Term metadata *) Definition metadata *) Reference metadata	1) Export of already collected list of terms from the spreadsheet. 2) Import data set using a function from the glossary's underlying database system which stores properly the initial data set in the database.s	Google Shared Spreadsheet	List of already collected terms and definitions

Initial Actor Profile

- Expertise
 - Pre-doc, post-doc or senior researcher working in the context of a specific research topic.
- Recruitment
 - From research lab staff and fellow researchers.

2. CI Analytics Model

List of Metrics:

Probe	Time for Measurement	System Component	Property	Metric
Tracker probe	At each load of a term's detail view.	Controller component	Actor Activity	Term Views by individual actor
Tracker probe	After a new term was created.	Controller component	Actor Activity	Term Creation by individual actor
Tracker probe	After a term content was modified.	Controller component	Actor Activity	Term Modifications by individual actor
Tracker probe	After a new definition was added to a term.	Controller component	Actor Activity	Definition Additions by individual actor
Tracker probe	After a definition was modified.	Controller component	Actor Activity	Definition Modificatons by individual actor
Tracker probe	After a term was validated.	Controller component	Actor Activity	Term Validations by individual actor
Tracker probe	After a definition was validated.	Controller component	Actor Activity	Definition Validations by individual actor
Notification probe	At each load of a notification email's content.	Controller component	Actor Activity	Notification Views by individual actor
Notification probe	At each click on a notification email's content that redirects actor to content in the system.	Controller component	Actor Activity	Notification Content Clicks by individual actor
Notification probe	After each notification dispatch to an individual actor.	Mailer component	System Activity	Notification Dispatches to individual actor