Internal messaging within XIdea system

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Abstract

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XIdea offers unique platform for creating and shearing similar interests and ideas among the users. XIdea is a novel communication platform for facilitating a nearly leaderless form of group collaboration and coordination. The communication platform can be used in purpose of socializing users. The purpose of user internal messaging is to become crucial platform for shearing ideas and helping in making decision during a topic event within XIdea system. It can be used by both formal organizations and informal populations, regardless of the number of users, the subject matter on diversity of opinions.

Objective of this thesis is to enhance a user communication within XIdea system by implementing messaging processes among the users of the system. The project focus is to deliver user messaging processes which will make user collaboration and interaction much easier for two individual users within the system.

This is a project oriented thesis. The process includes systematic reviews, design definitions, implementation and testing.. Therefore the implementation of the project is carried out by waterfall method thorough stages of analyze, design, implementation, testing and maintaining.

The result of these studies is XIdea internal messaging process documentation, implemented messaging processes within the system: private messaging, summary messaging, writing feedback, receiving and deleting messages from the system. External messaging from XIdea system to external user's e-mail account can be consider as one of most important issue for future improvements of communication for users within XIdea system.

Key words
Internal messaging, User communication, Web publishing system, Anonymous systems

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Vocabulary

Actor	An actor specifies a role played by a user or any other system that interacts with the subject
Attributes	An attribute is a specification that defines a property of an object
Brainstorming	Technique to generate large number of ideas for the solutions of the problem
Class	Objects that have same attributes and respond to the same messages can be grouped together to form of class
In/Out	Method to express and exchange opinions between users in way of negative and positive form.
Java	Java is programming language for developing software applications.
Learning Café	Technique to generate large number of ideas for the solutions of the problem
MySQL	MySQL is a relational database management system (RDBMS) that runs as a server providing multi-user access to a number of databases.
Object	An object is a uniquely identifiable entity that contains both the attributes that describe the state of a 'real world's object and action that are associated with it.
Owner	Owner is user who opened a topic event; also owner refers to user who

	provides directives, comments and explanations.
System documentation	Written document for a system which explains why, how and when a system is implemented.
User	A user is a person who uses a computer or Internet service.
Waterfall	The waterfall model is a sequential software development process, in which progress is seen as flowing steadily downwards (like a waterfall).
Web publishing system	Web application that is accessed via a web browser.

Abbreviations

BITE	Business Information Technology
CSS	Cascading Style Sheets
DB	Database
GUI	Graphic user interface
HH UAS	Haaga-Helia University of Applied Sciences
HTML	Hyper Text Markup Language
ICT	Information and communication technology
IT	Information Technology
JSP	JavaServer page
LIBA	International Business
MuBBA	Multilingual Business Bachelor Administrator
MVC	Module-View-Controller method
R&D	Research and development
RDBMS	Relational Database Management System
UI	User interface
UID	User identifier; user ID
UML	Unified Modular Language
XHTML	Extensible Hypertext Markup Language

1 Introduction

Haaga-Helia University of Applied Science (HH UAS) in Finland provides education in various professional fields such as education in Information Technology, International Businesses, Tourism, Hospitality and Sports (http://www.haaga-helia.fi/en).
During education at HH UAS student gets opportunities for personal development, creating personal ideas, exchanging experience in multicultural society and enjoying diversity of people around.

The objective of Haaga-Helia UAS is to develop students in professional way which will able them to handle future challenges at their work environment.

During summer – fall 2009 at H2UbiOffice the system for human collaboration and interaction was developed. The system is called XIdea. The aim of the implementing this kind of the system is to improve education and work flow at Haaga-Helia University of Applied Sciences. During building the system needs for improving user communication within the system were unavoidable part of XIdea system development. Based on the version 1 of the system definition XIdea system does not cover user messaging processes between users, moreover system is anonymous and the system does not publish any users' data, unless users of the system will to publish them by them self. However, implementing user messaging process within anonymous system is challenging part according to the system definition to keep the system anonymous. This thesis project will present definition and implementation of the user communication within anonymous XIdea system and its significant results.

In following section I will present more understandable picture of XIdea system. It will include what is XIdea system and what services system offers to its users. Also it will include aim of the system and what are system objectives. Approaching idea of the system and for better understanding what XIdea system is and what it does. I will use an example followed with clear descriptions. During Example 1 I will touch a purpose of this thesis work and introduce needs for internal messaging within XIdea system as well where those needs might occur during user activities within XIdea system.

Further during my thesis presentation I will present how I will develop internal messaging processes and what they are. I will present which tools and methods I will use for developing internal messaging within the system. I will present which parts of the system will be changed

where new implementation will be embedded into the existing system, also changes in the system database (DB). On the end I will go through significant results of internal messaging implementation.

1.1   What is XIdea?

XIdea offers unique platform for creating and shearing similar interests and ideas among the users. XIdea is a novel communication platform for facilitating a nearly leaderless form of group collaboration and coordination. The communication platform can be used in purpose of socializing users. The purpose of user communication in XIdea system is to become crucial platform for shearing ideas and helping in making decision. It can be used by both formal organizations and informal populations, regardless of the number of users, the subject matter or diversity of opinions. XIdea system is meant to be used by personal of Haaga-Helia University of Applied Science teachers, students and external partners such as companies, individual sponsors and partners.

To use XIdea system as a tool for gathering and sharing ideas, a user should first register into the system according to start enjoying in XIdea activities. (Jaman & Ilyukhina, 2009, 3.)

When user has idea, problem and seeking for a solution of a problem user is able to publish problem under XIdea system for further discussion. User can chooses one of offered techniques for gathering solutions, opinions, ideas and make final conclusion for a problem. In that way XIdea system provides its users with couple of techniques such as Brainstorming, Learning Café and In/Out technique (Figure 1-1). (Jaman & Ilyukhina, 2009, 4.)
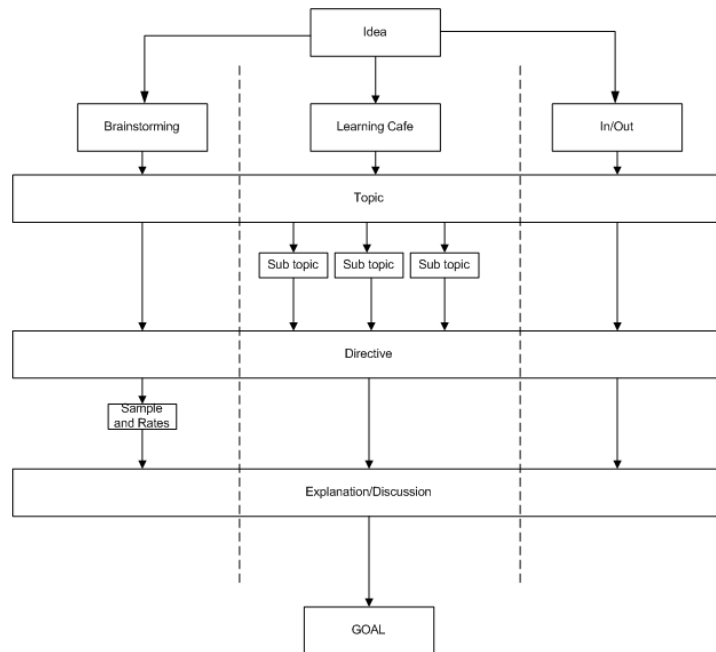
Figure 1-1: XIdea system level diagram

A topic is statement which presents area of interest also known as subject presented as short text sentences. In XIdea system a topic is a subject of further users' discussion. Topics are stored into XIdea system database. Each topic is opened under certain technique which applies different methods for gathering information during a topic event. Each user in the system can be participant of any topic but only users participants of a topic will be able to review results of the topic discussion. A user who open a topic can overview all directives and comments posts given by other users for that topic. A user owner of a topic can combine synonymous directive but cannot edit them according to change content of directives. (Jaman & Ilyukhina, 2009, 4.)

A sub topic is area of interest under particular topic, it is a subjects. They are approaching us clearer picture of further discussion on particular area of interest. Sub topics are considered only if main topic is opened under Learning Café technique and then main problem is divided into sub topics (at least two and no more than four sub topics need to be opened under Learning Café technique). In this way sub topics present tables such we have during executing Learning Café technique in personal with colleagues at our work environment. User owner of a topic opens sub topics; user participant of the topic cannot open sub topic under a topic where they are participants. Also, user participant does not need to participate in all sub topics of a topic. (Jaman & Ilyukhina, 2009, 4.)

Directives are suggestions, opinions, and relatives for a published topic. Each user can provide directives for any topic published under XIdea system. By providing directives for a topic a user becomes automatically participant of topic where directives are provided. Directives are saved and kept in the system database as long as topic exists in the system database. During providing directives for a topic depending on a technique under which some topic is opened a user is able to see only its own directives (Brainstorming technique) or all directives (Learning Café and In/Out techniques). Also user can add more directives at any time while topic is available for discussion. (Jaman & Ilyukhina, 2009, 4.)

Samples are group of two or more directives. Samples are group of directive ready for rating by a user participant under topic which applies the Brainstorming technique. Sample presents selected amount of directives which will be given to the next user to rate them. Sample is generated by the system and rated directives are stored and kept into the system database as long as the topic exists in the system. Rated directive are visible for all users participants of topic where directives are posted. (Jaman & Ilyukhina, 2009, 4.)

A comment is generally a verbal or written remark often related to an added piece of information, or an observation or statement. In XIdea comment presents a written remark related to a directive. An explanation is a set of statements constructed to describe a set of facts which clarifies the causes, context, and consequences of those facts. In XIdea explanations are related to directives and comments. In XIdea system comments and explanation are on the same level of user participation, in case that user provides comment or explanation related to a directive, comment or explanation user need to be participant of a topic where those comments and explanations are. Writing comment or explanation is allowed for all user participants of a topic while a topic is open. When a topic is closed users participants of that topic are able only to have overview of a topic results but not to have any further discussion under that same topic event. Explanations and comments are in direct relation with directives; a directive is on the higher level than comments and explanations (Figure 1-1). According that by deleting directive from the system explanations and comments provided for that directive would be deleted from the system as well. Removing an explanation or comment from the system database does not affect that directive post.

A goal or objective is a projected state of affairs that a person plans or intends to achieve (Wikipedia, Goal. 2010.). In XIdea a goal of some topic is presented through description of a topic User can get to know a topic goal by reading its description. User who opens a topic is re-

sponsible to presents what is goal that would like to achieve on the end of a topic event. Also, the same user who opens a topic is responsible for validation and confirmation of achieved goal or goals during a topic event discussion and to post them to user participants of a topic event.

After some topic is closed that topic is available only for results overview and not for any further discussion. A topic with the same name even same aim can be open as many times as needed or wished.

1.2   Why user messaging in XIdea?

When virtual environment is used for sharing and gathering ideas, as well to discuss what applies directly to them, they are streaming to establish direct connection with relatives. Virtual environments are meant to bring people with the same interest together who are not able for interacting personally about a subject. This solution makes user communication much easier.

Where, when and how a user of XIdea system has needs for messaging to another user of XIdea system will be presented in Example 1. I will make example which will describe user's participation for an open topic event. During the next example I will touch why internal user messaging processes within XIdea system are unavoidable part of the system improvements.

Example 1:

Let's say that User1 would like to enhance student education in Haaga-Helia University of Applied Sciences and would like to gather as much as possible opinions, suggestions and ideas from others users then the user User1 publish idea under XIdea system choosing most suitable technique for the topic according the own opinion.

First User1 will choose a technique which would like to use for gathering information. In this example User1 choose the Learning Café technique. New topic is open by giving a topic name "Haaga-Helia Education" followed with topic description (what is Haaga-Helia University of Applied Sciences and what way of education provides). Part of opening a topic, under Learning Café technique is naming and providing definitions for sub topics. In this case sub topics are 1, 2, 3, 4: Business Information Technology (BITE), International Business (LIBA), Multilingual Management (MuBBA) and Hotel, Restaurant and Tourism Management (Tourism)

(Figure: 1-3). (Haaga-Helia University of Applied Science, 2010.)
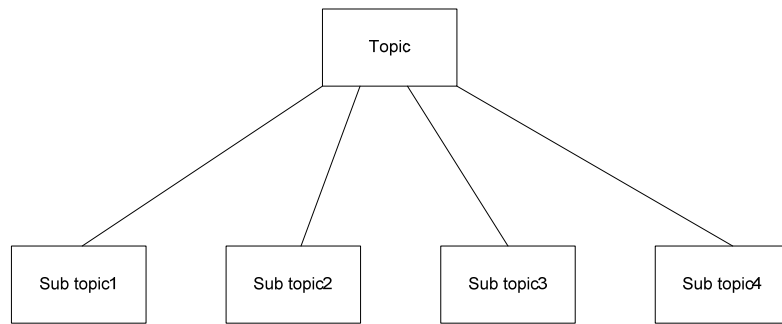
Figure 1-2: Relation diagram between topic and sub topics

Figure 1-2 presents relation between topic and subtopics after publishing them under XIdea system. In practice User1 has overview of the topic as shown on the Figure 1-3, the overview is the same for user owner who opened the topic as well as for users' participants of the topic event.

Figure 1-3: Example of Topic Overview page in XIdea system

Sub topics are there to help user owner of a topic to define a topic in better way or to divide main problem issue in more understandable way into parts which help in classification for gathered information. Because each sub topic behaves as a topic under XIdea system, directives of sub topics belong to a topic (main topic) too. From Figure 1-1 we can see dependency directive on a topic as well as from Figure 1-4 and Figure 1-5.

Figure 1-4 and Figure 1-5 shown us where a user participant will get first point for messaging

to another user. Before I proceed worth is to mention again that every topic has user owner of a topic who opens a topic and each directive has own user owner who provides directive post for a topic. Those users are known to directives and topics by unique user identifier (UID or user ID) for each user in XIdea system. The system knows owner of directives, topics and examples (comments) which users provide. All data is stored into the XIdea system database.
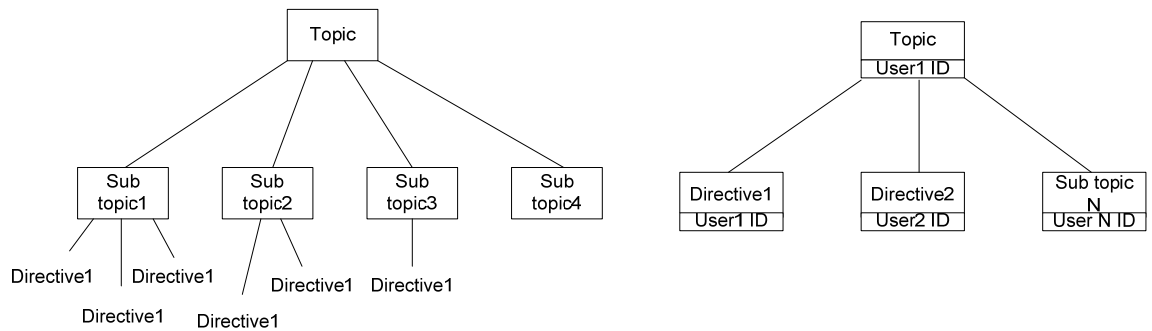
Figure 1-4: Relation diagram between a topic and directive

If User1 already has some opinions, suggestion, ideas or any other information that would like to share with other participant user is able to post them as directive, comment or explanation. Let's say that User1 provided few directives (directive1, directive2….etc) under different sub topics of the topic. In case of Brainstorming and In/Out techniques user will have no option for choosing a sub topic, and process of participation and providing directives for a topic which applies Brainstorming or In/Out technique is the same such publishing directive for sub topic under Learning Café technique. (Jaman & Ilyukhina, 2009. 4).

Figure 1-4 for a user of XIdea system looks like in Figure 1-5 which presents user interface (UI, GUI) for directive overview page.

Figure 1-5: Overview page of topic directives within XIdea system

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From Figure 1-5 we can see that all directives under a topic are public for all user participants of that topic. User can more express himself and lead discussion under each single directive as well. That section is called explanation or comment section. Under comment section users are able to discuss about each directive (Figure 1-6) and as well it allows users to have deeper discussion about a topic and exploring a problem more deeply (Figure 1-7).
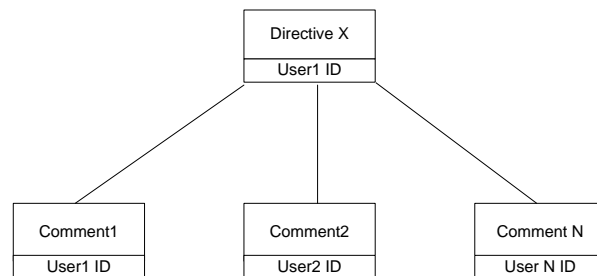
Figure 1-6: Relation diagram between directives and comments

As well as it is a case that are all directives are public for all users participants of a topic the same case is for comments (explanations) of directives and their discussion. In Figure1-7 is shown comments overview page which presents user discussion under a directive, it presents relations diagram from Figure 1-6 how looks like for a user of XIdea system.
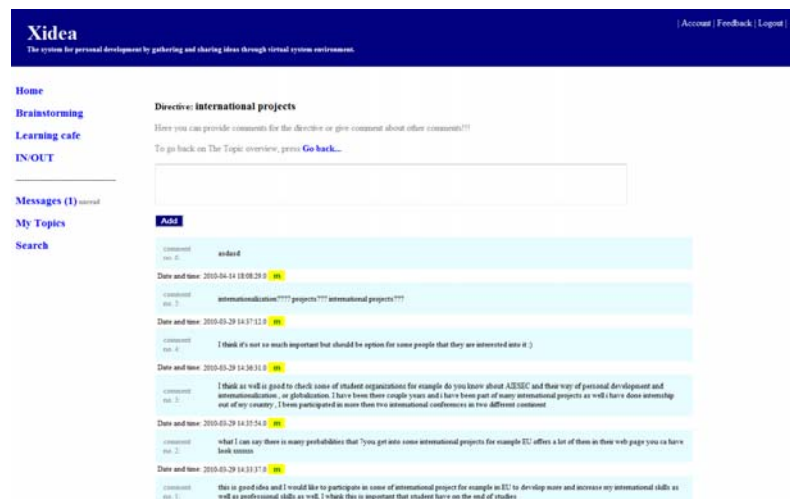
Figure 1-7: Overview page of comments and explanation within XIdea system

If would happen case that two user participants want to share particular information only between each other during their participation for a topic event they would need internal messaging process; process that will ensure that transferring information only among those two par-

ticular users. In that sense those two users should be able to interact using the messaging process of the system. They relation is shown in Figure 1-8 where users are directly connected to a topic and according to that a users of the same topic are connected indirectly.

Figure 1-8: Relation diagram User – Topic - User

Cases when would happens that a user writes a message to another user are different kind. Based on XIdea system definition that the system is an anonymous a reason for sending a message from one user to another is based on active participation, quality of discussion and problem process solving under a topic.

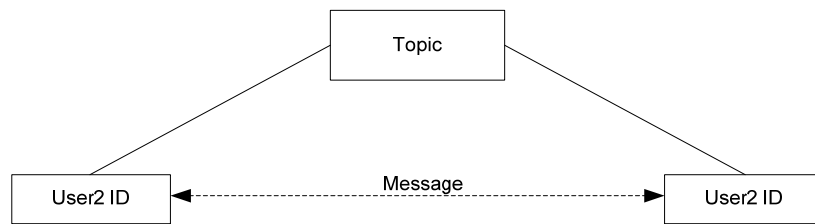Internal messaging process will make space for users to share personal information with another user such as ideas, opinions and any another wished information such can be contact details which can be use for further cooperation and user interaction. Messaging can happened and can be understand from this point of view as providing feedback for directive, topic or comment. Good example for that can be case when a topic is posted by a teacher or student. In that way teacher can provide for each student personal feedback based on directives or comment by student provided during a topic event.

Also important cases where messaging is needed is at the moment when user decides to close a topic for further participation. From user owner of a topic event is required to write summary of a topic event what will be closed. Summary of topic event presents significant results of topic event, achieved goals, resume of participation or just "thank you" note, however it depends of free will of user owner and a summary will be sent to all user participants as personal message from user owner.

What is needed and how internal messaging processes will be implemented within XIdea system will provide explanation and definitions in following sections.

2 Implementation of user messaging within XIdea system

In this section I will explain implementation of user communication in XIdea system. I will start by writing definition for implementation of messaging processes within XIdea. It will include descriptions of new implemented processes into XIdea system, as well as how they will be embedded into the existing system. Also, possible changes of existing processes and implementation code will be described here. Database model of XIdea system will be described, but during this thesis work I will consider only parts which will be necessary for this thesis project and its implementation. All implementations steps and changes made of existing code and new definitions will be record and add to the XIdea system documentation. On the end of this project as final confirmation of successful implementation and achieved goals during this project I will present significant results of thesis implementation. I will present definition of internal messaging implementation in following order:

- Entities; which entities I will operate with, what they are.
- Class diagram; it will show database solution as well as class relation among classes
- Life cycle of messaging in XIdea system; shows start and end of the messaging processes within XIdea system
- Processes of messaging in XIdea system; it will presents all messaging processes what as well as handling messages.

2.1 Entities

Entities are used in system developmental models that display communications and internal processing of, say, documents compared to order processing (Wikipedia, Entity. 2010). Here I will list and show all entities of XIdea system, latter I will be more focus to give more detailed explanation of entities which will be directly used during messaging within the system. Together, entity and class diagrams with their descriptions will give overall picture what classes will be included in user messaging processes, their responsibilities and relations.

Topic

1..* 1..*

User Directive
2..* 1..*
1..* 1 1
Participant Sample Techniques Sample Rate
Owner
0..*
Message

Private Summary Brainstorming In/Out
feedback Learning cafe
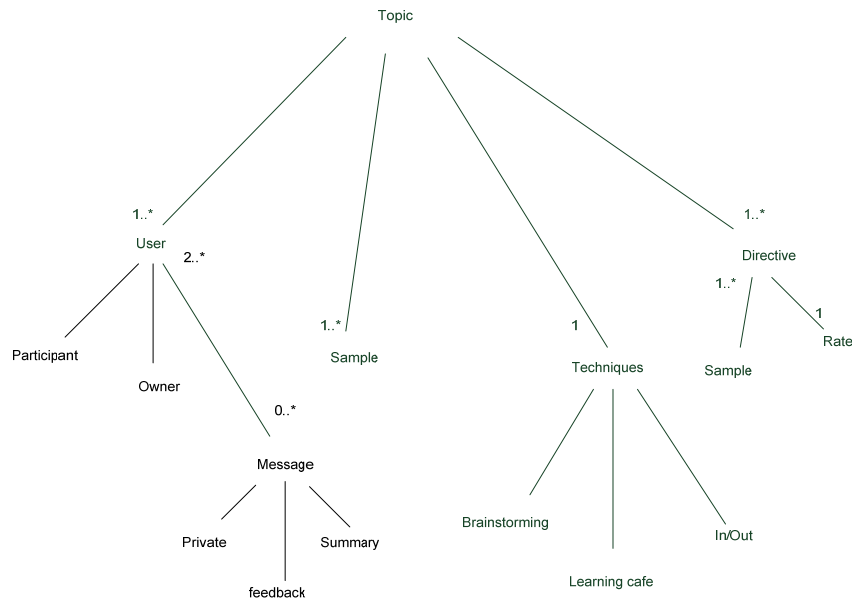
Figure 2-1: Entity diagram of XIdea system

In Figure 2-1 are presented entities of XIdea system, in following paragraph I will provide only description about entities which are applied into internal messaging processes and their relations which are shown in Figure 2-1. Entity's definition can be seen from Appendix 1.

Topic represents an event created by a user. It's done by using concrete technique, creating samples and submitting directives. Each topic has to have at least one directive. Topic event will be deleted from the system if during certain period of time it will stay inactive or the amount of users will be less than two. XIdea system provides the same rights for all users of the system which are divided in to employees and students. Each user may participate or administrate own topic event. Samples are created based on directives. Each directive in sample has to be rated. User has possibility to use different techniques, such as Brainstorming, Learning Cafe or In/Out. (Jaman & Ilyukhina, 2009, 13-15.)

Here I will go through more detailed description of entities, but only of those one that will be used for user messaging within the system. The target state model is made using an entity-structure diagram. New entity within XIdea system is "Message". The Message can be: "one-to-one" when a message is transferred only between two users within the system or message can be "one-to-many" when a topic event is closed and summary message is sent to all user participants of a topic event. Figure 2-2 presents the target state of the main terms of the XIdea messaging process and a definition of terms is shown in Table 2-1. In further, I will give a short description about entities from Figure 2-2 and their relations.
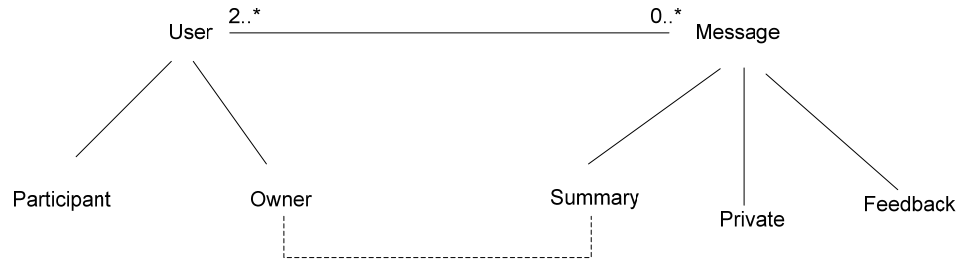
Figure 2-2: Entity relation between user and message

Table 2-1: Terms of entities

Term	Definition
User	Registered person in XIdea system (student, teacher, parents)
Participant	Participant is user who participates in a topic event.
Owner	Owner is user who opened a topic event and present administrator of own topic.
System administrator	XIdea system administrator is a person who maintain the XIdea system.
Message	Written text message in various amount of words.
Private	Private, it is a text message transferred from one user to another.
Summary	Summarize, it is text message, summarize of a topic event.
Feedback	It's the information about the initial event that is the basis for subsequent modification of the even

- User is registered person in XIdea system; each user can participate in any open topic event and enjoy its activities of sharing ideas through various techniques which XIdea offers to its user.
- Participant is a user who decides to participate for a topic event. Participants provide directives, comments and explanation during a topic event.
- Owner is a user who opening topic under XIdea system for seeking a solution for a problem. At same time owner is a participant as well even of its own topics within the system.

- System Administrator is a user of XIdea system with full privileges and rights within the system. The same user is responsible for maintaining the system. Analyzing and handling the system feedback received from users of the system.

- Message is written text which can be sent only between users participants under the same topic.

- Private message presents messaging process between two users of the same topic event.

- Summarize text message is sent by user administrator who is owner of a topic event. Summary is sent to all user participant of a topic event. Summarize message presents summarize of results achieved during a topic event.

- Feedback is written text message by any user to the system administrator of XIdea system. Feedback is treated by the system administrator as high priority of message according for the system improvements and development.

2.2 Class diagram

The class model shows static class objects in a system and the relationships between them. Two particularly important relationships are generalization (inheritance) and aggregation (whole-part). Each class object on the diagram often shows the class name, its attributes and operations. Details like data types for attributes and arguments for operations can also be shown on the diagram for some notations. Objects that have the same attributes and respond to the same message can be grouped together to form a class. (Connolly & Begg, 2005. 819-844)

Many class modeling notations are available but most developers have standardized on UML (Unified Modeling Language) as illustrated for XIdea system in Figure 2-3.
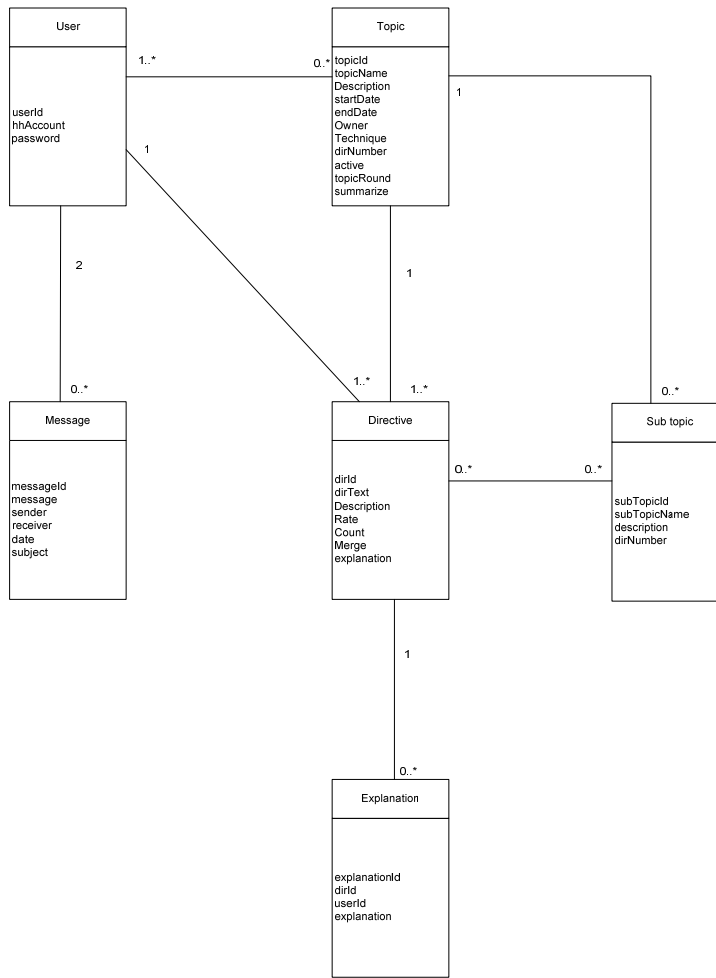
Figure 2-3: Class diagram of XIdea system

Figure 2-3 shows also database model solution for XIdea system. The part of class diagram which I will mostly consider for further implementation of internal user messaging within XIdea system are classes "User" and "Message" (Figure 2-4).
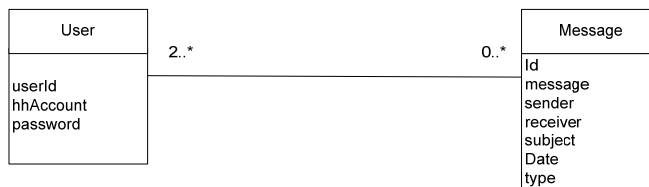
Figure 2-4: Class relation between user and message class

Class description of "User" and "Message" classes will be presented in Table 2-2 and Table 2-3. Entire class description with class diagram of XIdea system can be seen from Appendix 2.

Table 2-2: The description of the class <User>

Class name	**User**	
Definition	It is person who performs tasks and participates in XIdea system.	
Superclass	N/A	

Attributes	attribute name:Type	attribute description
	userId	unique user ID given by the system
	hh_number	unique HH system number used for valida-tion into the system.
	password	each user has unique password which pro-vide for its
		self during registration into the system.

Associations	
	-association with topic class; user can open or participate in as many topics as wants.
	-association with directives; user can provide at least one or many directives for a topic.
	-association with results; user can handle results of its own topic(s) which he opened.
	-association with password; one user-one password, provides during registration
	-association with message; user can have none or many messages

Volumes *(min, average, max and increase in a year)*	number of user cannot cross total number of HH personal, students and partners.

Table 2-3: The description of the class <Message>

Class name	**Message**
Definition	It is a written text which provides information
Superclass	N/A

Attributes	attribute name:Type	attribute description

	id	unique message ID given by the system
	message	written text as string
	sender	userId who is sending a message
	receiver	userId who is receiving a message
	subject	subject or name of a message
	date	date when message were sent
	status	status of a message is it read or not (1 and 0)

Associations	
	-association with user class; one message is owned by two users or more users; one sender and can be one or more receivers

Volumes *(min, average, max and increase in a year)*	
	number of messages are unlimited per user (receiver and sender).

2.3　Life cycle of messaging in XIdea system

The life cycle presents which stages and processes user does to send a message to another user. This life cycle shows steps from creating to delivering a message. Delivered message is presented as stored message into XIdea system database.
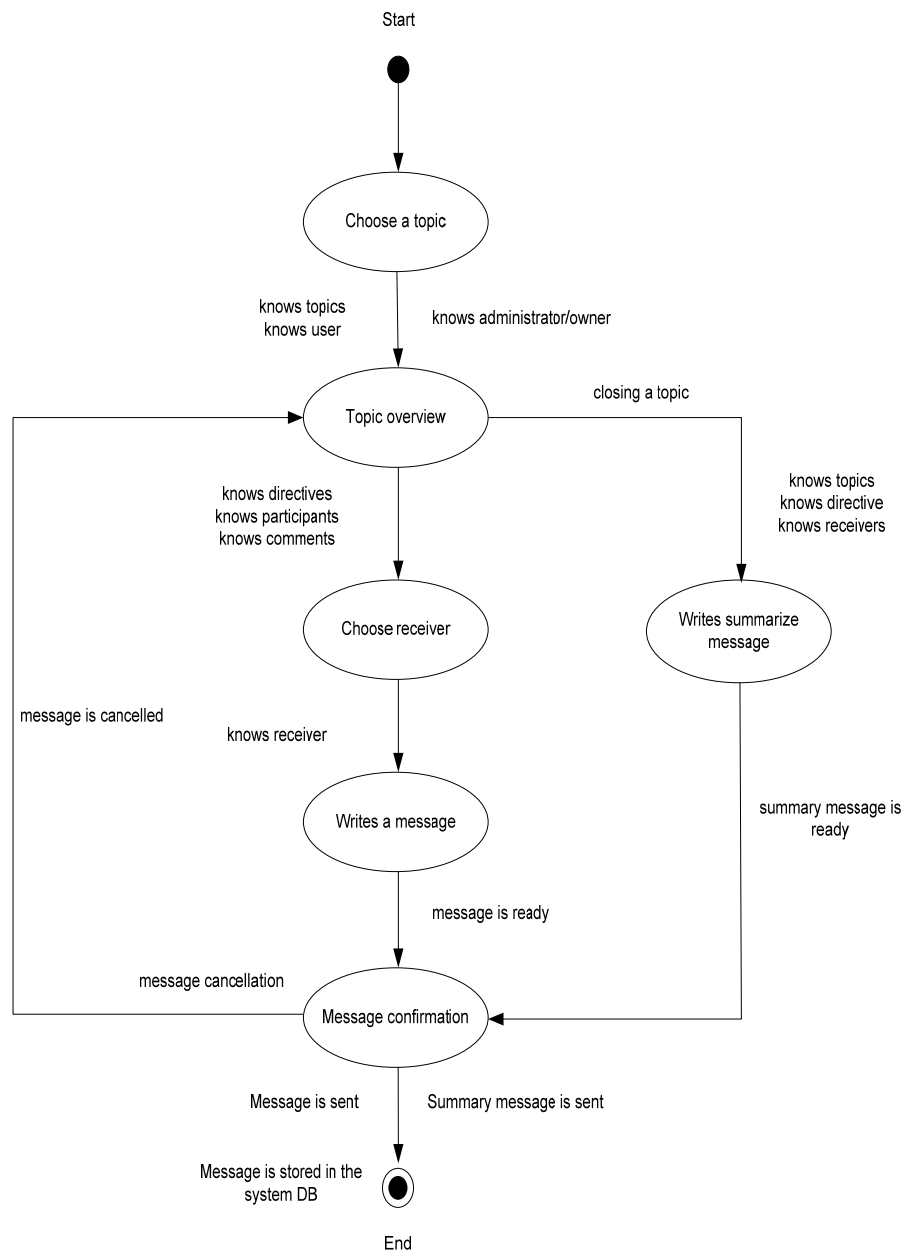

Figure 2-5: Life cycle diagram

2.4 Processes of messaging in XIdea system

The purpose of the business model of the application domain is to describe the target state of the main business processes. From each process there are descriptions of activities, data and material flows between activities, the data processing tasks and use of the target XIdea System. The target state business model of the application domain is described using business process diagrams. The business process diagrams and descriptions are:

- Level 0 presents process diagram "Target states of messaging processes within XIdea system" followed by own description.

- Level diagrams 1 presents each process as independent process what can happened and present messaging process within XIdea system those are:

  - Messaging Event; it will show messaging processes between two user participants of the same topic; how user send a message and which processes are applied in XIdea system; feedback message;

  - Summarize messaging Event; it will show messaging process when user decide to close a topic and writes summary of the topic, how will be summary message delivered to users participants of a topic.

  - Receiving message Event; will present processes how user receive message; what receiving message within XIdea system messaging process means.

  - Deleting message Event; will present processes when user decide to delete message from own message lists even received or sent messages.

Here I will present implementation of user messaging processes within XIdea system. Other processes such are opening a topic, closing a topic, topic participation and other processes could be found from XIdea system documentation. (Jaman & Ilyujkina, 2009)
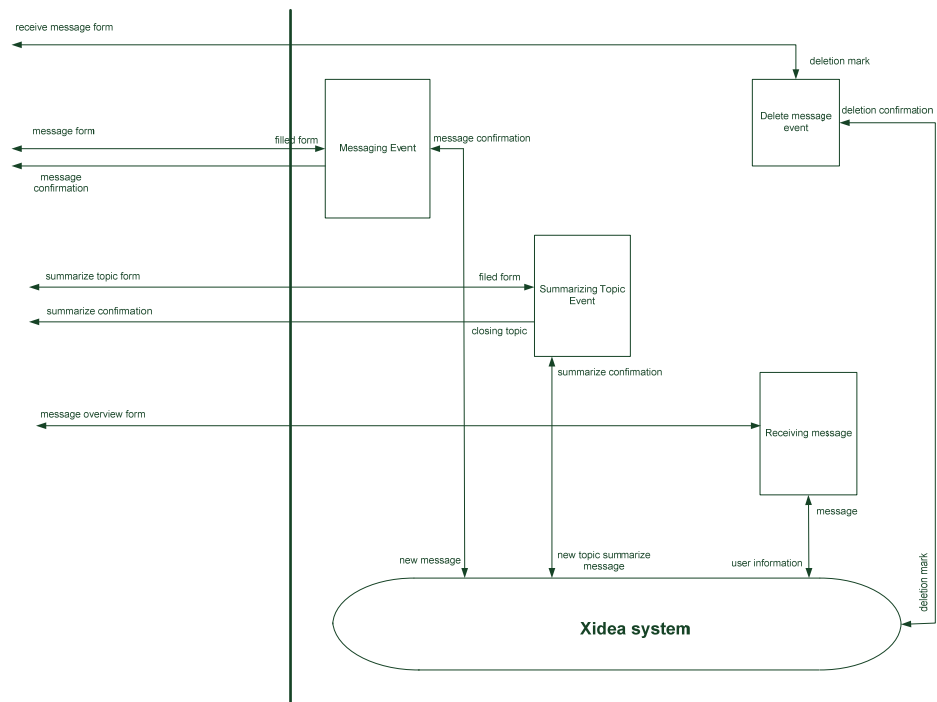
Figure 2-6: Target state of message processes within XIdea system

Table 2-4: The target state process description of <Message processes within XIdea system>

Process name
Message processes within XIdea system
Activators
Active participation of a topic event
Outcomes
Stored messages into XIdea system database.
Processes
1 .Messaging event When user wish to send a message to particular another user related to another user directive post or because of any other issue, user choose a message option for particular directive or comment under a topic event. By filling a message form for composing a message and after confirming a sending a message user is sent message to another user.
2. Summarizing topic event When a user decides to close a topic, the user needs to write summary of a topic event according to close a topic event. A summary is a text message which will be sent to all

users' participants of a topic event. A user who sent summary message will have summary message as sent message in own sent message list. User performs this task during a closing a topic event. User can write only one summarize message for one topic. Summary of the topic is appears in user received messages list (Inbox) for user participants of a topic event.

3. Receiving message

Sent message is stored in the database of XIdea system. User receiver receives a message after message is stored into the system database. Receiver view received messages from received messages list (Inbox page). Receiver does not know contact details of sender if sender does not write them in a content of sent message. Notification of received message appears in notification field of pages within XIdea system while a user is logged in the system.

4. Deleting message event

When user wants to delete message from one of message lists (received or sent) user can choose multiply option for deletion. User is able to delete message at any moment from own list of messages but in case to delete a message permanently from the system is done only in case if bout users (sender and receiver) delete a message from their lists (received or sent lists). There is no automatically deleting messages from the system by the system. One or more messages can be deleted at same time.

NOTE: Archiving messages is not part of this thesis work and it will not be implemented.

2.4.1 Process 1: Messaging event

The following process diagram shows the target state model of Messaging Event
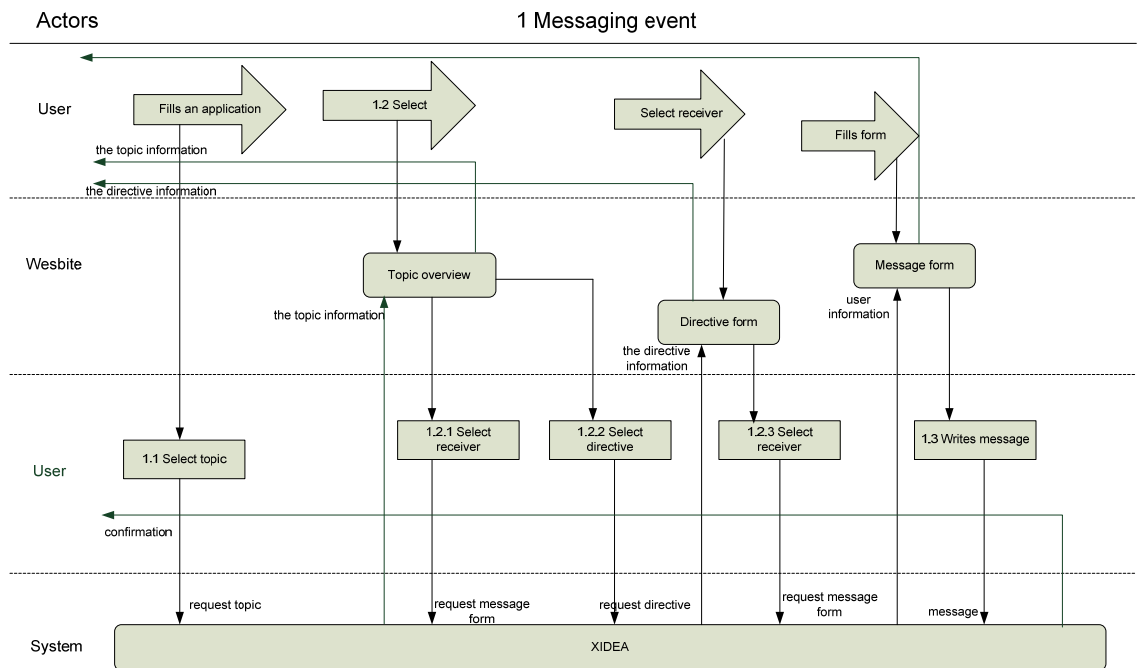
Figure 2-7: Target state of the messaging event

The process description of messaging processes:

Table 2-5: The target state process description of <Messaging Event>

Process name
Messaging Event
Activators
User participate in a topic event and wish to send a message
Outcomes
Stored message into XIdea system database
Processes
1.1 Select a topic After user log in XIdea system user is able to select a topic of own participation or to choose a new topic to start new participation. When user wish to send message to another user, user need to first select a topic from a topic list of participation or own topics list. 1.2.1 Select receiver User can select directive to get overview of directive comments after that step user will get overview of selected directive under which can select receiver for that directive, re-

ceiver is owner of directive or receiver can be selected by selecting comments for sending private message under selected directive.

1.2.2 Select directive

When user selects a topic, topic overview page is open and then user is able to select a directive of the topic. After selecting directive, directive overview page with comments will be shown to the user.

1.2.3 Select receiver

User can select a directive under selected topic to get directive overview with comments under which can select receiver for message. Selected receiver can be owner of directive or receiver can be selected by selecting comments of directive

1.3 Writing message

After user select receiver on one of ways described in previously steps user will get the message form user writes a message. User can write message and on the end can send the message by sending request to XIdea system to store message.

2.4.2 Process 2: Summarize messaging event

The following process diagram shows the target state model of Summarize messaging Event
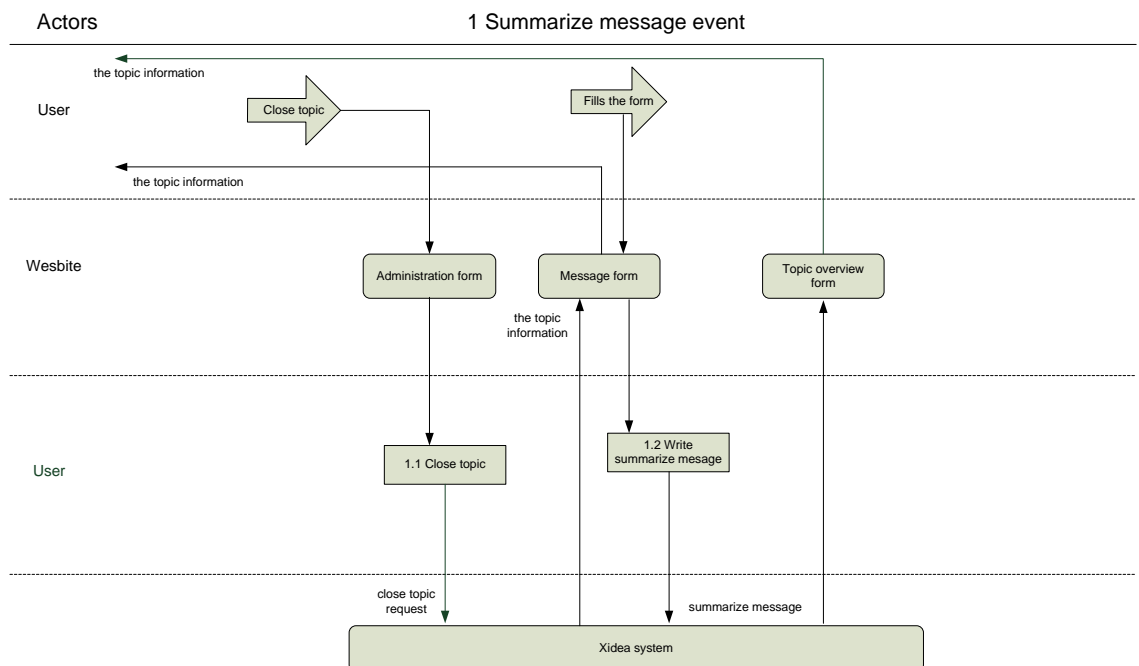
Figure 2-8: Target state of the summarize message event

The process description of summarize messaging processes:

Table 2-6: The target state process description of <Summarize message event>

Process name
Summarize message event
Activators
User is closing a topic event for further discussion
Outcomes
Stored messages into XIdea system database
Processes
1.1 Close topic When user decide to close own topic for further participation. By choosing closing a topic event option for XIdea system leads a user how to close a topic event by redirecting a user through few pages of closing a topic event. Closing topic event can be canceled before sending summarize message but not after summarize message is sent. 1.2 Write a summarize message When user choose option for closing a topic a user will be redirected to the message form for composing messages to write a summarize message for a topic event which wants to close. Writing summarize message is the same as writing private message only it will be sent to all user participants for a topic event that user is closing. User who is owner (administrator) of the topic event should write summarize of the topic event such as which ideas were useful, in which way this topic and user participants helped to solve or avoid certain problems or what valuable information were gathered during a topic event as well as thank note for participant. Also user who writes summarize message is not limited what to write in the summarize message and how long summarize message should be.

2.4.3   Process 3: Receiving message event

The following process diagram shows the target state model of Receiving message Event

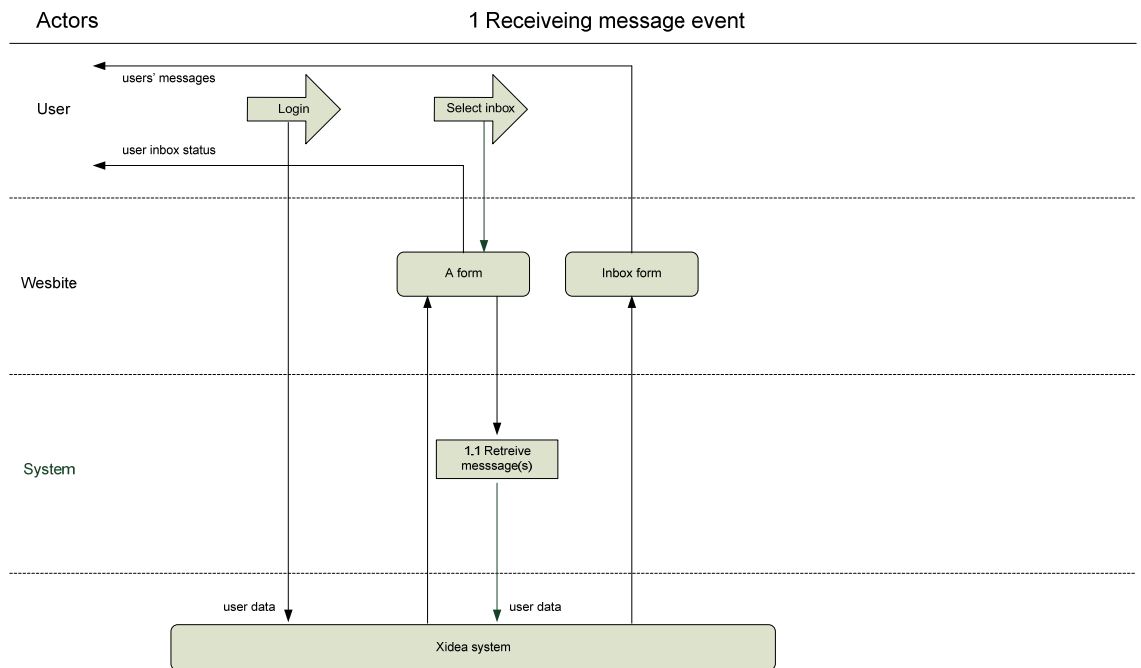**Figure 2-9: Target state of the receiving message event**

The process description of receiving processes:

Table 2-7: The target state process description of <Receiving message event>

Process name
Receiving message event
Activators
A user sent a message for another user
Outcomes
Notification of received message (stored message for a user into the system database) is shown for a user
Processes
1.1 Retrieving message Receiving message within XIdea system is reading messages from the system database for each user that is log in into XIdea system. Reading messages from XIdea system database happened at any moment that system page is refreshed. First reading messages from the system database for a user happening at moment when a user login to XIdea system. If user has any new messages, message notification of new messages will appears in notification area fir new messages in main menu of pages in XIdea system. Numeric notification will appears next to "Message" option in main menu. By selecting "Message" option

from user is able to check own messages. After reading messages message notification will change according to number of unread messages for a user.

2.4.4 Process 4: Deleting message event

The following process diagram shows the target state model of Deleting message Event
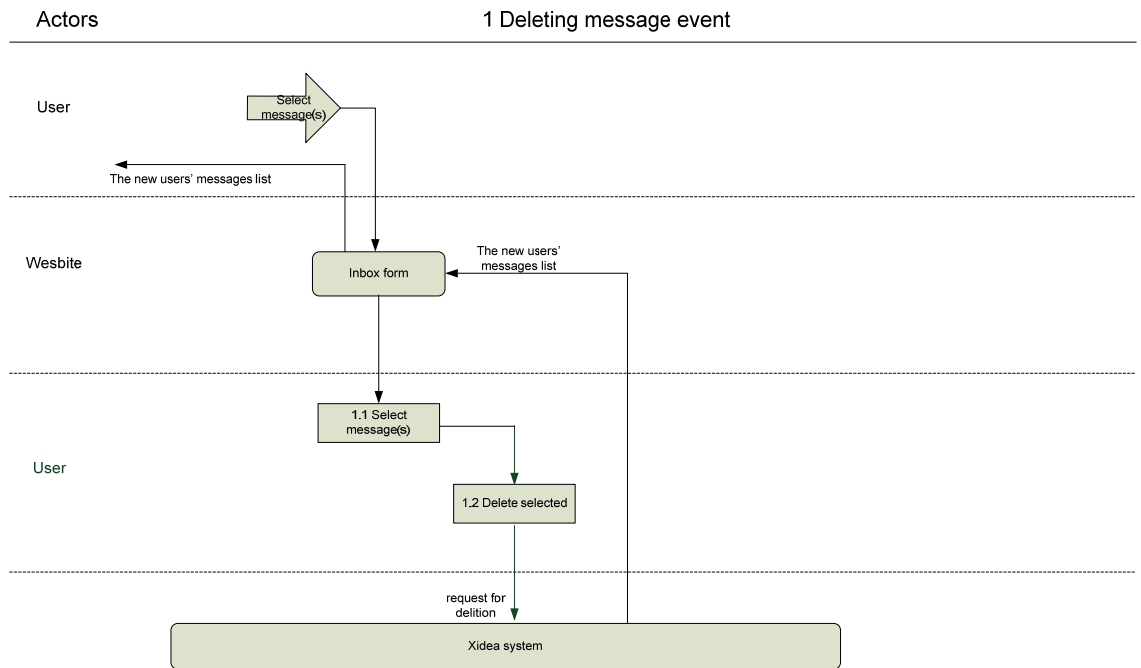
Figure 2-10: Target state of deleting message event

The process description of deleting a message processes:

Table 2-8: The target state process description of <Deleting Message Event>

Process name
Deleting Messages Event
Activators
User selects messages for deletion
Outcomes
Message is marked to be deleted permanently from the system database
Processes
1.1 Select message
User is able to delete own messages from own lists of messages (Inbox and Outbox). Deleting messages for users mean that they not appear anymore in their Inbox or Out-

box page. User does process of deleting messages as follows. A user needs to be under Inbox or Outbox page within the system which shows received and sent messages. From lists a user is able to select one or more messages for deletion. Each message has own check box as option to be mark for further tasks according to user's wishes, in this case for deletion. Selected message can be un selected at any moment before tasks for deletion proceed further.

1.2 Deleting message

After a user selects message(s) which would like to delete from the XIdea system confirmation of deletion process is done by selecting (clicking) an option "Delete" from messages lists on Inbox and Outbox page. After user delete a message from one list of messages either received or sent message, the message is still in the system database but is not anymore visible for the user who deleted the message. In case to delete one message permanently from the system database bout users (user who send message sender and user who receive message receiver need to delete the message from their list of messages in case of sender from sent messages list (Outbox) and in case of receiver from received message list (Inbox page).

NOTE: Implementation of message archive will not be implemented during this thesis work.

If further of this documentation I will present significant results of internal messaging implementation within XIdea system. More detailed specification and implementation such are collaboration diagrams can be seen from Appendix 3.

Collaboration diagram shows the dynamic interaction of the objects in a system. A distinguishing feature of a Collaboration diagram is that it shows the objects and their association with other objects in the system apart from how they interact with each other. The association between objects is not represented in a Sequence diagram. (http://www.developer.com) Each use case presented in collaboration diagram will be followed with own scenario (Appendix 3). Scenario is the collaboration template code that handles a particular incoming business object or set of business object. This business object can represent an event (from a connector) or an access call (from an access client). (IBM, 2010)

2.5   Significant results of internal messaging implementation

In this section I will present results of internal messaging process implementation. Also, I will show validation of the project and are pre defined goals and objectives matched? I used several users to test messaging process between within XIdea system. These users are already registered in XIdea system database. Users are a0700292, a0700331, a0700322, Administrator, hhpartner1, hhpartner. Example of test cases for internal messaging processes within XIeda system can be seen from Appendix 4. It shows basic test case from which can be seen that processes were successfully implemented into the system.

When users login into XIdea system, the system shows the main page of the system. Main page provides options for user activities within the system to perform diversity tasks. Main page consists options of task in which user can enjoy during activities within XIdea system. An option "Message" from main menu (Figure 2-11) allows users to handle and overview own messages either received or sent messages. The option is accessible to users from any page at the any time during their activities within XIdea system.

Figure 2-11: Main page of XIdea system

The "Message" option from main page of the system (Figure 2-11) shows us messages notification, at the same time it presents a link that user can access to its received messages (Inbox) and its sent messages (Outbox) as it is shown in figure 2-16. On the "Message" link will be displayed number of unread messages, we can see it from Figure 2-11 on the left side of the page.

When users wish to send messages among each another, they need to be under the same topic event and its discussion. Then a user participant will be able to select another user participant

of the same topic event for messaging. User sender has to choose a receiver based on a directive or comment post under the directive or comment (explanation) overview page within some topic event (Figure 2-12).
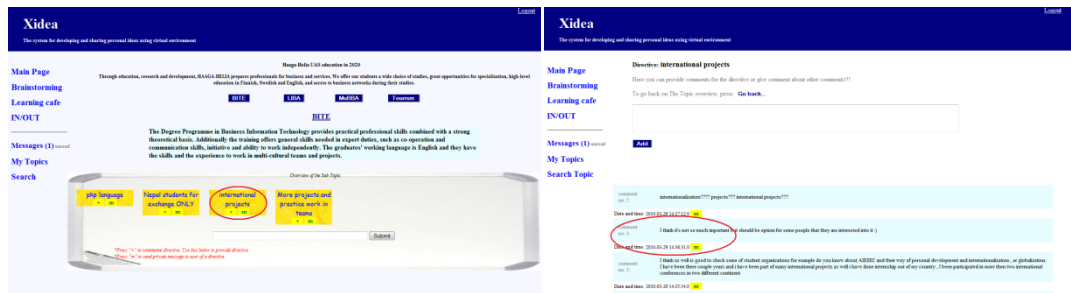

Figure 2-12: Overview page of topic directive (left) and directive comments (right)

On a directive post as well as on a comment post the "m" option (Figure 2-12, red mark) presents the messaging option for sending a message within XIdea system. When user select the "m" option from some directive or comment post the system set current user actor as sender of a message and user owner of a directive or comment post as receiver of that message. Then system opens the message form for composing a message (Figure 2-13). As well, the same message form is open on when a user wants to provide a feedback. Sending a feedback can be requested from any page in the system, and option for sending a feedback is in upper right corner on any page within the system (example, main page of XIdea system; Figure 2-11, red mark on the right side of the page). Only difference is that, a user receiver of feedback message is pre-defined into the system and receiver is system administrator. System administrator is also a user of the system. User sender of feedback is current user who writes feedback. Feedback is sent to the system administrator as text message described under 2.4.1 and 2.4.3 section. The system administrator receives a feedback as a message (Figure 2-17). Also, the system administrator is able to answer, replay or delete a feedback. There is no restriction in messaging among common users and the system administrator as well as among two common users of XIdea system.
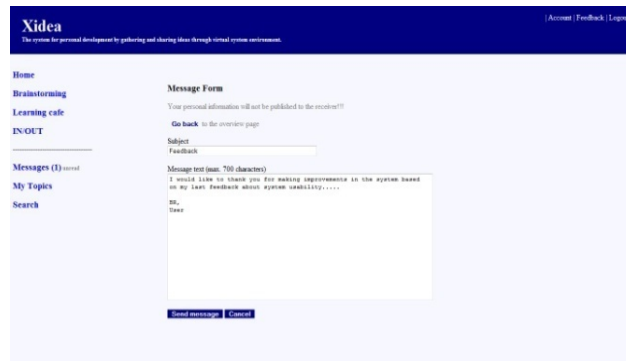
Figure 2-13: The Message form in XIdea system

Message from (Figure 2-13) contains:

- Text field for Subject text of a message; in definition of the internal messaging within the system subject field has default value which is the same as directive or comment text, a user sender of the message is able to change default value of subject field.

- Text field for text message; a written text, body of a message, this text field cannot be empty, user has to writes at least a text of minimum length of 1 character according to send message to another user.

- "Send" and "Cancel" are action buttons; sending or cancelation message sending are confirmed with those action buttons.

After pressing the "Send" action button from the message form (Figure 2-13) user sender will be redirected to the page from where messaging form been requested (Figure 2-12). Message notification "Message is sent" will appear on the same page after message is sent to a user receiver what means that is a message stored successfully into XIdea system database (Figure 2-14). In case when a user decides to cancel sending a message, user does it by pressing (selecting) "Cancel" button from the message form (Figure 2-13), after it user will be redirected to the page form where messaging process been requested (Figure 2-12).

Figure 2-14: Sent message notification

The Message notification that is message sent successfully a user sender in XIeda system see it as it is shown in Figure 2-14. If user gets message notification after sending a message, it means that a sent message is stored successfully in the system database (Figure 2-15) and can be accessed by user receiver for that message.

| messageId	message	sender	receiver	status	subject	time
12	This is message of example.¶ ¶By sending a private mess...	6	4	1	Example message	2010-04-19 15:.
13	I am from Nepal and I would like to ask couple questions:¶...	5	4	0	Post: Nepal students for exchange ONLY	2010-04-19 15:.
14	As Administrator I would like to ask you to close topic and r...	156	4	0	Request	2010-04-19 15:.
15	As Administrator I would like to ask you to close topic and r...	156	4	0	Request	2010-04-19 15:.
16	What this means???¶can I have more instructions what ar...	156	4	0	Post: more projects and students	2010-04-19 15:.
17	Thank yopu for this post	156	5	0	Post: printer !!!!	2010-04-19 15:.

Figure 2-15: Massage table in XIdea system database with messages

Now user receiver gets notification of received message (Figure 2-11). The number in brackets indicates how many unread messages a user has and can access them via "Message" link from main menu option list in XIdea system (Figure 2-11). After selecting "Message" option a user will be redirected to the Inbox page where is list of a user received messages and through Inbox page a user can access to sent messages list in "Sent messages" page (Figure 2-16). User read a message by selecting a message from one of the list, received message from "Inbox" page and sent message from "Sent messages" page. As I mentioned above from Inbox page a user is able to access sent messages and as well in opposite way, from sent messages page to received messages.

Figure 2-16: Overview of message list (Inbox and Sent message page)

Inbox and Sent message page gives user opportunities to read message, replay or delete a message. In overview of a message and according to the system definition there is no visible who is sender and who is receiver of a message. Overview message page (Figure 2-17) from where a user has full overview of a message (read message) user has a options to delete, replay or go back to any another system activity. By choosing "Replay" option user will get the message form for composing a message such as shown on the Figure 2-13.

30
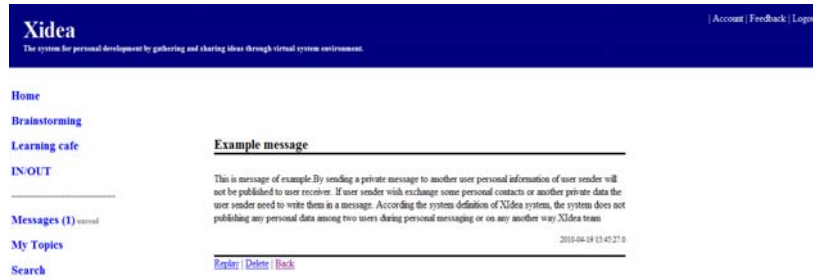
Figure 2-17: Message overview

As it is shown in this section internal messaging within XIdea system is implemented success-fully. User sender is able to send a message to another user as well as to provide a feedback for the system (to send message to the system administrator), user receiver is able to receive a message, replay on a message and delete message as well as the system administrator is able to handle with a feedback. User can access to own messages through own inbox and sent mes-sages page Figure 2-15. User is able to access received or sent messages while is logged in into XIdea system at the any time of user activities within the system.

Message security, that one user access to another user messages is implemented through view form. It means that every user of XIdea system is limited for viewing messages from the sys-tem database. Only messages that match a user's unique identification data (UID) in the "Mes-sage" table of the system database where messages are stored will be shown for that user. In case to receive a message, a user ID needs to match a receiver's ID field in the "Message" table in the system database. In case of sent messages a user ID needs to match a sender ID field in the "Message" table in the system database.

3   Summary and Conclusion

Messaging in XIdea system aims to create a unique way of communicating and networking one user with other. The user messaging process is designed to help the user interact with other via messaging user stays anonymous. The messaging process in XIdea system provides an enhanced platform of user communication within the system.

During my thesis work I was giving definitions, analyzing and designing internal user messaging processes using Unified Modeling Language (UML) modeling language. Method what I was using during the project implementation was Waterfall method. Such as XIdea system was developed on the Model-View-Controller (MVC) architecture model, I kept MVC model during implementation of internal messaging processes within XIdea system. XIdea system is developed in Java programming language which I was using as well during software developing of internal messaging units. Graphics user interface (GUI, UI) of XIdea system I developed JavaServer pages (JSP pages) which contains pure HTML, XHTML and CSS elements. In Servlets I implemented all arithmetical - logics operations as well connections with the system database. The new table in the system database is the "Messages" table which contains messages of XIdea users. For organizing and maintaining the system databases I was using MySQL/SQL.

3.1   Suggestions of further development for XIdea system

Future development of the internal messaging within XIdea system will be composed of building entity groups as well to developing friends list for a user. It will present a challenge according that the users of the system are anonymous. One way to develop a user friends' list could be done that user accepting or adding a friend to own friend list and at the same time does naming for an added friend. It means developing for each user different interface.

Messaging from XIdea system to external user's account as well can be one of most important issue to consider for further development of XIdea messaging processes. Subscription and messages archive are unavoidable future development for XIdea system.

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Appendices

Appendix 1: Entities table description for XIdea system

Term	Definition
Brainstorming	Technique to generate large number of ideas for the solutions of the problem
Directive	Opinion, solution or ideas expressed by users
Feedback	It's the information about the initial event that is the basis for subsequent modification of the even
In/Out	Method to express and exchange opinions between users in way of negative and positive form.
Learning Café	Technique to generate large number of ideas for the solutions of the problem
Message	Written text message in various amount of words.
Owner	Owner is user who opened a topic event and present administrator of own topic.
Participant	Participant is user who participates in a topic event
Private	Private, it is a text message transferred from one user to another.
Rate	Sum of points given by users in rating directives
Sample	Random chosen directives that are represented to the user for rating
Summary	Summarize, it is text message, summarize of a topic event.
Technique	It is a method (brainstorming, learning café) that is used for solving problems
Topic	A theme that represents a problem or idea that has to be developed
User	Haaga-Helia person who is using XIdea system

Appendix 2: Class descriptions of XIdea class diagram

Class Model diagram

Here is presented class model diagram. This diagram show as well database model solution for XIdea system. Under the diagram will be described each class separately with own attributes, relations with another classes, operations and responsibilities.
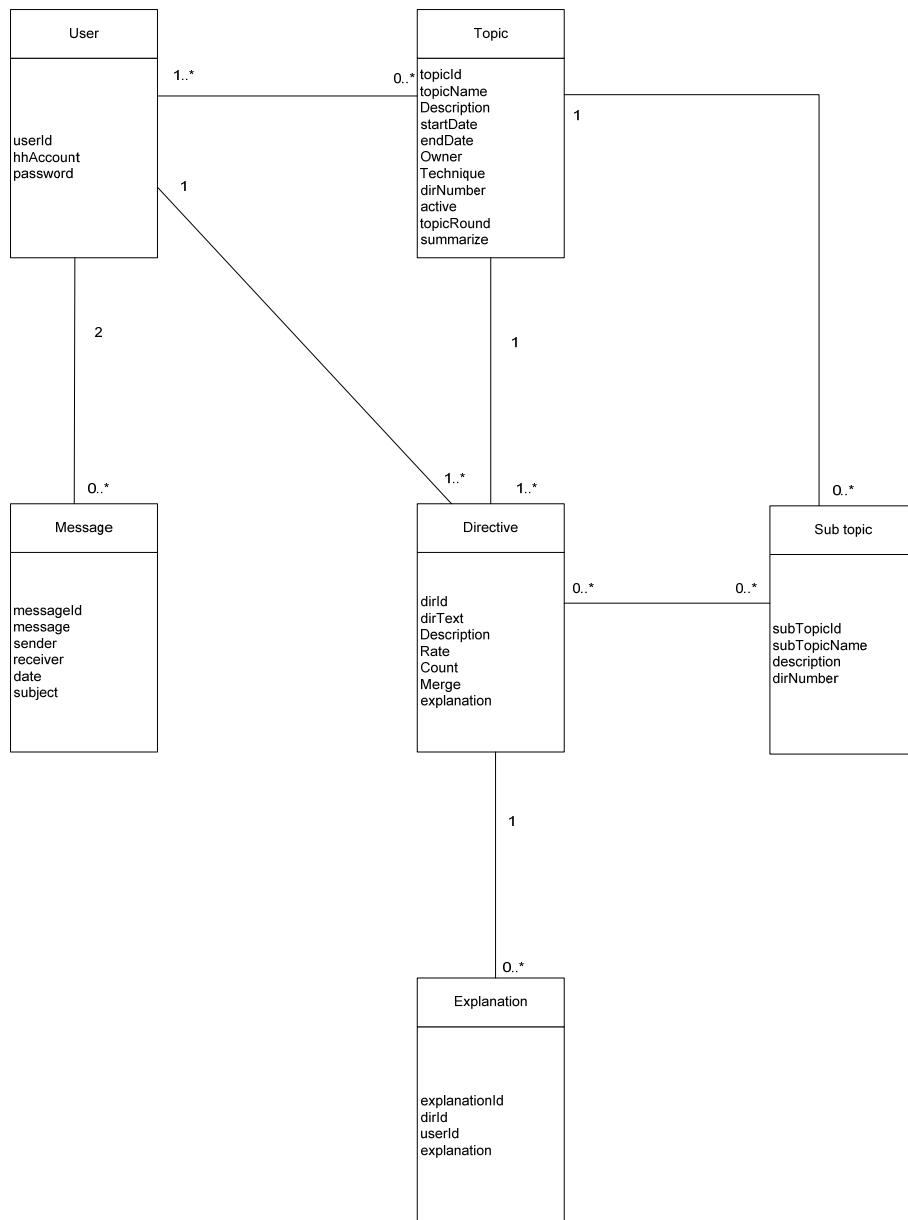
Class diagram of XIdea system

The description of the class <**Technique**>

Class name	**Technique**	
Definition	It's technique in which way user would like participate giving directives or publish a problem for discussion	
Superclass	N/A	

Attributes	attribute name:Type	attribute description
	name	name of the technique
	description	description of technique and what user can perform under it with instructions.

Associations	
	association with topc class; topic has one technique under which is carried on.

Volumes *(min, average, max and increase in a year)*	under technique can be performed unlimited number of topics for discussion.

The description of the class <**User**>

Class name	**User**	
Definition	Is person who performs tasks and participate in the same using XIdea system.	
Superclass	N/A	

Attributes	attribute name:Type	attribute description

	userId	unique user ID given by the system
	hh_number	unique HH system number used for validation into the system.
	password	each user has unique password which provide for its self during registration into the system.

Associations	
	-association with topc class; user can open or participate in as many topics as wants. -association with directives; user can provide at least one or many directives for a topic. -association with results; user can handle results of its own topic(s) which he opened. -association with password; one user-one password, provides during registration

Volumes *(min, average, max and increase in a year)*	
	number of user cannot cross total number of HH personal, students and partners.

The description of the class <**Topic**>

Class name	**Topic**
Definition	Opened topic for discussion or providing solution for potential problem named by user initiatopr.
Superclass	N/A

Attributes	attribute name:Type	attribute description
	topicId	unique topic ID given by the system when topic is opend by user
	topicName	The name of topic, written question or problem for
	desription	which users participants are giving directives
	directivesNumbers	short description of a topic, what, why, how etc…
	startDate	nuber of directives which can be given for the topic,
	endDate	defined by user initiator, must be at least 1
		date when a topic starts to be available
		date when a topic will be closed (not available)

Associations	
	-association with user class; the topic has many users but at least one user initiator who opens topic

	-association with directives; a topic can be provided with many directives but at least with one directive
	-association with results; each topic has final results set which are ready for new rating and discussion.
	-association with technique; technique which is choosen to be suitable for a topic salvation, getting idea and sharing the same.

Volumes *(min, average, max and increase in a year)*	One topic per user per week, onece participant one own topic.

Description of the class <**Directive**>

Class name	**Directive**
Definition	solution or idea given for opened topic provided by user, that will be stored in the XIdea system, and get rates from another users.
Superclass	

Attributes	attribute name:Type	attribute description
	directiveId	identification of directive
	dirText	solution or idea provided by user
	rate	grade given by other users

Associations	An association to Topic class: each directive must belong to one topic; An association to User class: each directive must be provided by one user;

	An association to Result class: each directive must belong to one result;

Volumes *(min, average, max and increase in a year)*	

The description of the class <**Password**>

Class name	**Password**
Definition	login information, that might be updated anytime
Superclass	

Attributes	attribute name:Type	attribute description
	username password	unique name of a user unique combination of characters for this username

Associations	An association to the class User: each Password belong to only one User;

Volumes *(min, average, max and increase in a year)*	

The description of the class <**Result**>

Class name	**Result**
Definition	set of all rated directives
Superclass	

Attributes	attribute name:Type	attribute description
	resultId	identification of result set
	description	overview of all directives provided by users

Associations	An association to the User class: result can be accessed only by one user (initiator); An association to the Directive class: result has many directives; An association to the Topic class; one result is setted for one topic.

Volumes *(min, average, max and increase in a year)*	

Appendix 3: Use cases of internal messaging within XIdea system

Use case sending message
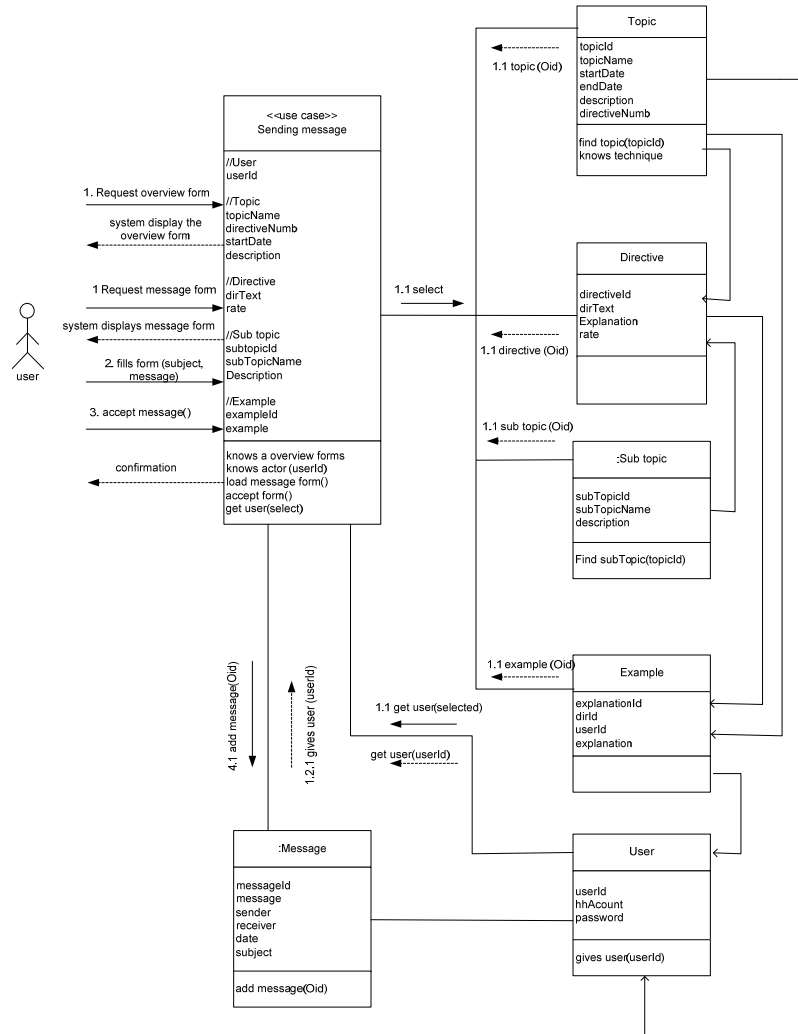
Scenario: Sending message

Use case: Sending message

Actor: User

Pre-condition: user is logged in into the system; user is on one of the next level in the system can be under a topic, directive or explanation overview page.

1. Actor request a message form (select)

-         system sends request to user class to get user owner or directive, comment or

topic by selecting messaging option

- user class finds user and gives user (userId) to use case

- system displays message form to the actor.

2. Actor fills a form (subject, message)

3. Actors submit filled form by accepting it.

- system set actor (userId) as sender and user (userId) as receiver (sender=actor(usserId), receiver=user(userId))

- from use case goes request to message class to add message (subject, message, sender, receiver) (add message(Oid))

- message class set parameter values for message received from use case (add message(Oid))

- confirmation of stored data is sent to use case and from use case to actor.

Use case sending summarize message
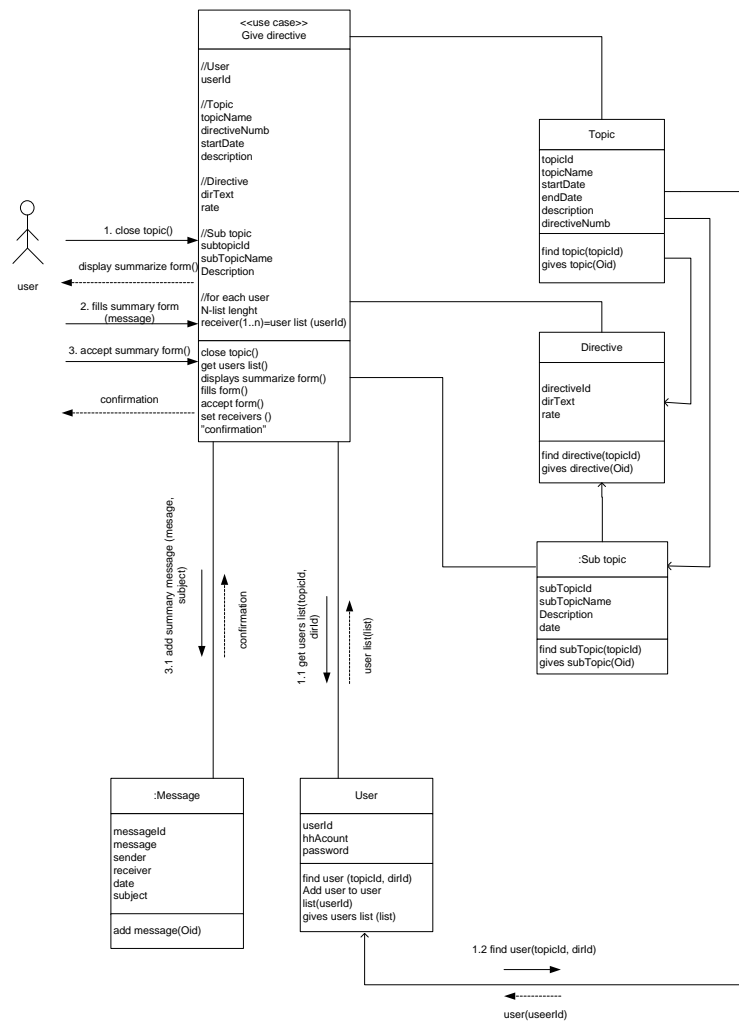
Scenario: Summarize messaging

Use case: Summarize messaging

Actor: User

Pre-condition: user is under in administration overview page for own topic.

1. Actor send request to close topic

-        from use case goes request to user class to get users (topicId, dirId)

-        from user class goes request to find each user participant for the topic find user (topicId, dirId)

-        topic class respond to user class and gives user (userId) for each participant that match topic or directive user owner

-        user class gives users to use case for each user user (userId)

2. Actor fills a form (message)

3. Actors accept filled form by submitting /sending request to use case.

-        from use case goes request to message class to set parameters for storing summarize message add summary message (subject, message, sender, receiver) for each user from user list length

-        message class set parameters and add new message (Oid)

Use case receiving message

44
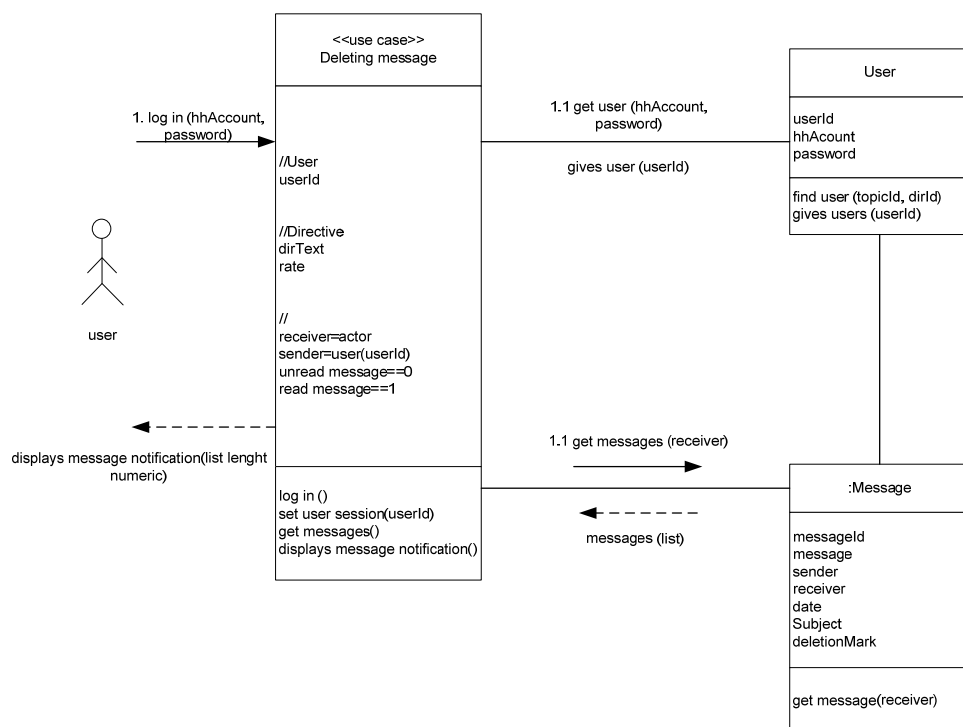
Scenario: Receiving message

Use case: Receiving message

Actor: User

Pre-condition: user does not need to be logged in into the system; user can be logged in into the system.

1. Actor send request for log in into the system. log in (hhAccount, password)

-　　　　　from use case goes request to user class to get users (hhAccount, password)

-　　　　　user class goes finds a user and gives user (userId)

-　　　　　system send request to message class get messages (receiver) where receiver=user (userId)

-　　　　　message class gives list of messages for user(userId)/receiver and send it to use case

-　　　　　notification of message list is displayed to actor (user)

In this case user is able to go from one page to another and perform different tasks within the system and this process will be repeated all the time while user session active, message notification of read/unread messages is visible all the time.

Use case deleting message
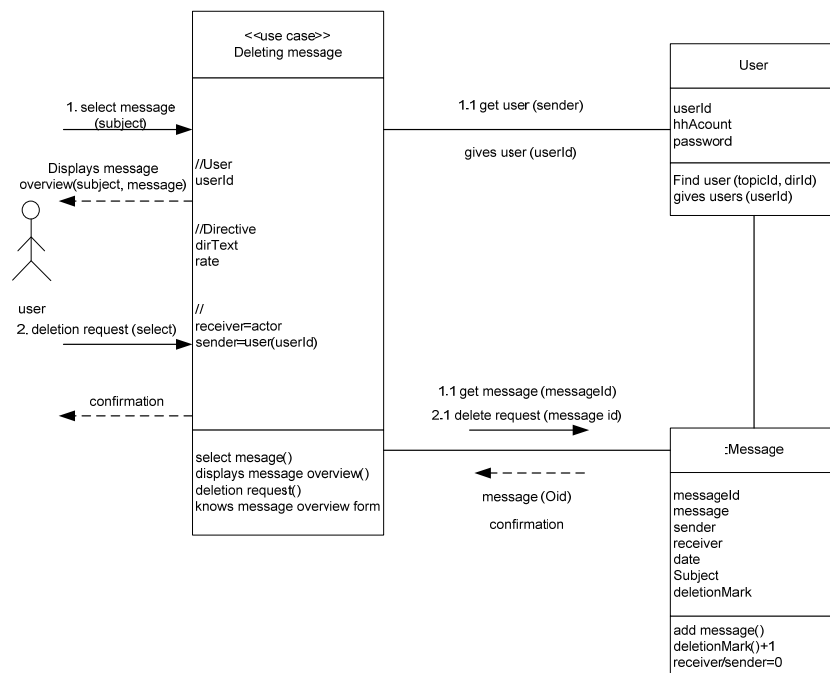
Scenario: Deleting message

Use case: Deleting message

Actor: User

Pre-condition: user is logged in and he is under overview message form (Inbox) of XIdea system.

1. Actor selects a message from the list of messages shown in Inbox page of the user. select message (subject)

-            from use case goes request to message class get message(messageId)

-            message class respond with message (Oid)

-            use case displays to actor message (subject, message)

2. Actor sends deletion request to message class deletion request (messageId)

-            message class set deletionMark parameter to 1 and receiver or sender is sender to 0

In case that actor perform the task under inbox page where received messages are shown, receiver will be set to 0; in case that actor perform the tasks under Send messages page sender will be set to 0;

NOTE: Message will not be deleted from XIdea system database until receiver and sender are not 0, only then a message will be removed from XIdea system database. It means that actually by setting receiver or sender to 0 only that user will not be able to see a message anymore.

Appendix 4: Test cases of internal messaging processes within XIdea system

TEST FORM FOR SYSTEM/ACCEPTANCE TEST for Project "Internal messaging within XIdea system"

Use Case: Sending message (private and feedback)   Tester: Sha Liu   Date: 22.04.2010

Step	Detailed instructions for the tester	Expected result	Errors/ Exceptions	Has to be fixed? Yes/No
1	Login to XIdea system (http://www.h2ubioffice.fi:8080/Xidea_v.0.1/Login.jsp) with username: a0700331 and password: avisheck	User logged in into XIdea system, system shows main page.		no
2	User choose "My topics" link then select a topic from "My participation" list (Ubi Office) then press "Overview" button	Selected topic overview page is shown with its directive	If is a topic Learning Café technique a sub topics descriptions are shown, after it I am able to choose one of offered sub-topics	no
3	Select "m" option from directive (choose first from left side)	Message form for composing a message is shown, as subject there is the directive text		no
4	Change subject to "test" and write a text message (free chose), then pres "Send message" button	user is redirected to topic overview page with directives and "Message is sent" message is shown in the page	Text length for subject and text message not tested here.	no
5	Select "Home" from menu then "Feedback" from upper right corner	Message form for composing a message is shown and subject is "Feedback"	Feedback form need to be different then a message form, should support more option for a user	yes

| 6 | Do the same processes from step 4 from this testing | User will be redirected to main page of XIdea system | | no |

TEST FORM FOR SYSTEM/ACCEPTANCE TEST for Project Internal messaging within XIeda system

Use Case: Receiving message, replay and delete message   Tester: Sha Liu   Date: 22.04.2010

Step	Detailed instructions for the tester	Expected result	Errors/ Exceptions	Has to be fixed? Yes/No
1	Login to XIdea system (http://www.h2ubioffice.fi:8080/Xidea_v.0.1/Login.jsp) with username: a0700292 and password: jurica	User logged in into XIdea system, system shows main page. On the main menu next to "Message" is shown numeric notification of unread messages		no
2	Click on "Message" link from main menu	Inbox page is show with list of user's messages, number of "new" messages corresponding to the number next to "Message" link		no
3	Click on the text of "new" message (the message what was sent from test case 1) according to read message	System shows selected message with subject, text message date, with options under with Delete, Back and Replay, numerical notification next "Message" link from main menu is changed for one value down	If there is no message which should be sent, stop executing the test case.	no

4	Press "Replay" option	The form for composing a new message is show to user, default subject is "Re:+(subject of the message)"		no
5	Fill the text field for message text and press button "Send message"	User will be redirected to Inbox page from where the message was opened to read and will get notification that message is sent "Your message has been sent."		no
6	Do the step from case 3 and 4 and then press "Cancel" button	User will be redirected to Inbox page from where the message was opened		no
7	Form inbox page select randomly several messages by checking in check boxes next to a message, then press button "Delete" under the list of current messages	Selected messages are deleted from Inbox list of messages, they are not shown in refreshed list of messages		no
8	Select one of messages from a list to the read then when message is open for reading choose option "Delete" to delete that message	Inbox or Outbox page with a list of messages will be shown and the message what was read and deleted will not appear in the list where was before		no