

ID2.5 Elaborated Use Cases & Domain Model

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ID2.5 Elaborated Use Cases & Domain Model

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ID2.5 – Elaborated Use Cases & Domain Model

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Abstract (for dissemination)	This document describes the elaborated use cases that are implemented in the first version of the TENCompetence Personal Competence Manager (PCM) and the relation between the Domain Model and this version of the PCM		
Keywords List	Elaborated Use Cases, Activity Diagram, Data Model.		

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1 Introduction

This document describes the elaborated use cases that are implemented in the first version of the TENCompetence Personal Competence Manager (PCM). The use cases of this document are elaborations of the initial requirements and the high level use cases for implementing the PCM accordingly to the objectives of the project.

This document also describes the data model that is the current reflection of the relation between the Domain Model and the first version of the TENCompetence Personal Competence Manager (PCM).

2 Definitions

2.1 Acronyms

The following acronyms are used in the rest of this document.

CDP	Competence Development Programme
PCM	Personal Competence Manager, the TENCompetence Client
UoL	Unit of Learning

2.2 Actors

Learning and training are actor centric tasks, to which actors contribute in different roles. These roles are not fixed but these roles can change, overlap and interfere from the perspective of a single actor. These dynamics of roles play an important part in lifelong competence development. Therefore, a support system for lifelong competence development has to estimate and to reflect the support of the needs of the different roles, in order to provide support throughout these tasks.

From the perspective of the technological infrastructure, the actors trigger the system's functions from the outside. With regard to the TENCompetence infrastructure, actors can be persons, groups, a formal or informal organisation, or even other systems (e.g. knowledge repositories, or autonomous agents). Each actor can interact with the system from within different roles. These roles may change according to policies of a learning network, but also according to the choice of the actor. Thus, an actor can act as a learner, a teacher, an assessor. The roles of an actor may vary according to the learning network, to the competence levels, to job positions, etc. Actors may also perform in different roles simultaneously.

For the TENCompetence project there were six user-stereotypes identified. The stereotypes are actors, assessors, authors, external systems, (learning) facilitators and learners (see Figure 1). Each user-stereotype clusters roles of similar function in a learning network. The use cases of the functional requirements are always associated to one or more of these user-stereotypes.

This document describes in detail the use cases from two actor roles: the learner role and the author role. However, in the following all roles that will be covered by the PCM are described for completeness.

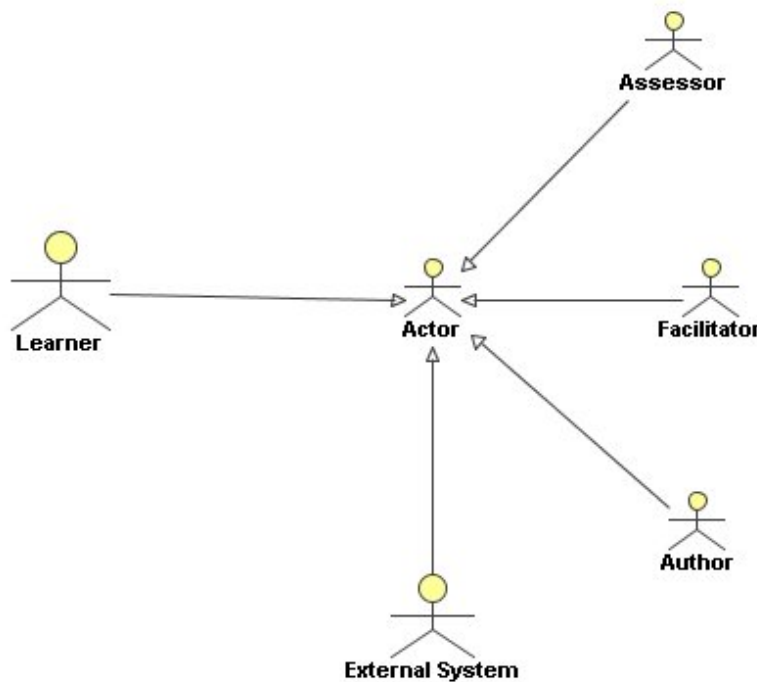


Figure 1: User-stereotypes

Actors

The most general user-stereotype is the *actor*-stereotype. This stereotype refers to any type of external interaction without reflecting a specific role. In the requirements specification of TENCompetence the actor stereotype is only used to specify use cases that can not be associated reasonably to one of the other user-stereotypes.

Learners

With regard to the high level use cases, the learner stereotype is most important. The *learner*-stereotype represents those persons who use the TENCompetence infrastructure in order to develop their competences. This can be a pre-defined educational path provided such as a university, a competence development programme in vocational training within an enterprise, or participation in a community of practice. The learning activities within the TENCompetence infrastructure can be part of both formal and informal learning simultaneously.

Authors

The *author*-stereotype refers to those actors who create knowledge resources, activity specifications or entire curricula. In general terms all editing actions within the TENCompetence infrastructure are associated to the author-stereotype. This covers at least the following roles.

1. Content creators develop knowledge resources for a learning network.
2. Instructional designers or course designers define topics and create the actions of parts of a learning network.

3. Administrators specify and associate competence maps to a learning network for assessment.

Facilitators

The *facilitator*-stereotype refers to those roles that actively support learners during their learning process. The users of the TENCompetence infrastructure act as learning facilitators when they support learners as experts, teachers and trainers, tutors, mentors, moderators, or peer learners.

Assessors

An *assessor* is a person that is legally entitled for accreditation of the learning outcomes of a learner. An assessor can be involved in the competence assessment, an assessment activity or the unit of assessment. The role of assessor can be fulfilled by any actor (also the person himself, e.g. for self-assessment) dependent on how formal the assessment must be.

External Systems

A special case is the *external-system*-stereotype. This particular user-stereotype refers to external systems that use the TENCompetence environment or provide information to it. These systems offer *special services* on the level of assessors, authors, or facilitators. This user-stereotype helps to define the boundaries of the TENCompetence environment's functionality. The TENCompetence environment and the external services form the TENCompetence infrastructure.

The user-stereotypes refer to specific types of user activities or intentions. From the perspective of the real world a user may change its role with regard to these stereotypes. This is illustrated by the following example. Teachers and Tutors use the system to help Learners in their learning process. By these means their primary role while using the system refers to the *facilitator*-stereotype. Different to tutors, teachers are also involved in the preparation of units of learning and in testing the learning progress of the students. During preparation, teachers act as authors to the system, while during testing teachers act as assessors. Compared to teachers, tutors have fewer responsibilities in educational processes, although they may add resources to a course or help during assessment tasks. However, the described user-stereotypes are not the same as professional roles but refer to different ways of using the TENCompetence infrastructure.

3 PCM Use Cases Diagrams

3.1 Overview

The term “functional requirements” refers to the description of functions a system must provide to its users. These requirements can be used in order to validate if a system provides a specified function. Functional requirements define the users’ objectives for a system, independent from the actual implementation of that system. Therefore, functional requirements are not necessarily strict definitions that lead only to one implementation. For example, the same functional requirements can be met by a rich client and a web-based environment even if these systems neither base on the same code base nor have similar user-interfaces.

Use cases are a way of describing functional requirements from a users’ perspective in a way that these requirements can be translated into functional specification and application workflows.

Within TENCompetences six main use cases were defined according to the objectives of the project. Each use case describes a distinct set of functions that are needed for lifelong competence development. The use cases are documented according to the following list.

- Explore a learning network
- Improve the proficiency level
- Keep up to date
- Reflect on their competences
- Study for a new function or a new job
- Want some support for some specific action

The high level use cases have sub-ordinate task assigned. In order to map these high level use cases to the technical constraints for a personal competence management, a set of nine use cases have been identified. These use cases refer to technical aspects that are shared across the different high level use cases. These use-cases are shown in figure 2. The following sections describe these use cases in greater detail.

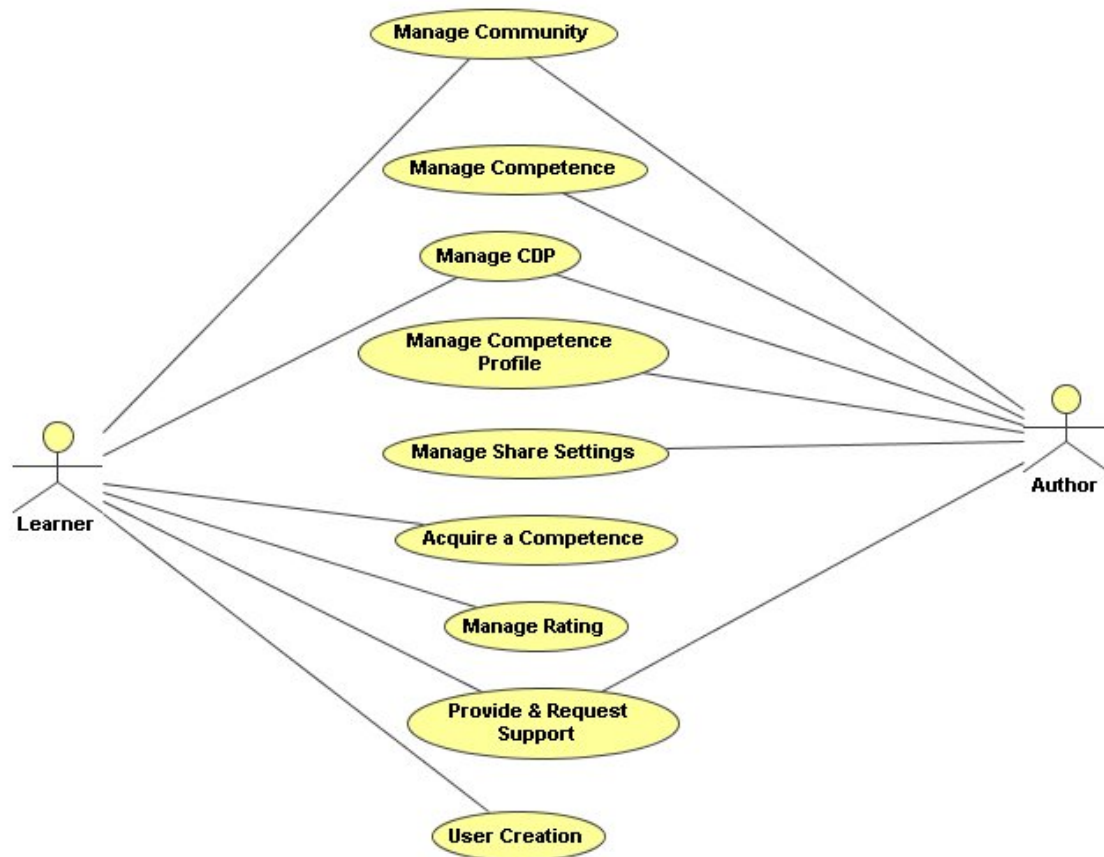


Figure 2 elaborated use cases

Each section will provide a more detailed perspective for each of the nine elaborated use cases. Each use case description has the following parts.

1. The general objective for the use case from the perspective of the main user
2. A UML diagram of the use case of sub-ordinate use cases
3. All actors that are directly involved in the use case
4. For each sub use case a UML activity diagram
5. For each sub use case a brief narrative description of the activity flow.

4 Competence Management

4.1 *Manage Objects*

4.1.1 *General Objectives*

The manage objects use case is an abstract use case. The PCM consists of several components, on which the users can perform several actions. Each object of the PCM shares the following four use cases with all other components of the system.

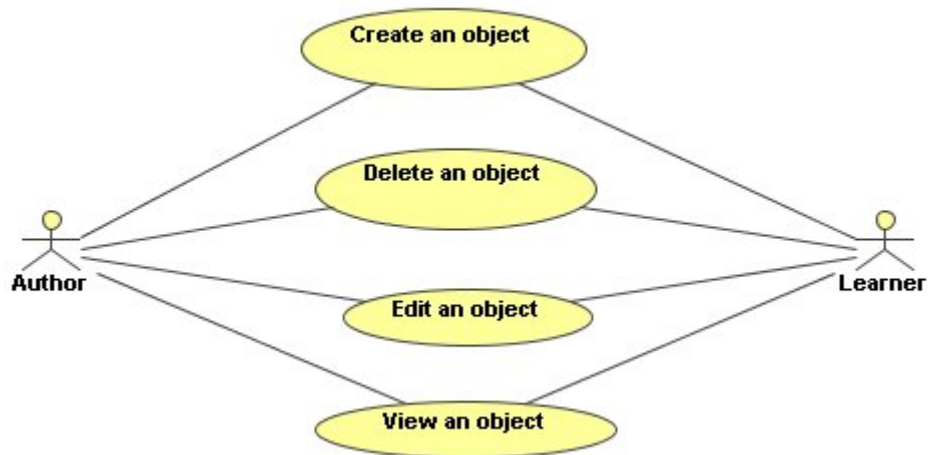
1. Create an object
2. Delete an object
3. Edit an object
4. View an object

Other use cases may refer to these four use cases as part of the use cases that concern “object activities”. These activities are unified in their flow for all the objects in the system. The different objects in the system that can use these four use cases are the followings:

1. Community
2. Competence profile
3. Competence
4. Competence development plan
5. Action
6. Resource
7. Topic
8. Post

The use case ‘Delete an object’ isn’t implemented in the current version of the PCM for community, competence profile, competence, competence development plan, action and resource. At the moment is only implemented for topic and post.

4.1.2 UML use case diagram

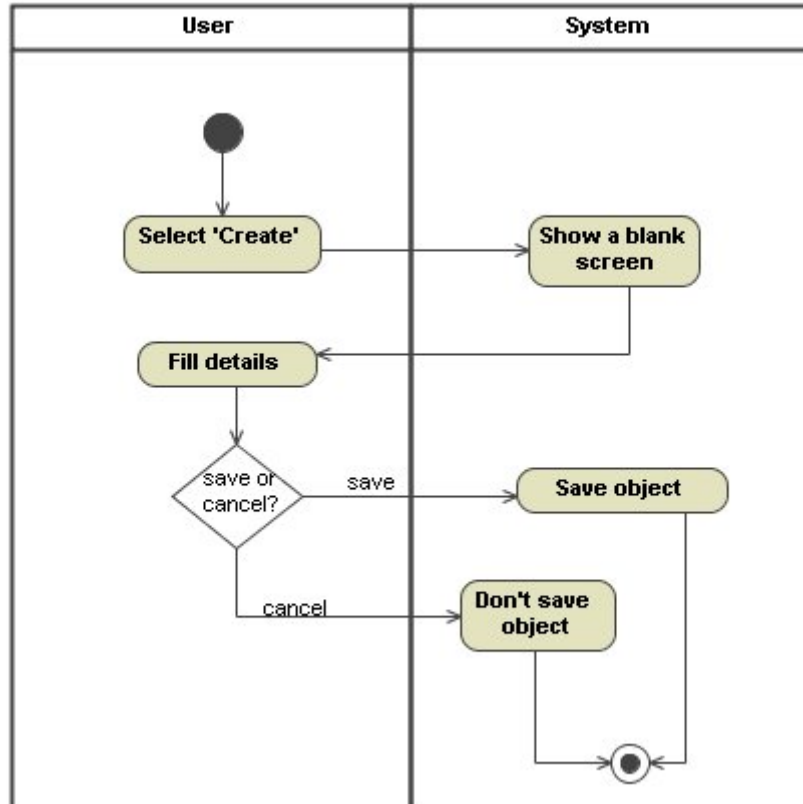


4.1.3 Involved user-stereotypes

- *author* (main user)
- *learner*

4.1.4 Activity diagrams

4.1.4.1 Create an Object



Activities

Select 'Create'

The user wants to create a new object, so once he/she is positioned in the correct screen, he/she selects the option of creating the new object.

Show a blank screen

The system shows to the user the screen that corresponds to the selected object. Depending on the object the blank screen contains different information.

Fill details

The user fills the information of the object that he/she has selected. The details that the user has to provide are different depending on the object.

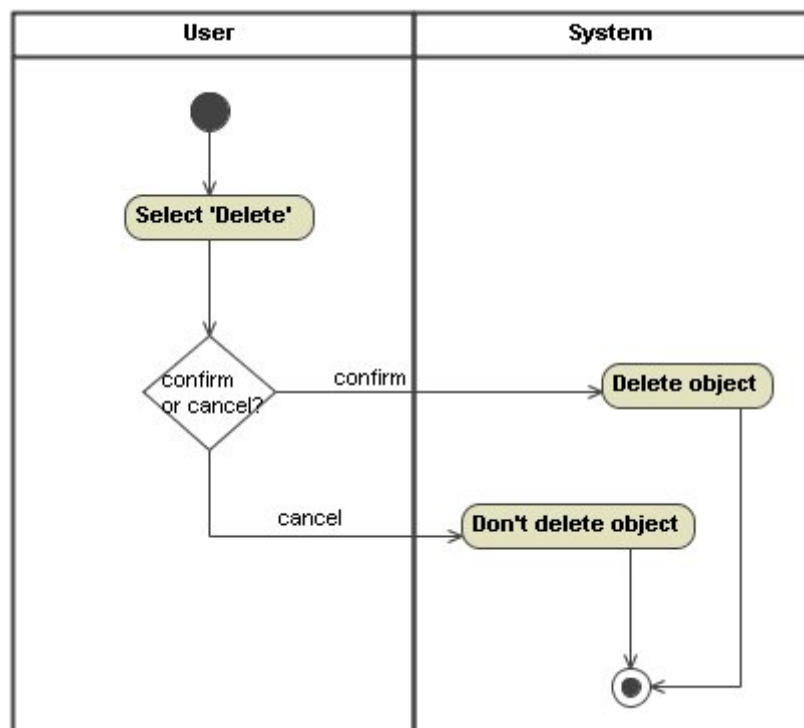
Save object

If the user agrees with the selection and the information that he/she has provided, he/she confirms the creation of the object and the system creates and saves it.

Don't save object

If the user doesn't agree with the selection and the information that he/she has provided, he/she cancels the creation of the object and the system doesn't save it.

4.1.4.2 Delete an Object



Activities

Select 'Delete'

The user wants to delete a concrete object, so once he/she is positioned in the correct screen, he/she selects the option of deleting the selected object. Deleting an object only works if there are no related objects.

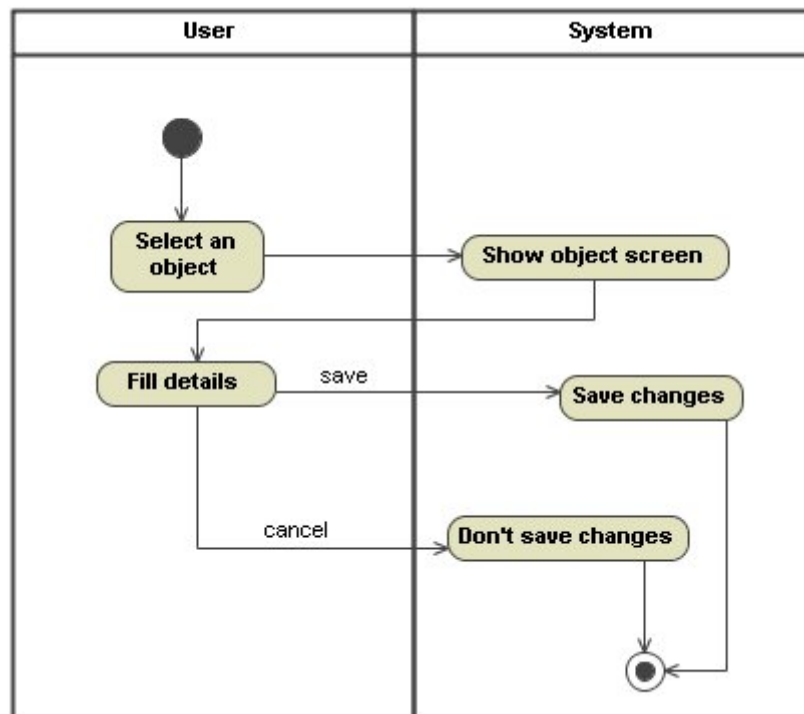
Delete object

If the user is completely sure that he/she wants to delete the object, he/she confirms the selection and the system deletes the object.

Don't delete object

If the user is not completely sure that he/she wants to delete the object, he/she cancels the selection and the system doesn't delete the object.

4.1.4.3 Edit an Object



Activities

Select an object

The user wants to edit a concrete object, so once he/she is positioned in the correct screen, he/she selects the object that he/she wants to edit.

Show object screen

The system shows a screen with all the information related to the selected object.

Fill details

The user changes the information or adds new details to the object.

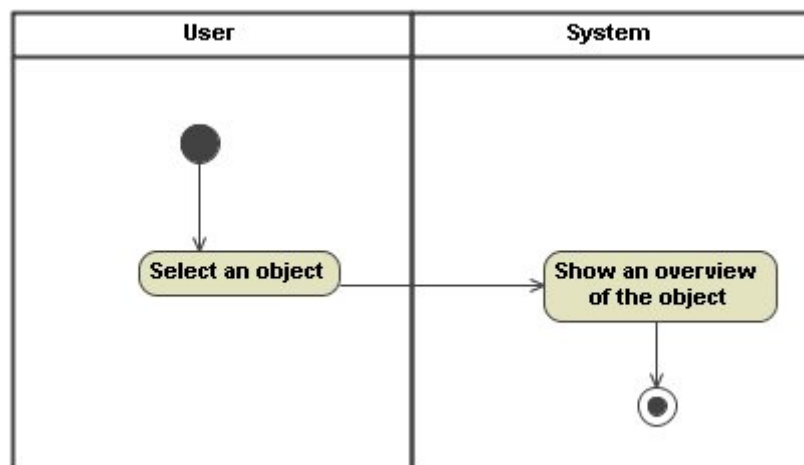
Save changes

If the user agrees with the new information that he/she has provided, he/she confirms the changes of the object and the system updates and saves it.

Don't save changes

If the user doesn't agree with the new information that he/she has provided, he/she cancels the changes of the object and the system doesn't update it. The object has the same information than before its edition.

4.1.4.4 View an Object



Activities

Select an object

The user wants to see all the information related to a concrete object, so once he/she is positioned in the correct screen, he/she selects the object that he/she wants to see.

Show an overview of the object

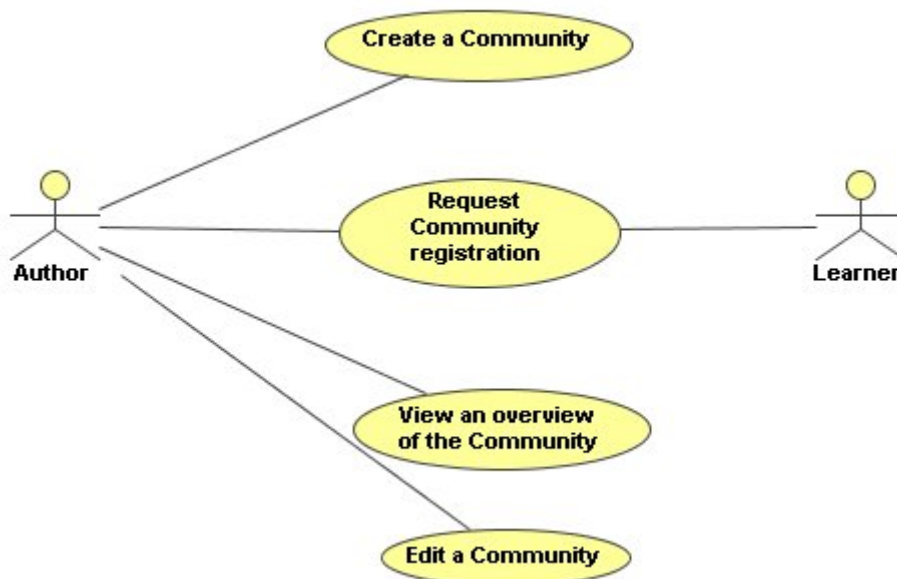
The system shows a screen with all the information related to the selected object.

4.2 Manage Community

4.2.1 General Objectives

The concept of learning networks (LN) is translated as communities for the user interface. The term community has been chosen because for average users this is easier to understand than the term “learning network”. The high level use cases of TENCompetence depend on existing LN, while basic administrative functionality is not modelled in the high level use cases. This use case defines four basic functions which are prerequisites for the high level use cases. The use cases deal with the creation of a learning network, becoming a member of a learning network, edit the preferences of a learning network, and browse the learning network for information.

4.2.2 UML use case diagram



4.2.3 Involved user-stereotypes

- *author* (main user)
- *learner*

4.2.4 Activity Flow

Basic flow

- 1 The Author selects create a community
- 2 The System shows a blank Competence Development Community screen
- 3 The Author fills in the details and confirms
- 4 The Author Manages Share Settings
- 5 The System gives an overview of all the Communities including the new created community.

Alternative Flows**A Learner requests for a Community (1)**

- 1 The Learner selects a community
- 2 The Learner selects register to the community
- 3 The System adds the user to the community

A Learner requests for a Community (2)

- 1 The Learner selects a community
- 2 The Learner selects register to the community
- 3 The System creates a request for membership

Accept the add request of a Learner to a Community**Trigger: request for membership**

- 1 The System displays a request message
- 2 The Author selects the message
- 3 The systems shows a membership screen
- 4 The Author accepts the add request of a learner to a community
- 5 The System adds the user to the community and creates a message for the user and a message for the community

Deny the add request of a Learner to a Community**Trigger: request for membership**

- 1 The System displays a request message
- 2 The Author selects the message
- 3 The systems shows a membership screen
- 4 The Author denies the add request of a learner to a community
- 5 The System does not add the user to the community and creates a message for the user and a message for the community

View an overview of the community

- 1 The Author selects view Community
- 2 The System shows an overview of the Community Competences

Edit a community and confirms

- 1 The Author selects a community
- 2 The System shows the Community screen
- 3 The Author fills in the details and confirms
- 4 The System saves the Community and gives an overview of all the Communities

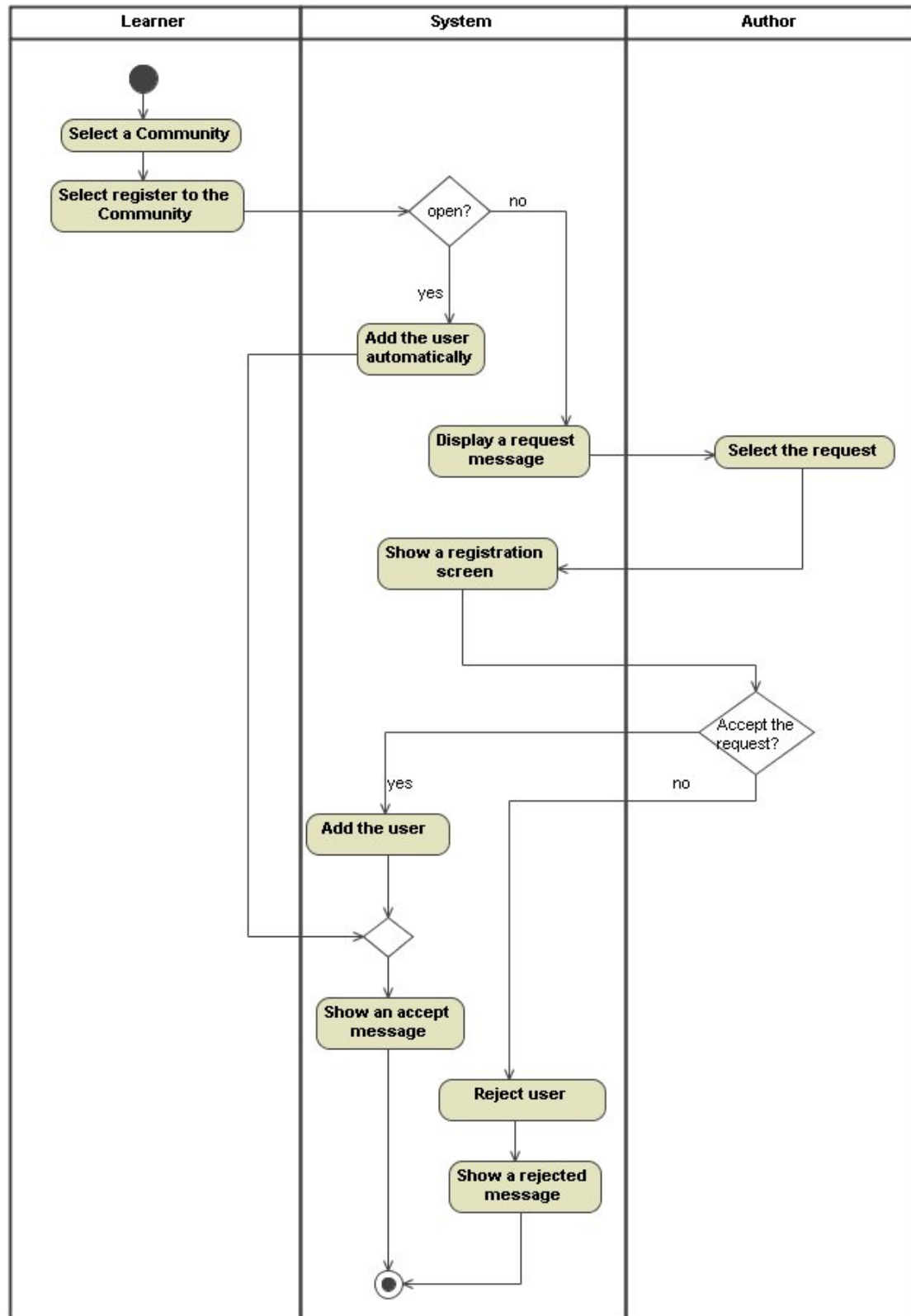
Edit a community and cancels

- 1 The Author selects a community
- 2 The System shows the Community screen
- 3 The Author fills in the details and cancels
- 4 The System does not save the Community and gives an overview of all the Communities

4.2.5 Activity diagrams**4.2.5.1 Create a Community**

The standard flow of the creation of a new community is based on the general activity diagram in section “4.1.4.1 Create an object”.

4.2.5.2 Request Community registration



Activities

Select a Community

When the user wants to access to a Community he/she is not registered in, the user selects the desired Community from a list of available communities.

Select register to the Community

Start the process to register to a new Community. If the user doesn't exist on the community server yet, a 'Register user' process is started.

Add the user automatically

When the Community type is open, the user is automatically registered in the selected Community.

Display a request message

When the Community is closed, the author of the Community gets a request message: 'user X wants to register for community X'.

Select the request

The author selects one of the request messages that he/she gets. This step is asynchronous, it might be shown to the author days later and as a part of a large list.

Show a registration screen

When the system shows a registration screen the user has three possible options:

- Approve the request that the user has done
- Reject the request that the user has done
- Cancel the screen and decide later whether approve or reject the request

Add the user

If the author has decided to approve the request of the user the system adds the user to the selected Community.

Show an accept message

To inform the user that he/she has been accepted in the desired Community he/she receives an accept message. At the same time, the author receives a message informing that the request of the user has been accepted.

Reject user

If the author has decided to reject the request of the user the system doesn't add the user to the selected Community.

Show a rejected message

To inform the user that he/she has been denied in the desired Community he/she receives a denied message. At the same time, the author receives a message informing that the request of the user has been accepted.

4.2.5.3 View an overview of the Community

The standard flow of consulting a community is based on the general activity diagram in section “4.1.4.4 View an object”.

4.2.5.4 Edit a Community

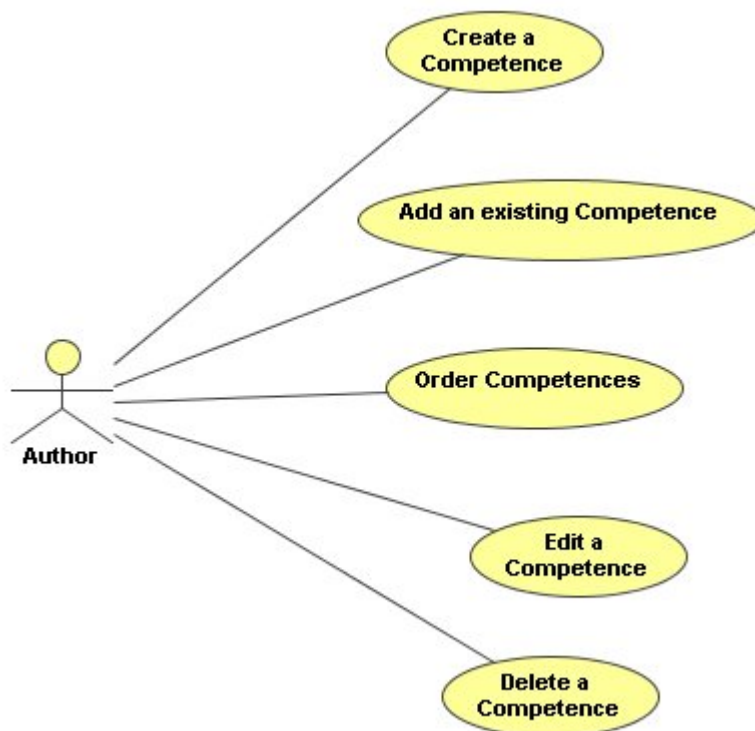
The standard flow of editing a community is based on the general activity diagram in section “4.1.4.3 Edit an object”.

4.3 Manage Competence

4.3.1 General Objectives

The core objective of the PCM is to support learners in organising and developing their competences. The majority of the high level use cases presume existing competence maps. This use case provides those requirements that are at the baseline of competence management and the definition of competence maps. These activities include introducing new competences to the system (create a competence), assigning competences to user profiles (add an existing competence), organise competences in a competence map (order competences), change or extend a competence’s meta-information (edit a competence), and remove competences from competence maps and from the PCM (delete a competence).

4.3.2 UML use case diagram



4.3.3 *Involved user-stereotypes*

- *author* (main user)

4.3.4 *Activity Flow*

Basic Flow

- 1 The Author adds a new competence
- 2 The System shows the Competence Screen
- 3 The Author fills in the details of the Competence
- 4 The Author Confirms
- 5 The System adds the competence to the Competence Profile

Alternative Flows

Add new Competence and Cancel

- 1 The Author adds a new competence
- 2 The System shows the Competence Screen
- 3 The Author fills in the details of the Competence
- 4 The Author Cancels
- 5 The System does not add the competence to the Competence Profile and returns to the edit Competence Profile screen

Add existing competence and confirm

- 1 The Author adds an existing competence
- 2 The System shows the available competences within the community
- 3 The Author selects a Competence
- 4 The Author confirms
- 5 The System adds the competence and returns to the Competence Profile screen

Add existing competence and cancel

- 1 The Author adds an existing competence
- 2 The System shows the available competences within the community
- 3 The Author selects a Competence
- 4 The Author cancels
- 5 The System does not add the competence and returns to the Competence Profile screen

Order Competences in the Competence Profile

- 1 The Author selects a competence
- 2 The Author re-orders the competences
- 3 The Systems shows the new order
- 4 The Author adds a folder
- 5 The System adds a folder to the Competence Profile
- 6 The Author adds a competence to a folder
- 7 The System adds the chosen competence to the folder

Repeat steps 2 to 7 till ready

Edit competence and confirm

- 1 The Author selects a competence
- 2 The System shows the competence screen
- 3 The Author fills in the details and confirms
- 4 The System saves the changes on the competence

Edit competence and cancel

- 1 The Author selects a competence
- 2 The System shows the competence screen
- 3 The Author fills in the details and cancels
- 4 The System does not save the changes on the competence

Delete competence and confirm

- 1 The Author selects a competence
- 2 The Author deletes the competence
- 3 The Systems shows a confirmation screen
- 4 The Author confirms the deletion
- 5 The System deletes the competence

Delete competence and cancel

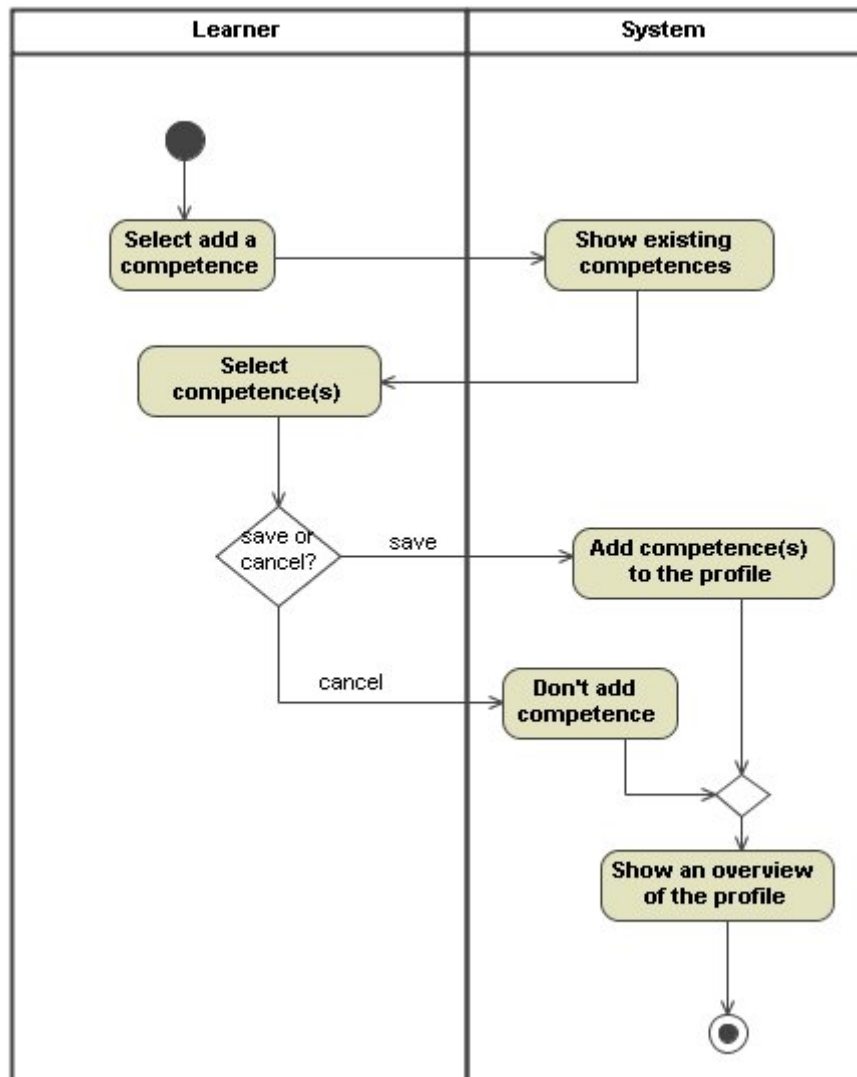
- 1 The Author selects a competence
- 2 The Author deletes the competence
- 3 The Systems shows a confirmation screen
- 4 The Author cancels the deletion
- 5 The System does not delete the competence

4.3.5 Activity diagrams

4.3.5.1 Create a competence

The standard flow of the creation of a new competence is based on the general activity diagram in section “4.1.4.1 Create an object”.

4.3.5.2 Add an existing competence



Activities

Select add a competence

Start adding a competence to a competence profile.

Show existing competences

The system shows a list with all the available competences that can be added to the competence profile.

Select competence(s)

From the list of available competences the user can select one of them.

Add competence(s) to the profile

The system gives the possibility of saving or cancelling the selection. If the user has selected the option of saving the selected competence, the system adds the competence to the profile.

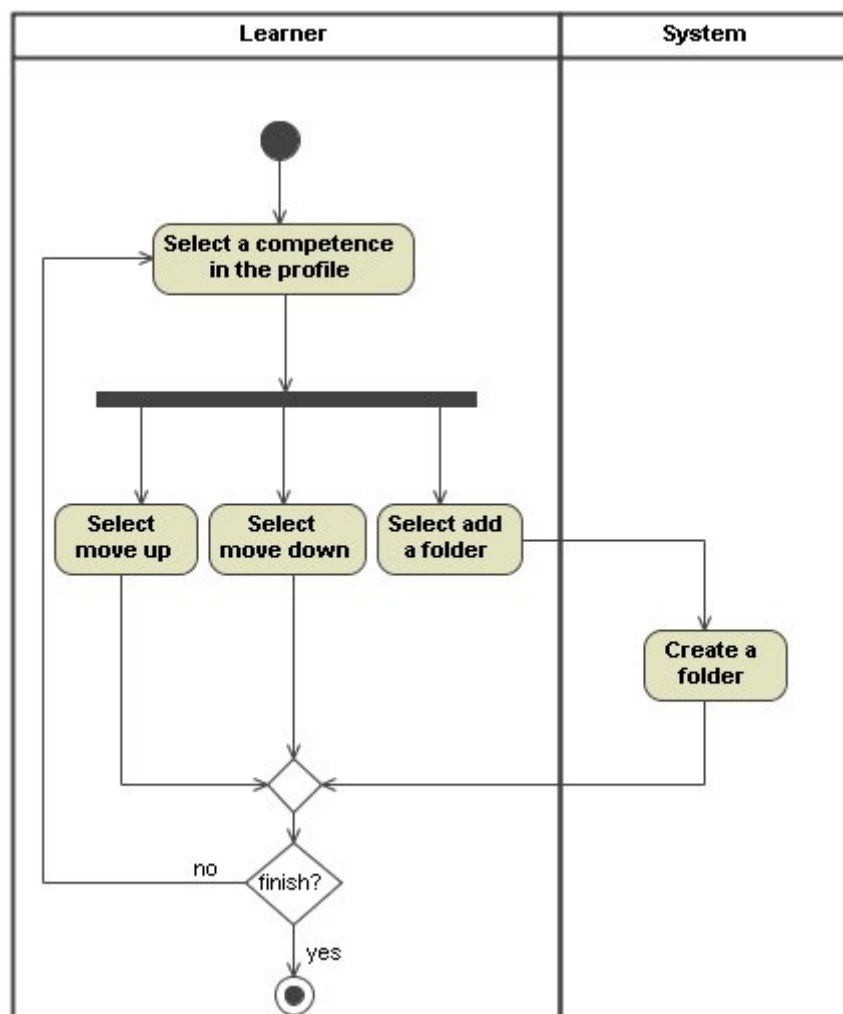
Don't add competence

The system gives the possibility of saving or cancelling the selection. If the user has selected the option of cancelling the selected competence, the system adds the competence to the profile.

Show an overview of the profile

Once the user has saved or has cancelled the addition of the competence, the system shows a 'Competence Profile' screen with the details of that profile.

4.3.5.3 Order Competences



Activities

Select a competence in the profile

Select one of the competences that are linked to the competence profile.

Select move up

The user wants to reorder the competences and he/she wants to move up the selected competence.

Select move down

The user wants to reorder the competences and he/she wants to move down the selected competence.

Select add a folder

The user wants to reorder the competences and he/she wants to create a folder to move competences inside.

Create a folder

Create a folder in the competence profile.

4.3.5.4 Edit a Competence

The standard flow of editing a competence is based on the general activity diagram in section “4.1.4.3 *Edit an object*”.

4.3.5.5 Delete a Competence

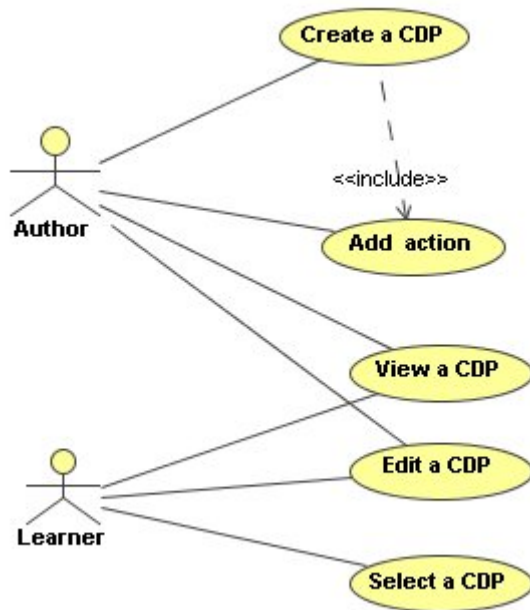
The standard flow of deleting a competence is based on the general activity diagram in section “4.1.4.4 *Delete an object*”.

4.4 Manage CDP

4.4.1 General Objectives

The high level use cases mention the authoring process of competence development plans (CDP). However, these use cases remain unclear about the actual tasks of CDP authoring. This use case describes the underlying use cases of CDP authoring.

4.4.2 UML use case diagram



4.4.3 Involved user-stereotypes

- *author* (main user)
- *learner*

4.4.4 Activity Flow

Basic Flow

- 1 The Author selects create new plan
- 2 The System shows a screen with a blank plan
- 3 The Author fills in the plan Details
- 4 The Author confirms the plan
- 5 The Systems displays the Profile competence screen including the Competence Plan

Alternative Flows

Cancel the creation of a plan:

- 1 The Author selects create new plan
- 2 The System shows a screen with a blank plan
- 3 The Author fills in the plan Details
- 4 The Author cancels the creation
- 5 The System does not create the Plan

Add an existing action to a plan

- 1 The Author selects add Action
- 2 The System displays actions to add
- 3 The Author selects an action
- 4 The Author confirms the action
- 5 The System adds the action to the plan
- 6 The Systems shows the Competence Development Plan screen

Add a new action to a plan:

- 1 The Author selects create a new action
- 2 The System shows a blank action screen
- 3 The Author fills in the Action Details
- 4 The Author *Manages Share settings*
- 5 The Author confirms the creation
- 6 The Systems shows the Competence Development Plan screen

Cancel the creation of a new action:

- 1 The Author selects create a new action
- 2 The System shows a blank action screen
- 3 The Author fills in the Action Details
- 4 The Author *Manages Share settings*
- 5 The Author cancels the creation
- 6 The Systems shows the Competence Development Plan screen

View an overview of the competence plan

- 1 The Author selects view an overview of a competence plan
- 2 The System shows an overview of the competence plan

Edit competence plan and confirm

- 1 The Author selects a competence plan
- 2 The System shows the competence plan screen
- 3 The Author fills in the details and confirms
- 4 The System saves the changes on the competence plan

Edit competence plan and cancel

- 1 The Author selects a competence plan
- 2 The System shows the competence plan screen
- 3 The Author fills in the details and cancels
- 4 The System does not save the changes on the competence plan

Select a competence plan and confirms:

- 1 The Learner selects Select Plan
- 2 The System shows a list of available Competence Development Plans
- 3 The Learners selects a Competence Development Plan
- 4 The Learner verifies the choice
- 5 The System adds the Competence Development Plan to the Competence Profile

Select a competence plan and cancels:

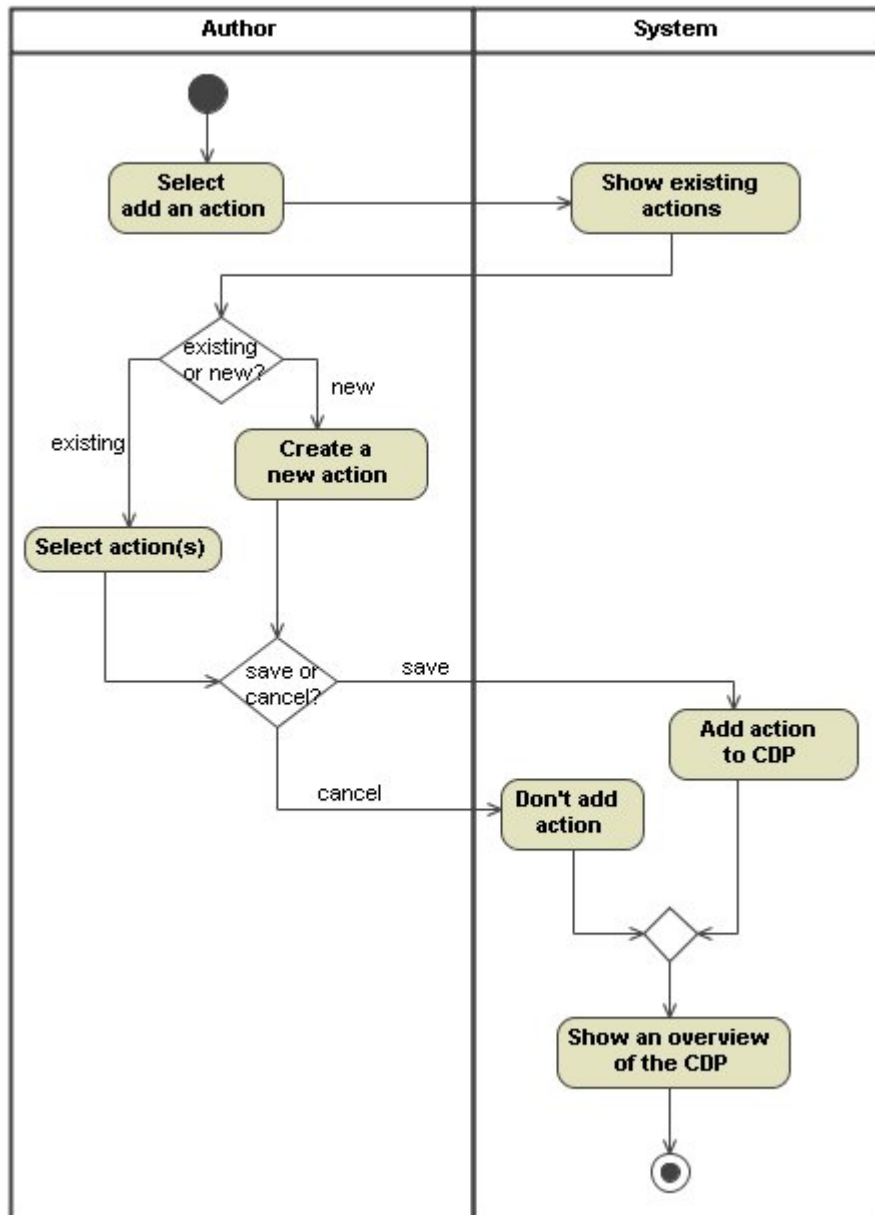
- 1 The Learner selects Select Plan
- 2 The System shows a list of available Competence Development Plans
- 3 The Learners selects a Competence Development Plan
- 4 The Learner cancels the choice
- 5 The System returns to the Competence Profile

4.4.5 Activity diagrams

4.4.5.1 Create a CDP

The standard flow of the creation of a new competence development plan is based on the general activity diagram in section “4.1.4.1 Create an object”.

4.4.5.2 Add action



Activities

Select add an action

Start adding an action to a competence development plan.

Show existing actions

The system shows a list with all the available actions that can be added to the competence development plan.

Create a new action

If the user wants to create a new action he/she can do it. The standard flow of the creation of a new action is based on the general activity diagram in section “*2.1 Create a component*”.

Select action(s)

From the list of available actions the user can select one of them.

Add action to CDP

The system gives the possibility of saving or cancelling the selection. If the user has selected the option of saving the selected action, the system adds the action to the competence development plan.

Don't add action

The system gives the possibility of saving or cancelling the selection. If the user has selected the option of cancelling the selected action, the system doesn't add the action to the competence development plan.

Show an overview of the CDP

Once the user has saved or has cancelled the addition of the action, the system shows a ‘Competence Development Plan’ screen with the details of that CDP.

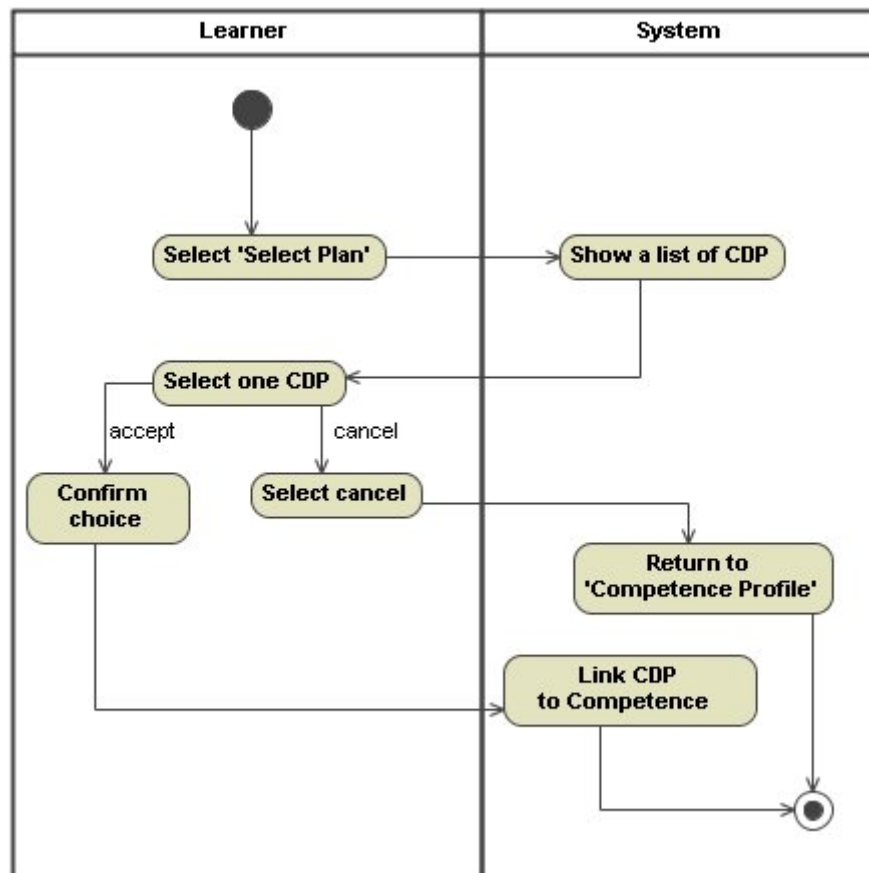
4.4.5.3 View a CDP

The standard flow of consulting a competence development plan is based on the general activity diagram in section “*4.1.4.4 View an object*”.

4.4.5.4 Edit a CDP

The standard flow of the editing a competence development plan is based on the general activity diagram in section “*4.1.4.3 Edit an object*”.

4.4.5.5 Select a CDP



Activities

Select 'Select Plan'

Start the process to link a Competence Development Plan to a Competence Profile.

Show a list of CDP

The system shows a list with all the available CDPs that can be linked to the competence profile.

Select one CDP

From the list of available CDPs the user can select one of them.

Confirm the choice

The user confirms the selection.

Link CDP to Competence Profile

The system then links the Competence Development Plan to the Competence Profile. A CDP applies to exactly one competence. If that competence is used in many of the competence profiles of a learner, that learner will have the same CDP for that competence in all his/her competence profiles.

Select cancel

The user cancels the selection.

Return to 'Competence Profile'

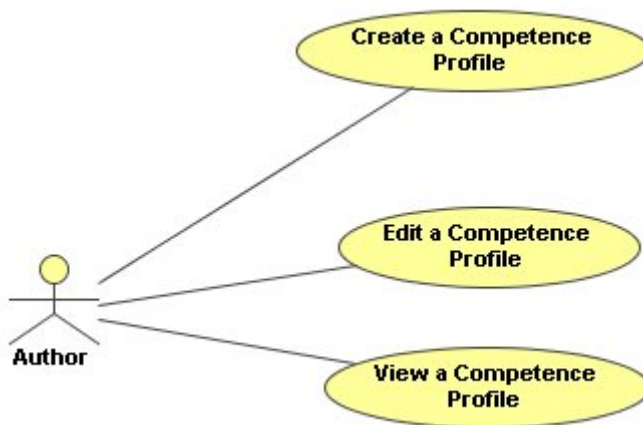
The system then shows the 'Competence Profile' screen.

4.5 **Manage Competence Profile**

4.5.1 *General Objectives*

In order to organise competences in competence maps, a user has to create a competence map and organise the competences that are organised in this map. This use case describes the tasks of creating and manipulating competence maps.

4.5.2 *UML use case diagram*



4.5.3 *Involved user-stereotypes*

- *author* (main user)

4.5.4 *Activity Flow*

Basic flow

- 1 The Author manages Community
- 2 The Author selects Create new Competence Profile
- 3 The Author enters the Community for the Competence Profile
- 4 The System shows an empty Competence Profile Screen
- 5 The Author enters the Competence Profile Details
- 6 The Author Manages Competences
- 7 The Author Manages Share settings
- 8 The Author Confirms the competence Profile
- 9 The System creates the Competence Profile in the chosen Community
- 10 The System shows the overview of Competence Profiles

Alternative Flows

Cancel the creation of a Competence Profile

- 1 The Author manages Community
- 2 The Author selects Create new Competence Profile
- 3 The Author enters the Community for the Competence Profile
- 4 The System shows an empty Competence Profile Screen
- 5 The Author enters the Competence Profile Details
- 6 The Author Manages Competences
- 7 The Author Manages Share settings
- 8 The Author Cancels the creation
- 9 The System does not create the Competence Profile
- 10 The System shows the overview of Competence Profiles

Edit the Competence Profile, and confirm

- 1 The Author selects a Competence Profile
- 2 The Author selects Edit the competence Profile
- 3 The System shows the Competence Profile screen
- 4 The Author enters the community for the Competence Profile
- 5 The Author Manages Competences
- 6 The Author Manages Share settings
- 7 The Author Confirms the competence Profile
- 8 The System updates the Competence Profile

Edit the Competence Profile, and cancel

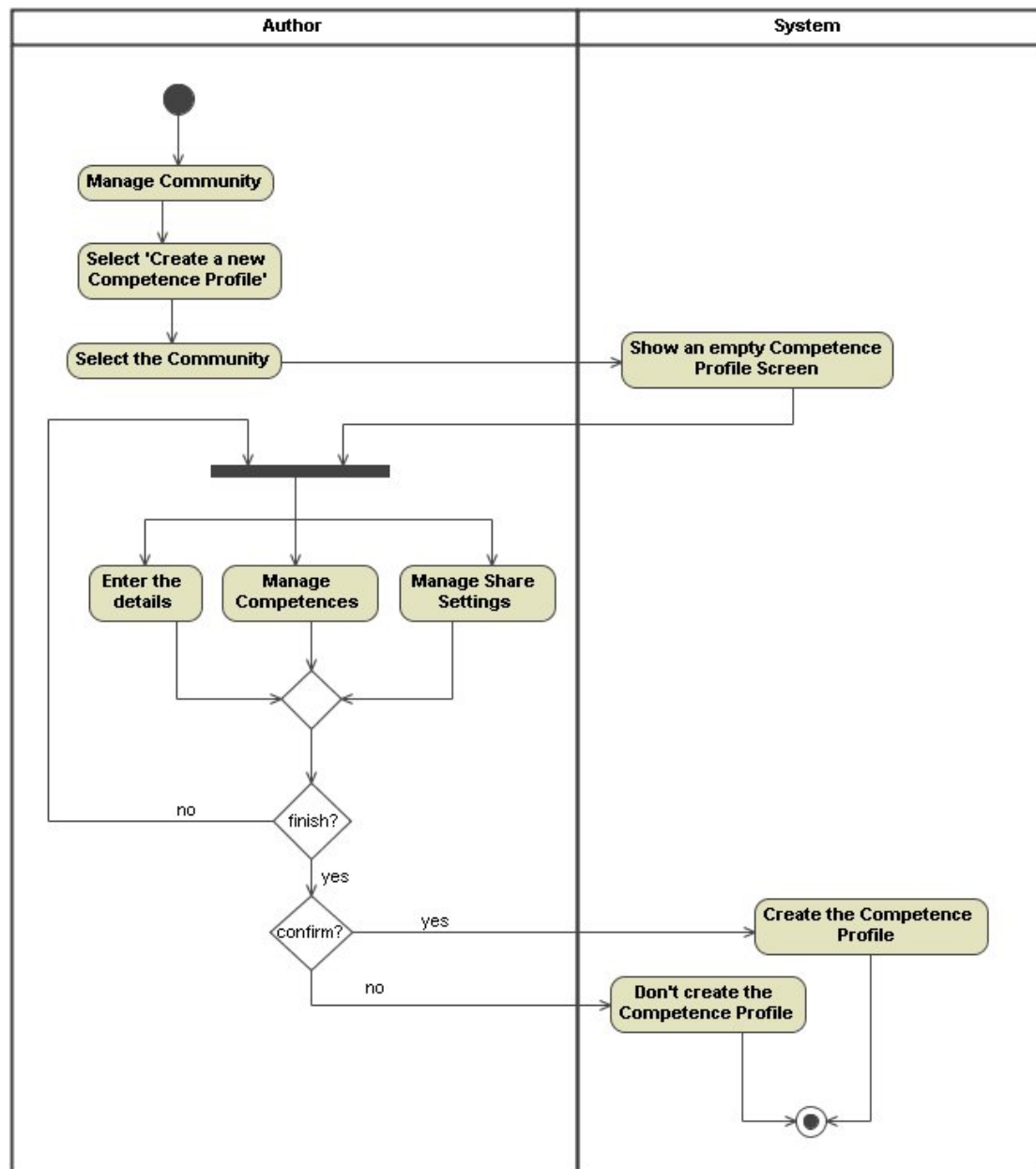
- 1 The Author selects a Competence Profile
- 2 The Author selects Edit the competence Profile
- 3 The System shows the Competence Profile screen
- 4 The Author enters the community for the Competence Profile
- 5 The Author Manages Competences
- 6 The Author Manages Share settings
- 7 The Author Cancels the edit
- 8 The System does not update the Competence Profile

View an overview of the competence profile

- 1 The Author selects view an overview of a competence profile
- 2 The System shows an overview of the competence profile

4.5.5 Activity diagrams

4.5.5.1 Create a Competence Profile



Activities

Manage Community

The first activity that has to be performed to create a Competence Profile is to create and subscribe to a community, these actions are detailed in section “3.-*Manage Community*”.

Select 'Create a new Competence Profile'

Starts the process to create a Competence Profile.

Select the Community

From the list of available communities, the user selects the one he/she is interested in.

Show an empty Competence Profile Screen

The next step in the creation of a Competence Profile is that the System shows a blank "Competence Profile" screen.

Enter the details

The user fills the details of the "Competence Profile" screen.

Manage Competences

In the "Competence Profile" screen the user also have to manage the Competences related to that Competence Profile. The different actions that have to be performed to manage a competence are detailed in section "*4. Manage Competence*".

Manage Share Settings

In the "Competence Profile" screen the user also has to manage the share options that have to be assigned to the Competence Profile. The different actions that have to be performed to manage the share settings are detailed in section "*7. Manage Share Settings*".

Create the Competence Profile

The user confirms the information. The system then creates a new Competence Profile with the provided information.

Don't create the Competence Profile

The user cancels the information and the creation of the Competence Profile.

4.5.5.2 Edit a Competence Profile

The standard flow of editing a competence profile is based on the general activity diagram in section "*4.1.4.3 Edit an object*".

4.5.5.3 View a Competence Profile

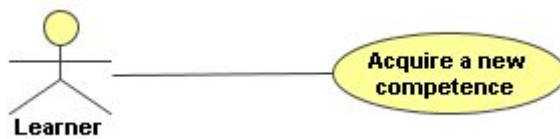
The standard flow of viewing a competence profile is based on the general activity diagram in section "*4.1.4.4 View an object*".

4.6 *Acquire a Competence*

4.6.1 *General Objectives*

In order of acquire a new competence the user has to perform several actions within the PCM. This use case describes the steps that the user has to follow to acquire the desired competence.

4.6.2 *UML use case diagram*

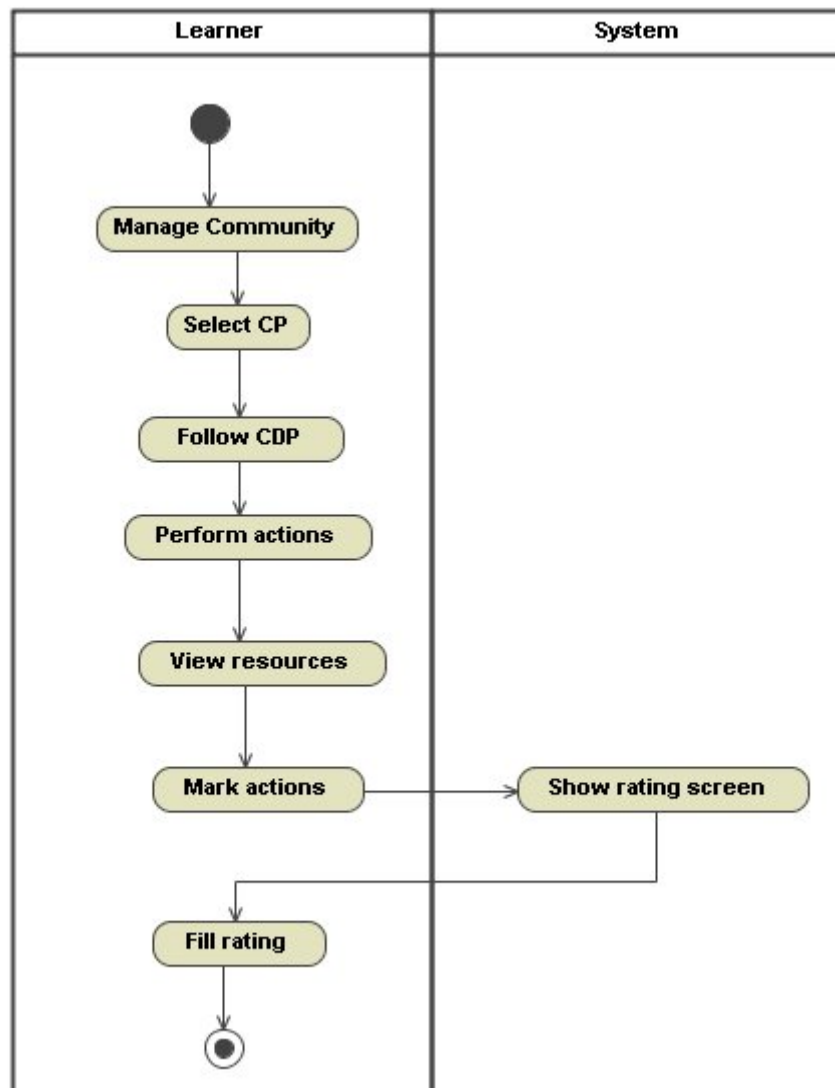


4.6.3 *Involved user-stereotypes*

- *learner* (main user)

4.6.4 Activity diagrams

4.6.4.1 Acquire a new Competence



Activities

Manage Community

The first activity that has to be performed to acquire a Competence is to create and subscribe to a community, these actions are detailed in section “3. *Manage Community*”.

Select CP

The user selects the Competence Profile where he/she wants to acquire the competence.

Follow CDP

In the Competence Profile, the user has to select a Competence Development Plan, the actions for performing a CDP are detailed in section “5. *Manage CDP*”.

Perform actions

The user has to complete the actions that are associated to the CDP to acquire a competence.

View resources

The user can view the resources of all the actions.

Mark actions

Once the user has complete one action, he/she has to mark it to inform the system that can state the action as finished.

Show rating screen

Once the action has been marked as complete, the system shows the rating screen.

Fill Rating

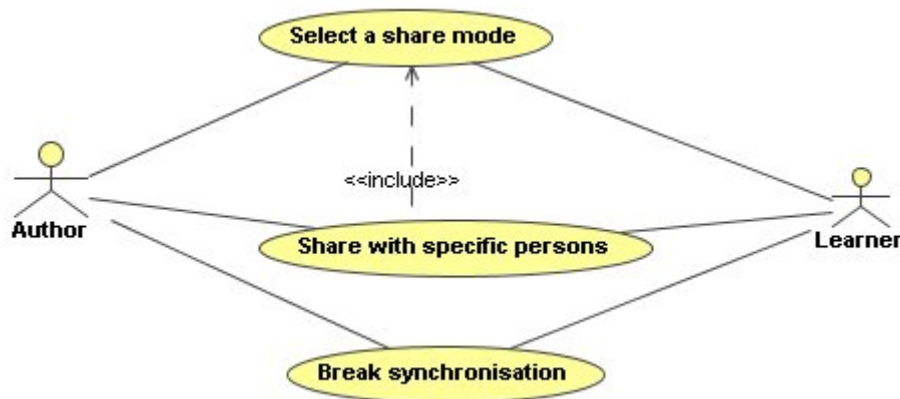
The user fills the details of the rating screen, setting his/her opinion about the action that he/she has just completed. Ratings need to be provided for both completed actions and completed CDPs.

5 Manage Share Settings

5.1 General Objectives

Users organise their personal information together with their competences in the PCM. This use case is about how a user can share his or her personal information with other users of the system.

5.2 UML use case diagram



5.3 Involved user-stereotypes

- *author* (main user)
- *learner*

5.4 Activity Flow

Basic Flow

- 1 The Author selects a share mode
- 2 The System shows the shared mode

Alternatives

Share mode with specific persons, add a person:

- 1 The Author selects the share mode with specific person options
- 2 The System shows the shared mode and enables the add and delete persons options
- 3 The Author selects add person
- 4 The System show a pop-up screen of available users within the Community
- 5 The Author selects one or more person(s) and confirms
- 6 The System closes the pop-up screen and the user is added to the list

Share mode with specific persons, delete a person:

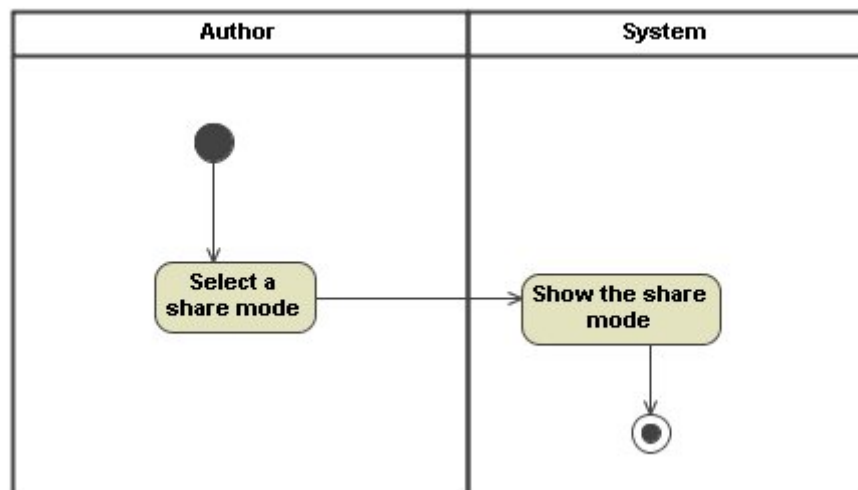
- 1 The Author selects the share mode with specific person options
- 2 The System shows the shared mode and enables the add and delete persons options
- 3 The Author selects one or more person(s)
- 4 The Author selects Delete
- 5 The System deletes the user(s) from the list

Make a private copy, break synchronization:

- 1 The Learner selects an object
- 2 The Learner selects the option of breaking synchronisation
- 3 The system makes a private copy of the object

5.5 Activity diagrams

5.5.1 Select a share mode



Activities

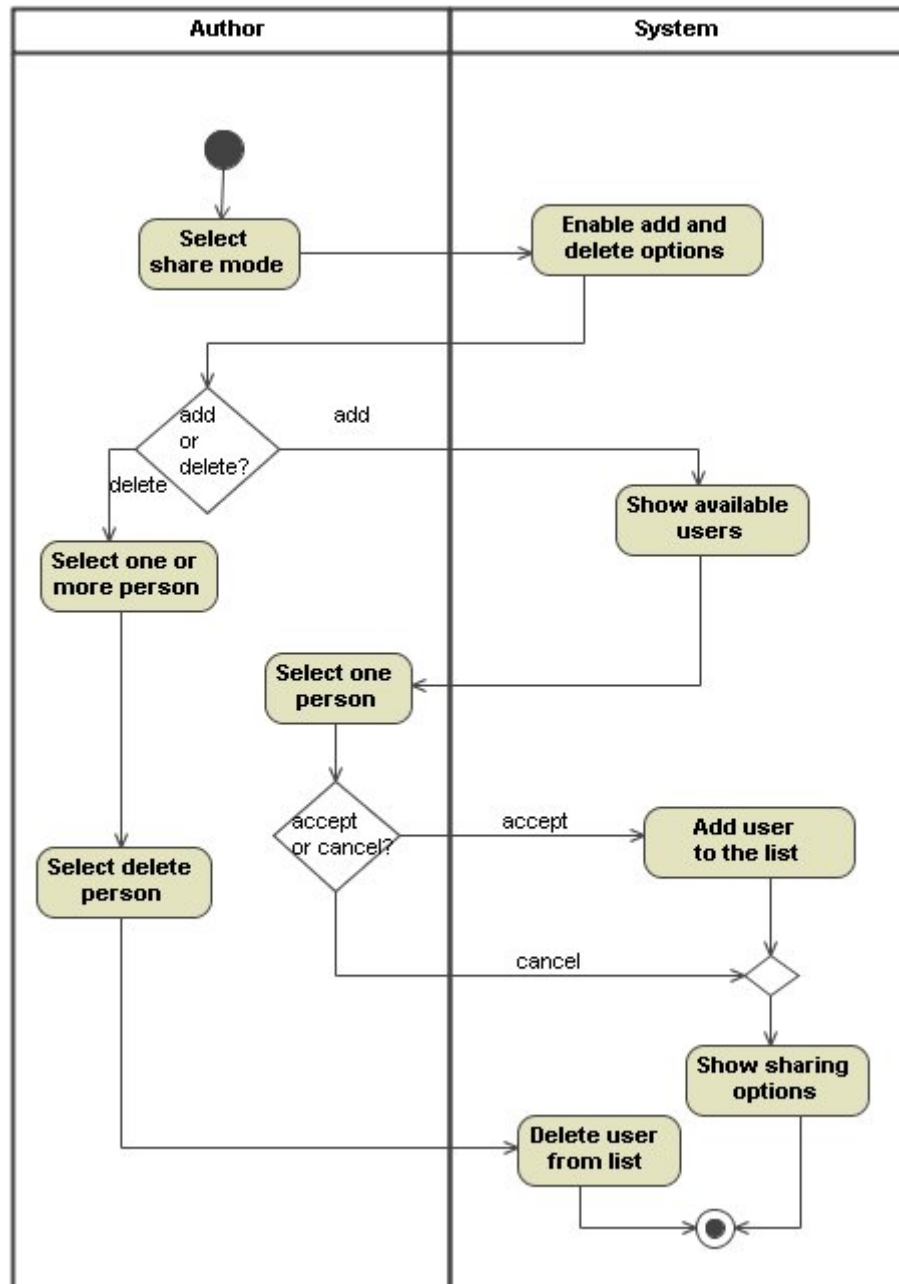
Select a share mode

Depending on the type of the action to be performed, the system shows different types of share. The user selects one of the share modes that the system offers.

Show the share mode

The system shows the selection that the user has just done, each time that the user wants to see the information of a concrete element of the PCM, the system also shows the share mode that has been assigned.

5.5.2 Share with specific persons



Activities

Select share mode

The user selects the share mode of a concrete element. In this case, the user is supposed to select the concrete mode 'share, only specific persons are allowed to update'.

Enable add and delete options

In the moment that the user selects the share mode of an element, the system activates the options of adding or deleting users.

Select one or more person

In the case that the user wants to delete a user from the list of members, the user selects the person or the persons that he/she wants to eliminate.

Select delete person

The user selects the option of deleting the selected persons.

Delete user from list

The system deletes the selected persons from the list of people that can add members.

Show available users

The system shows a list with all the available users. Moreover the user can perform a search of users to add to the list.

Select one person

The user selects one or more persons from the list.

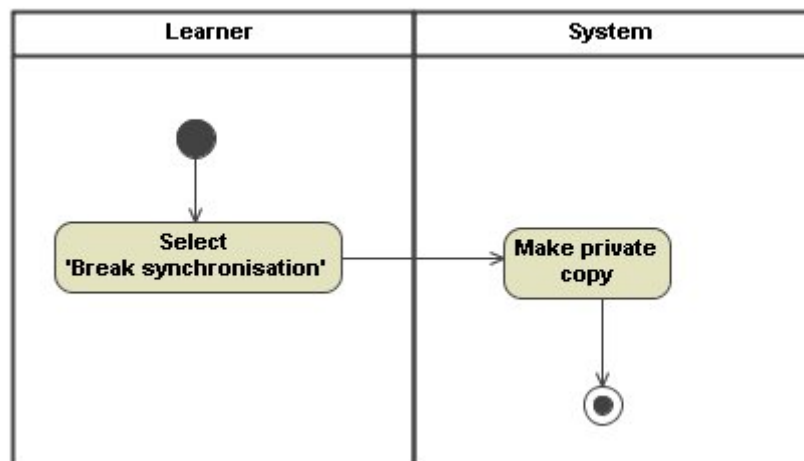
Add user to the list

The system adds the selected persons to the list of people that can add members.

Show sharing options

The system shows the different types of share that can be assigned to a concrete element.

5.5.3 Break synchronization



Activities

Select 'Break synchronisation'

The user wants to make a private copy of an existing object. Within the selected object, the user selects the option of braking synchronisation to start the process.

Make private copy

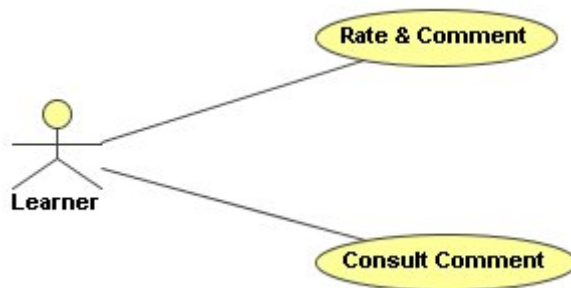
The system makes a private copy of the selected object without any share options associated.

6 Manage Rating

6.1 General Objectives

Ratings and commenting content and people is a common and easy way for peer assessment. This use case reflects the two parts of the rating/commenting process. The first part is to contribute a rating or a comment. The second part is about receiving ratings and comments from others.

6.2 UML use case diagram



6.3 Involved user-stereotypes

- *learner* (main user)

6.4 Activity Flow

Basic Flow

- 1 The Learner enters the rating info
- 2 The Learner confirms
- 3 The system saves the rating closes the screen
- 4 The system shows the rating and the average rating

Alternatives

The Learner cancels:

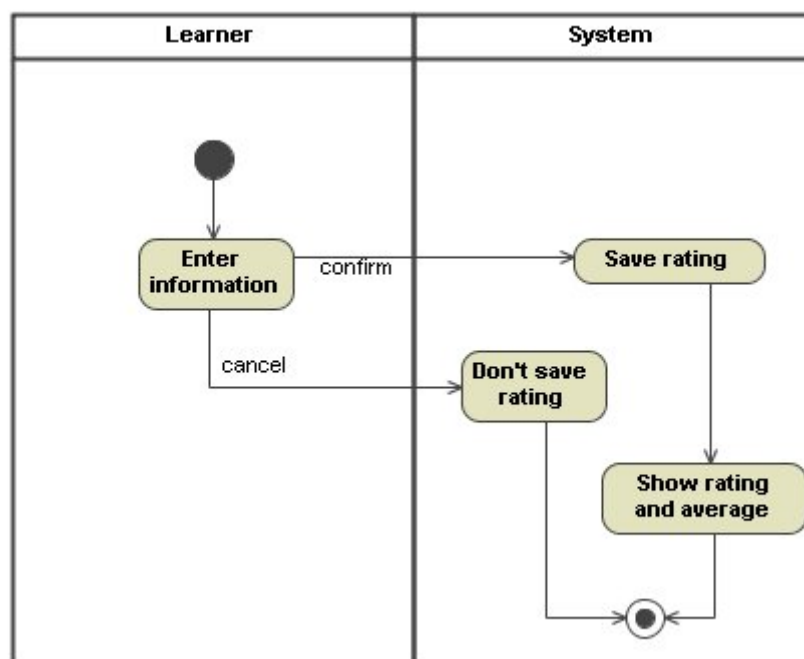
- 1 The Learner enters the rating info
- 2 The Learner cancels
- 3 The system does not save the rating closes the screen
- 4 The system shows the rating and the average rating

The Learner selects to view a comment:

- 1 The Learner selects a rating comment
- 2 The System shows the rating information screen
- 3 The Learner returns
- 4 The System show the main screen

6.5 Activity diagrams

6.5.1 Rate & Comment



Activities

Enter information

The user provides a rating and a comment about his/her experience.

Save rating

If the user is in agreement with the written information, he/she confirms the rating and the system saves it.

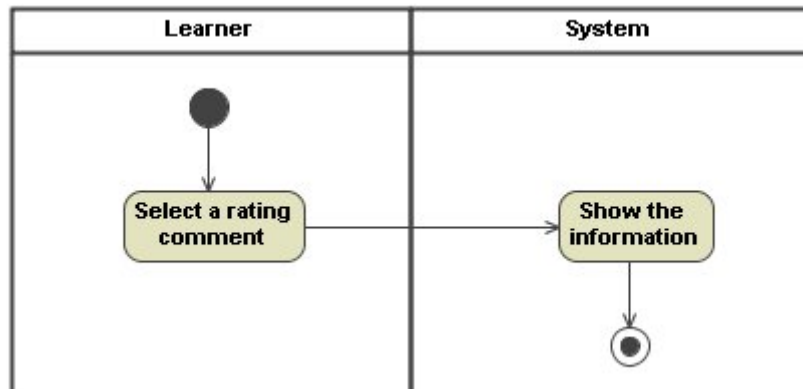
Show rating and average

The system shows the information related to the action that the user has just entered.

Don't save rating

If the user isn't in agreement with the written information, he/she cancels the rating and the system doesn't save it. The completion of an object is also cancelled. An object is only completed after giving a rating and saving it.

6.5.2 Consult Comment



Activities

Select a rating comment

The user selects the action, the Competence Development Plan or the Community for reading the comment. If the selected element has more than one comment the user selects one of them.

Show the information

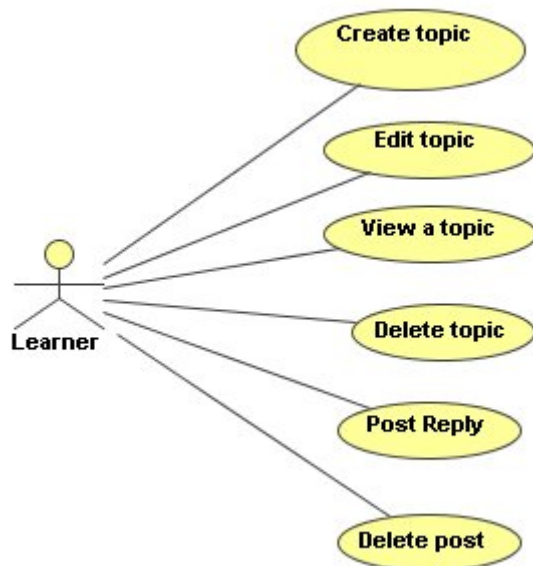
The system shows the information of the rates and comments of the selected element.

7 Provide & Request Support

7.1 General Objectives

Learners need support on their learning process. The high level use case “Want some support” mentions abstract “support providers”. This use case defines the activity flow for requesting support from a discussion group or forum. In this particular case the forum is an instance of a “support provider”.

7.2 UML use case diagram



7.3 Involved user-stereotypes

- *learner* (main user)

7.4 Activity Flow

Basic Flow

- 1 The Learner posts a new topic on the Forum
- 2 The system shows the topic screen
- 3 The Learner enters the Topic
- 4 The Learner confirms
- 5 The System adds the topic to the forum

Alternatives**The Learner cancels:**

- 1 The Learner posts a new topic on the Forum
- 2 The system shows the topic screen
- 3 The Learner enters the Topic
- 4 The Learners cancels
- 5 The System does not add the topic to the forum

Edit topic and confirm

- 1 The Author selects a topic
- 2 The System shows the topic screen
- 3 The Author fills in the details and confirms
- 4 The System saves the changes on the topic

Edit topic and cancel

- 1 The Author selects a topic
- 2 The System shows the topic screen
- 3 The Author fills in the details and cancels
- 4 The System does not save the changes on the topic

The Learner views a topic on the forum:

- 1 The Learner selects a topic on the forum
- 2 The Learner selects view
- 3 The system shows the topic screen

Delete topic

- 1 The Author selects a topic
- 2 The Author selects to delete the topic
- 3 The System deletes the topic

The Learner creates a post reply and sends it:

- 1 The Learner selects a topic on the forum
- 2 The system shows the details of the topic
- 3 The learner select post reply
- 4 The learner fills the details of the reply
- 5 The learner sends the post
- 6 The system saves the reply and adds it to the topic list

The Learner creates a post reply and cancels it:

- 1 The Learner selects a topic on the forum
- 2 The system shows the details of the topic
- 3 The learner select post reply
- 4 The learner fills the details of the reply
- 5 The learner cancels the post
- 6 The system doesn't save the reply and show the topic details

Delete post

- 1 The Author selects a post
- 2 The Author selects to delete the post
- 3 The System deletes the post

The Learner creates a new topic for an action

- 1 The Learner selects an action
- 2 The System shows the topics of the action
- 3 The Learner selects new
- 4 The system opens an editor for the new action

The Learner creates a new topic for a Competence Development Plan

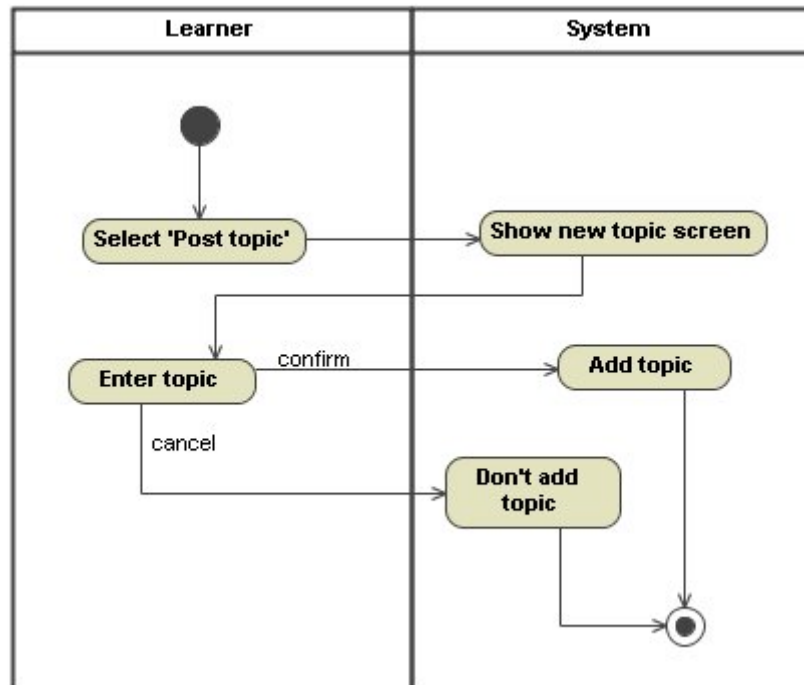
- 1 The Learner selects a Competence Development Plan
- 2 The System shows the support topics of the Competence Development Plan
- 3 The Learner selects new
- 4 The system opens an editor for the new Competence Development Plan

The Learner creates a new topic for a Competence Profile

- 1 The Learner selects a Competence Profile
- 2 The System shows the support topics of the Competence Profile
- 3 The Learner selects new
- 4 The system opens an editor for the new Competence Profile

7.5 Activity diagrams

7.5.1 Create topic



Activities

Post a new topic

When the user wants some support he/she selects the desired object and starts the creation of a new topic.

Show new topic screen

The system displays a new topic screen related to the objects previously selected by the user.

Enter topic

The user fills the details of the topic.

Add topic

If the user is in agreement with the written information, he/she confirms the topic and the system saves it.

Don't add topic

If the user isn't in agreement with the written information, he/she cancels the topic and the system doesn't save it.

7.5.2 *Edit topic*

The standard flow of editing a topic is based on the general activity diagram in section “4.1.4.3 *Edit an object*”.

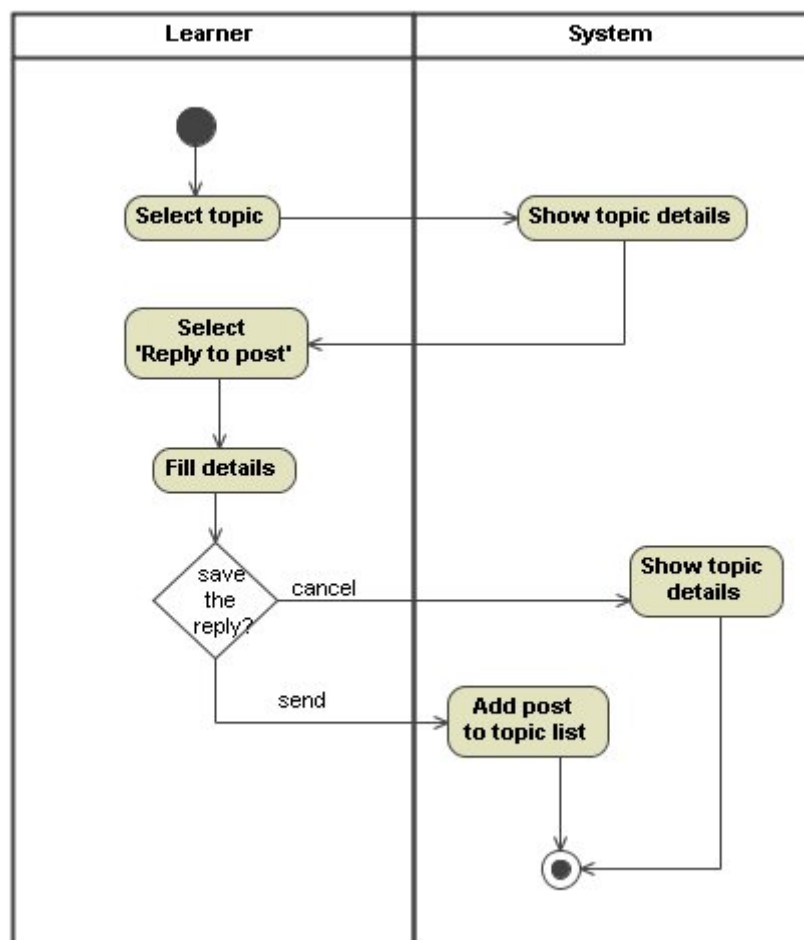
7.5.3 *View topic*

The standard flow of viewing a topic is based on the general activity diagram in section “4.1.4.4 *View an object*”.

7.5.4 *Delete topic*

The standard flow of deleting a topic is based on the general activity diagram in section “4.1.4.2 *Delete an object*”.

7.5.5 *Post reply*



Activities

Select topic

Within a concrete object of the system, the user selects one of its topics.

Show topic details

The system displays the topic screen including its details and descriptions.

Select 'Reply to post'

The user decides to reply to that topic, so he/she selects 'Reply to post'.

Fill details

The user fills the details of the reply.

Show topic details

If the user decides to cancel the reply of the post, the system shows the topic screen with its details and description.

Add post to topic list

If the user decides to send the reply of the post, the system saves it and adds the post to the topic list.

7.5.6 *Delete post*

The standard flow of deleting a topic is based on the general activity diagram in section "4.1.4.2 *Delete an object*".

8 User Creation

8.1 General Objectives

When the user first enters into the PCM, he or she doesn't have a profile on the server, the first action the user will perform is to register into a community, at this moment, the process of creation of the new user will start. This use case defines the registration of a new user within the PCM.

8.2 UML use case diagram

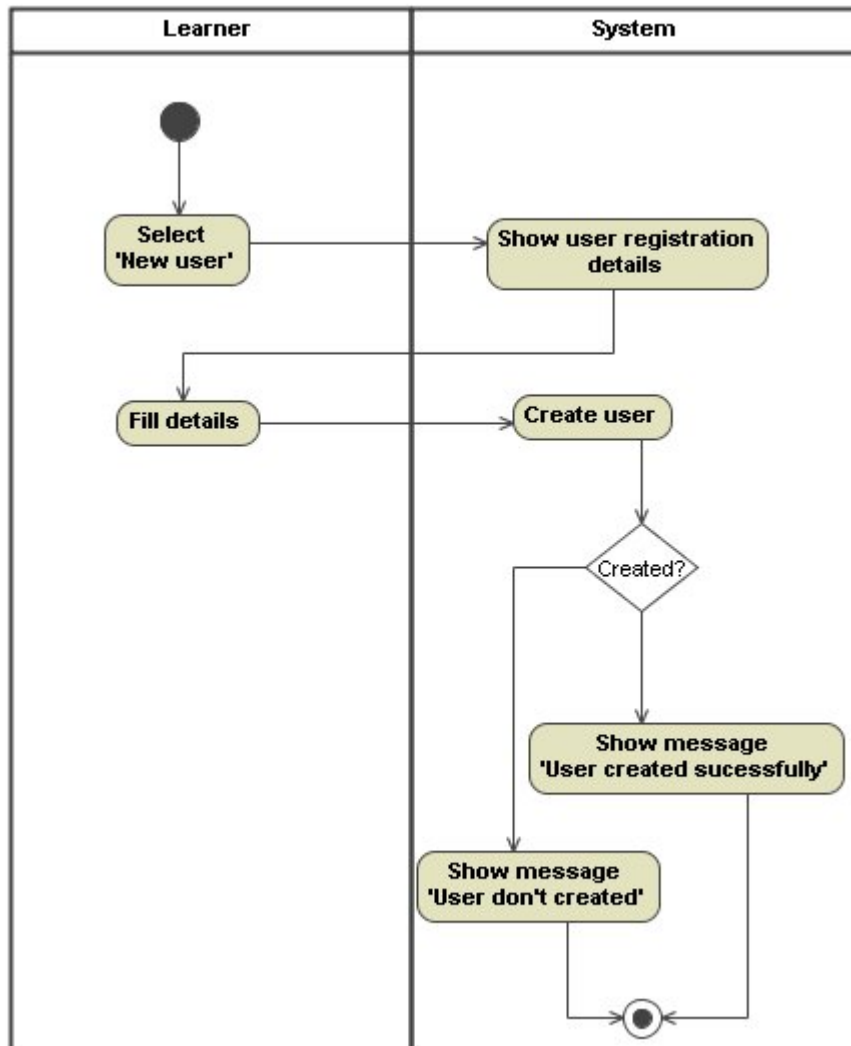


8.3 Involved user-stereotypes

- *learner* (main user)

8.4 Activity diagrams

8.4.1 Register user



Activities

Select 'New user'

The system asks the user if he/she is a new user or a registered one. The user selects the option of new user.

Show user registration details

The system shows a screen with the registration details that the user has to fill to create his/her user.

Fill details

The user fills the details for the creation of the new user.

Create user

Once the user has finished filling the details, the system starts the process of creation the new user.

Show message 'User created successfully'

If the process has finished successfully, the system shows a message indicating this information.

Show message 'User don't created'

If there has been any problem within the server and the system has not been able to create the new user, a message is shown to indicate this information.

9 Data Model

The data model provides a different view on a software system's organisation. While activity diagrams show processes, workflows, and interactions between the different components of the system, the data model shows the relation between the data objects that are created, processed, and managed by the system. In that sense, the data model provides a view on the organisation and structure of a software system, whereas the activity diagrams show the dynamics within it.

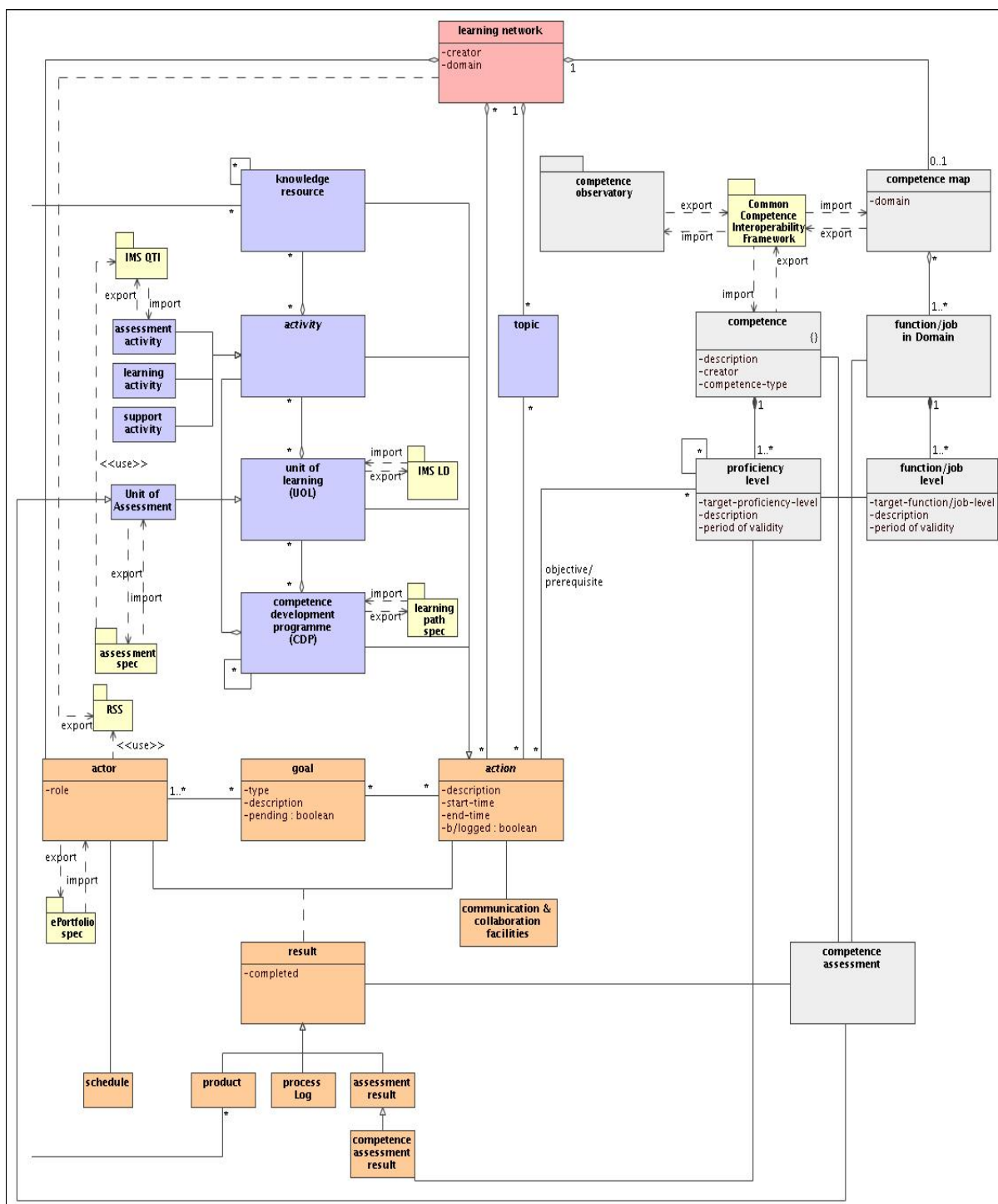
The following sections show the different levels of abstractions of TENCompetence's PCM. First, the *domain model* describes the relation of components and concepts. This model provides the conceptual structure of the PCM. Second, the *database model* describes the internal organisation of data in terms of a database. The database model shows dependencies and relations between data objects and allows estimating potential aggregations and usages of the data to the level of atomic data fields. Third, the *data model* shows the relations between the different data objects provided by the TENCompetence services. The data model links the domain model with the database model.

9.1 Domain Model

A Domain Model can be thought of as a conceptual model of a system which describes the various entities involved in that system and their relationships. The Domain Model is created to document the key concepts and the vocabulary of the system, it also displays the relationships among all major entities within the system, which means that it provides a structural view of the system which is normally complemented by the dynamic views in Use Case models.

The Domain Model is expressed as an UML class diagram and a vocabulary defining each concept (class) in the model. The Domain Model serves several functions in the project:

- a) to define the scope of the project, including the scope for the use cases,
- b) to define the vocabulary used,
- c) to define the relationship between the concepts used,
- d) to define the overall conceptual architecture,
- e) to provide a technological theory for the project that must be tested in the pilots,
- f) to provide a starting point for the design of other models, like the data model and services,
- g) to provide the minimal functional components that must be present in the TENCompetence infrastructure.



The TENCompetence System that we are developing must meet at least 7 core functional requirements according to the project plan:

1. Support for new, promising, innovative pedagogical and organisational approaches for lifelong competence development that use the possibilities of new technologies available. This includes an integration of formal and informal learning.
2. Help learners to get an overview of all the possible formal and informal knowledge resources, units of learning, programmes and learning networks that are available, and to identify the most appropriate for their needs and background.
3. Stimulate the pro-active sharing of knowledge resources.
4. Provide support for competence assessment, including the assessment of the competences of applicants, employees and learners who have studied and worked in a variety of formal and informal settings.
5. Provide effective and efficient support for users during the performance of the various tasks in various roles (learner, teacher, assessor, etc.).
6. Provides support for decentralized, self-organized and empowered management.
7. Integrates four different types of models and tools used for competence development, i.e. tools and models for:
 - a) knowledge sharing & management,
 - b) the creation & use of learning activities and units of learning,
 - c) creation & use of formal and informal competence development programmes for lifelong learning and
 - d) creation and use of learning networks & learning communities for lifelong learning.

The model is a further elaboration of the initial domain model that was specified in the project plan. It includes more details than the original version and it concentrates on the aspects of the system that will be represented in the TENCompetence System to fulfil the 7 requirements.

The model was drawn with the UML tool 'MagicDraw' version 11.0. The documentation in this document is a copy of the documentation in the MagicDraw document. The most recent version of the Domain Model can be found at <http://hdl.handle.net/1820/649>.

The system that is currently being developed within TENCompetence, the PCM tool, 'Personal Competence Manager', must implement in its final release, as it is said above, the seven core objectives of the project, as well as the high level use cases.

9.2 Database Model

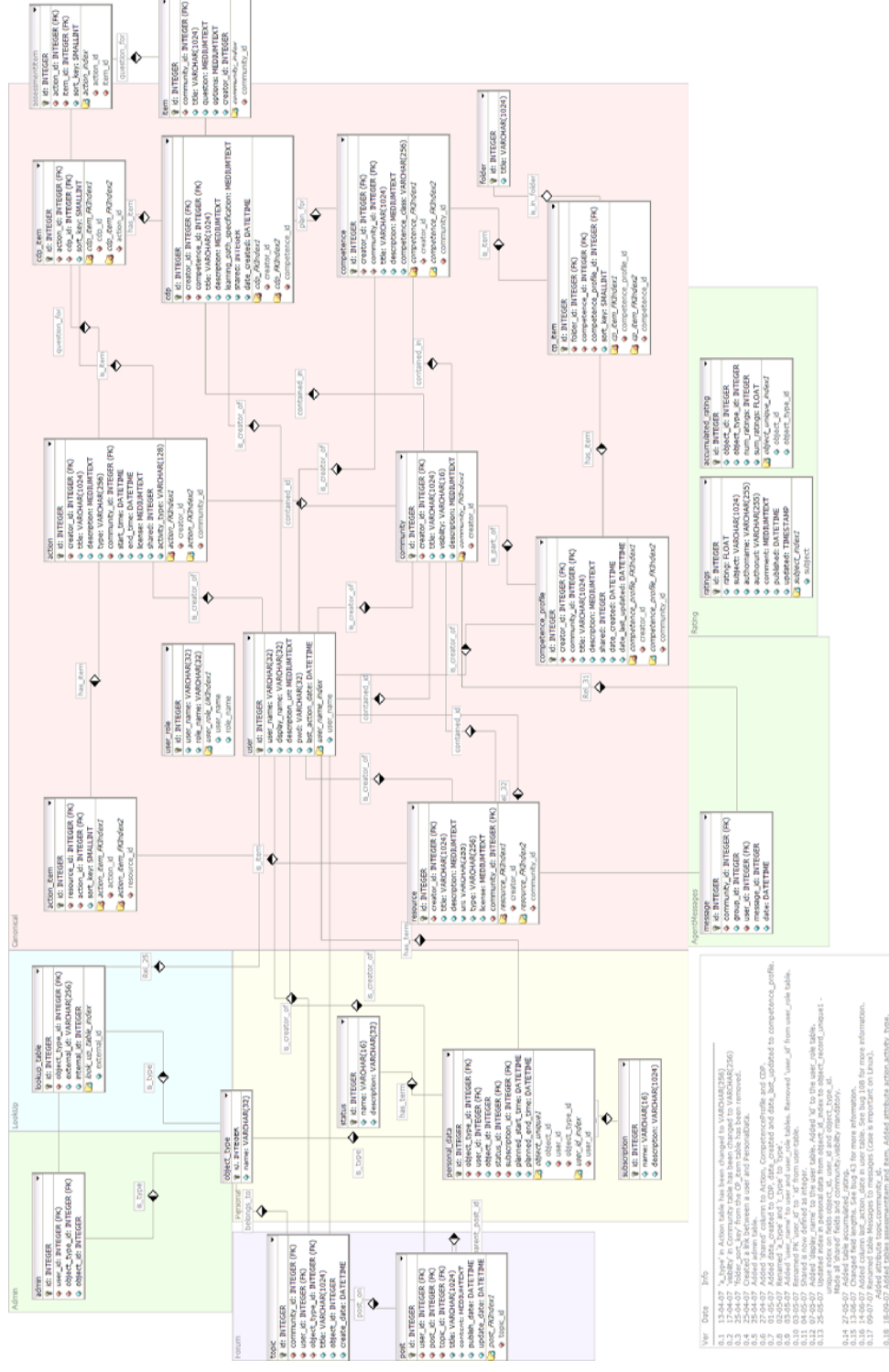


Figure 4: Database Model

The schema above represents the database model of the first release of the TENCompetence Personal Competence Manager (PCM). The different tables represent the objects that can be found in the PCM and the relations between them. In the future releases of the PCM, this database model will change including new tables that will add functionalities to the system.

9.3 *Data Model*

The data model is a link between the domain model and the database model, a diagram that can be used for a better understanding of the current implementation of the TENCompetence Personal Competence Manager (PCM) in relation with the last version of the domain model.

The provided diagram, called Data Model, shows in a very visual and graphical way, the classes and entities of the domain model that have already been implemented in the current version of the PCM, and that have their correspondence in the database model of the PCM. Across this diagram, the correspondences between the classes of the domain model and the tables of the database model can be seen.

The system of TENCompetence, the PCM, will produce some releases before its last version, in the first one of all of them, the current one, only some of the functionalities described in the objectives of the project and some parts of the high level use cases have been implemented, for this reason it hasn't been necessary to implement all the classes of the domain model in the database model of the PCM.

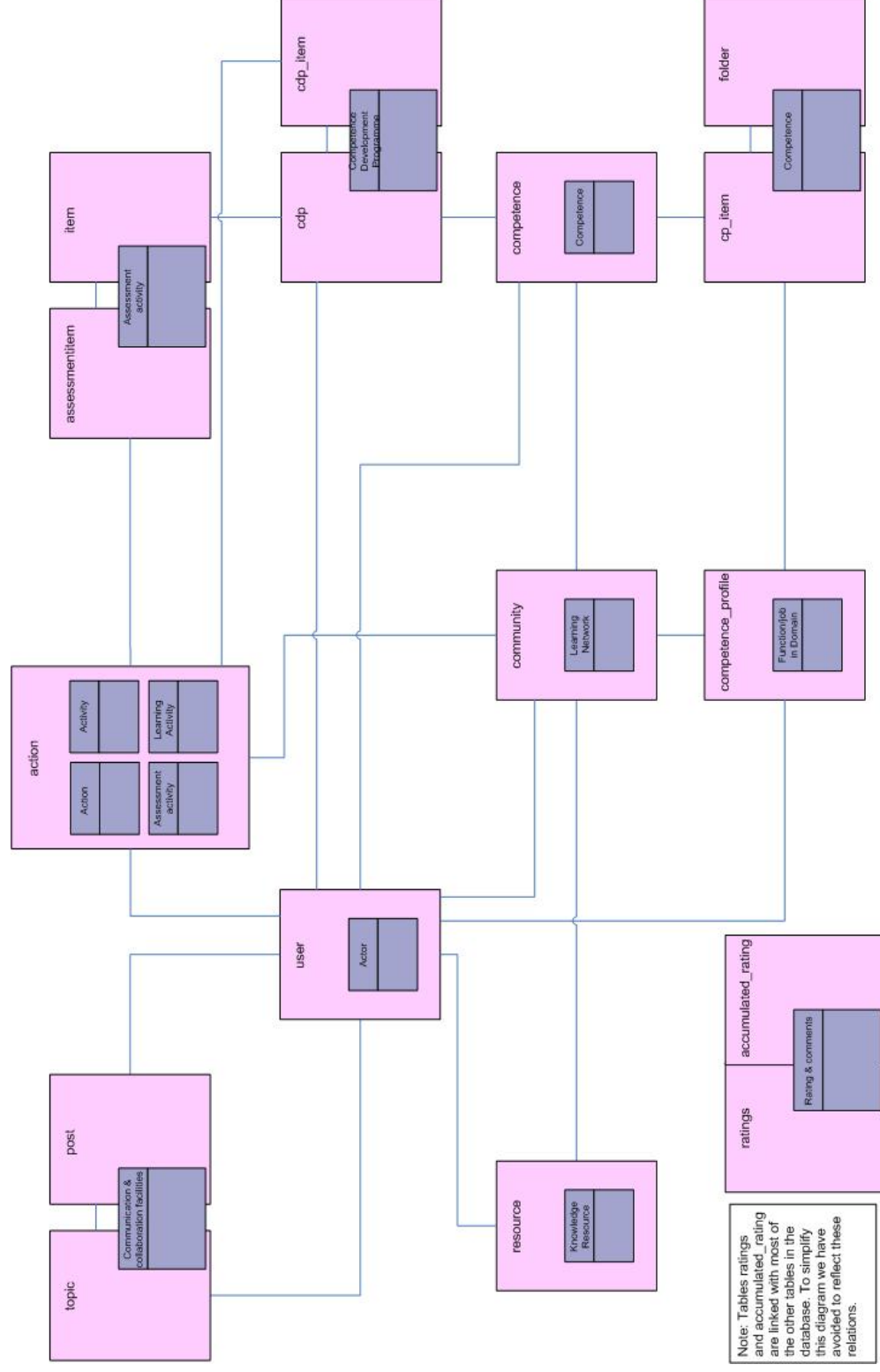


Figure 5: Data Mode

In 'Figure 6: Classes of the Domain Model' there is a list of the classes that appear in the Domain Model but don't have correspondence in the Database Model, and therefore they won't have their correspondence in the PCM.

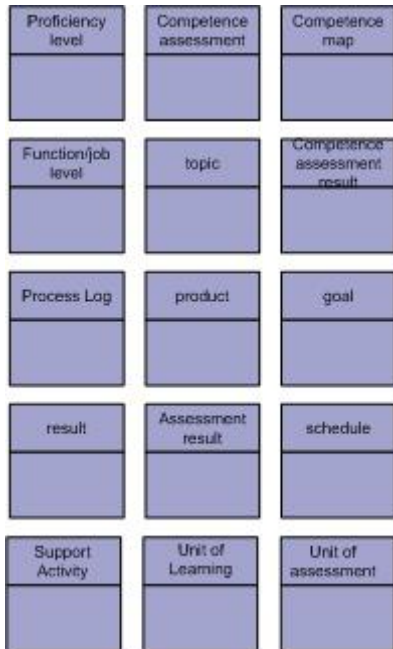


Figure 6: Classes of the Domain Model

On the same way that some classes of the domain model are not reflected in the database model, some of the tables of the database model don't have correspondence in the domain model. In order to develop a database model complete and consistent, some administrative or auxiliary tables have been used, in the 'Figure 7: Tables of the Database Model', are described the tables just mentioned.

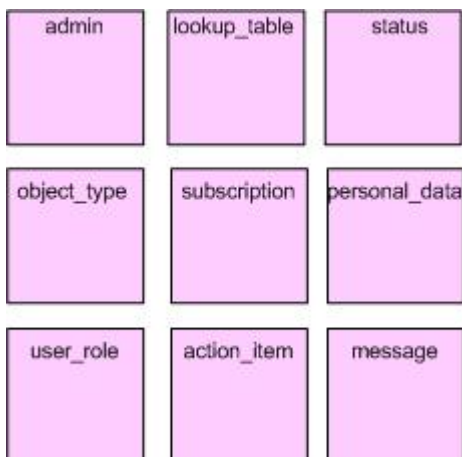


Figure 7: Tables of the Database Model

10 Conclusions

This document describes the elaborated use cases that are implemented in the first version of the TENCompetence Personal Competence Manager (PCM). The use cases that are documented in this document are elaborations of the initial requirements and the high level use cases for implementing the PCM accordingly to the objectives of the project.

The use cases and activity diagrams shown in this document define the functionality of the PCM. In parts these definitions extend the high level use cases or transfer abstract specification to the user level.

This document also describes the domain model which is the base of the TENCompetence Personal Competence Manager (PCM), the database model that structures the PCM, and the data model that establishes the relation between the domain model and the database model. At this stage of the TENCompetence project, most of the main classes of the domain model have already been implemented in the PCM. The future releases of the PCM will implement additional classes of the domain model.