



Education and Culture DG

ViPi Project 511792-LLP-1-2010-1-GR-KA3-KA3NW

Lifelong Learning Programme



Virtual Portal for Interaction and ICT Training for People with Disabilities

Integrated ViPi platform

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Version History table

Version no.	Date	Dates and comments
0.1	01-11-2011	First draft version describing activity UML diagrams
0.2	23-11-2011	Draft version edited by Manolis Nikiforakis (Steficon)
0.3	29-03-2012	Draft version with comments from EuroCy and PhoenixKM
0.4	07-05-2012	Draft version UML diagrams enriched with developed mobile application functionality (Steficon)
1.0	31-05-2012	Final version compiled by Steficon

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1 Introduction

The main purpose of the deliverable “D15-Web 2.0 mobile applications” is to describe the functionality and the contemporary mobile technologies that support ViPi mobile client as the means to achieve Web 2.0 facilities to the Users. Chapter 2 describes the Web 2.0 application aims & objectives. Chapter 3 presents the ViPi mobile application functionality. Chapter 4 describes the adopted technologies. Chapter 5 is dedicated to the semantic functionality inherited by the integrated platform.

Finally, Annex I includes the ViPi UML activity diagrams on which the development was based upon.

2 Web 2.0 application Aim & Objectives

Web 2.0 applications aim at improving the interaction between users and their principles overlap with characteristics of knowledge management (KM) or could be applied to reshape KM practices. This gives space to improve the sharing and creation of knowledge.

The creation of an application that will facilitate the Users in using the service while mobile and additionally to give them the ability of using the means of Web 2.0 was a stake of ViPi project to win. The application has been developed, giving to the Users access to the Learning Objects, news and postings, with the ability to interact with it in groups or individually. Sharing with the community (Facebook, Twitter, as well as other social networks) is a process that can be carried out by pushing the appropriate link. Commenting and rating of the provided content is also a functionality that has been made available in the mobile ViPi client.

3 ViPi Mobile app Functionality

ViPi portal is currently available through the following web page:

http://vipidev.dyndns.org:8080/sites/ViPi_portal/

Access through the mobile app occurs automatically, since after installation, the client has already predefined the required URL for making the connection and retrieve information from the portal (see figure below: Figure 3 Login by input of credentials).

3.1 Installing ViPi mobile client

The User downloads the ViPi mobile client apk on his device. By using a file manager he can find the apk and by clicking on it the installation process begins. After a successful installation, the following information is presented to the User:

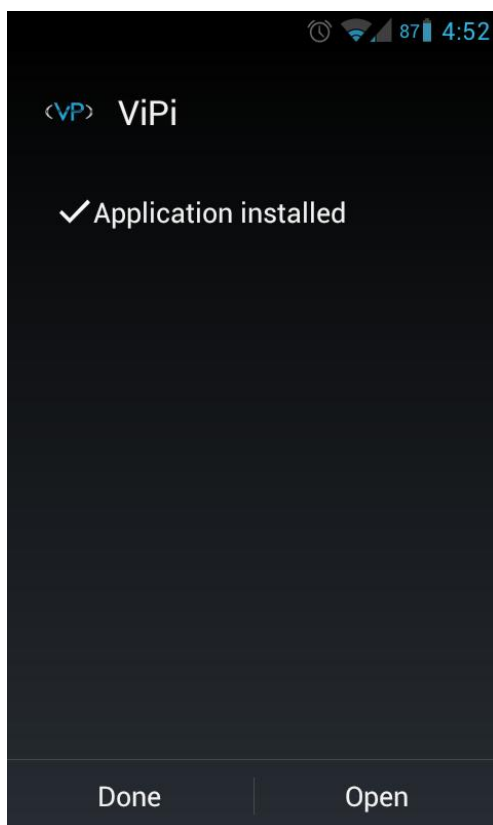


Figure 1 Successful installation of ViPi mobile apk on an Android device

3.2 Registering with ViPi

Registration takes place at the main ViPi integrated platform, so that the User inputs all necessary information (language, type of disability, etc.), while the mobile version offers access to ViPi information during the time the User is mobile. Through his/her device, the User can login with the own credentials in order to acquire the functionality provided, further to just reading the postings (i.e. make comments, rate articles, subscribe to content, etc.)



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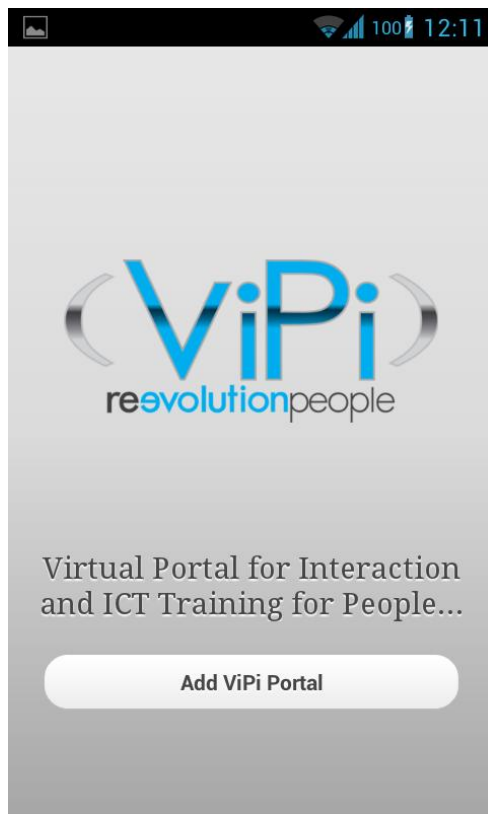


Figure 2 ViPi mobile client splash screen

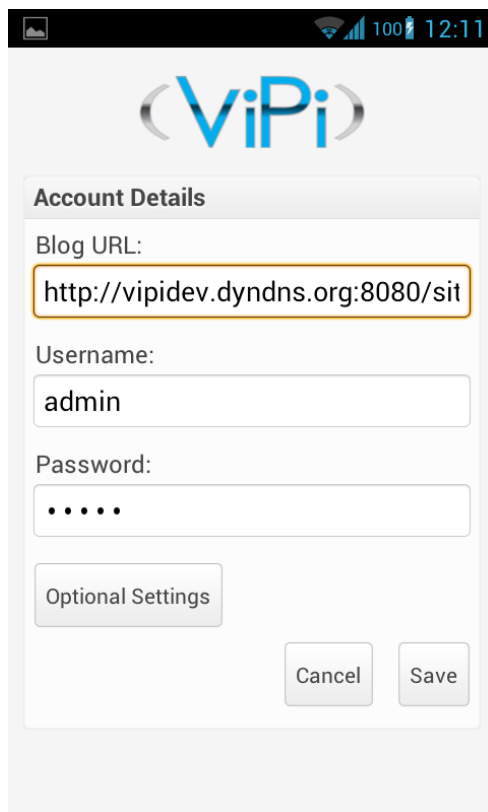


Figure 3 Login by input of credentials

3.3 Reading news and subscribing to content

As long as the User has not used his/her credentials to login to the ViPi service the only available functionality is to read news / content / postings. In order for the User to be able to interact and use the social functionality of ViPi platform, he/she must login.

After the User has logged-in to the ViPi service he/she will have all interactive functionality available, comprising making comments to posted material, rating articles, subscribing to content, etc.

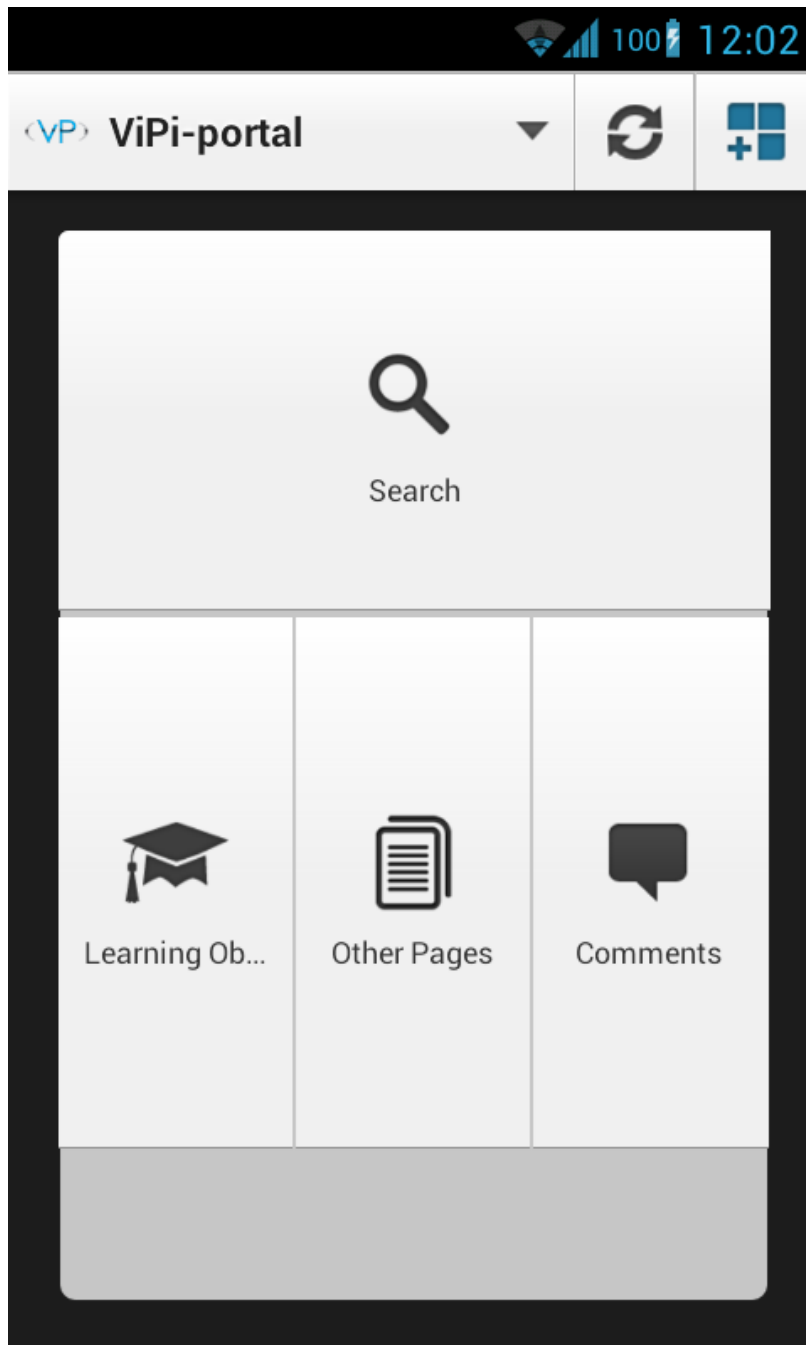


Figure 4 Selections on main mobile ViPi screen (search, browse Learning Objects, see comments and other pages)

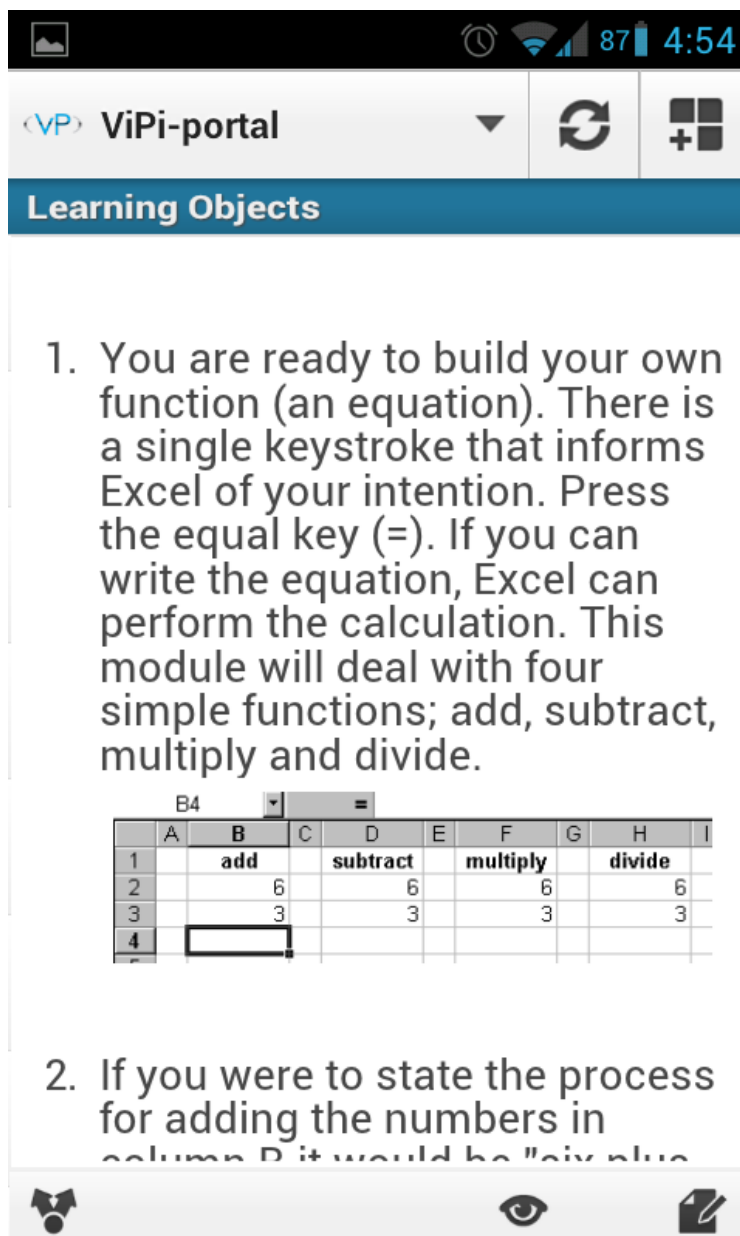


Figure 5 Reading an article / posting on mobile ViPi client

3.4 Finding appropriate content

The User has the ability to find the content he / she prefers either by browsing among posted material or by using the searching functionalities available by the ViPi mobile client.

There is a "simple search" functionality available, which carries out searches to all ViPi posted information, except Learning Objects. Specifically for such (learning) content search a step-by-step searching mechanism exists, which uses semantic keyword searching throughout the ViPi ontology. Both functionalities are presented in the following section (3.5)

3.5 Performing a simple and advanced search

As it was mentioned in the previous paragraph there is a “simple search” functionality available in the mobile ViPi client, which performs search to the whole ViPi posted information, except Learning Objects. The User by pressing the search icon is presented with a pop-up input box where he / she can enter the search keyword. In the case of a successful search, a list of results is presented to the User for further selection of the subjects of interest.

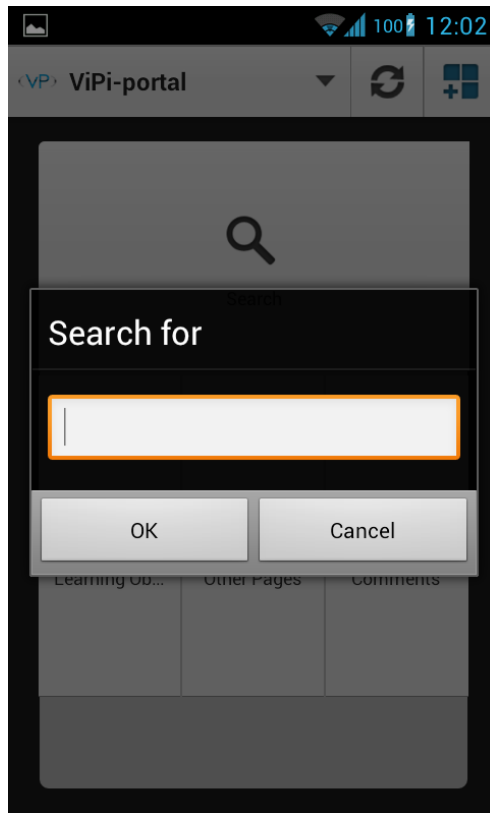


Figure 6 Simple search functionality of ViPi mobile client

A second searching mechanism is also available, namely the “advanced search”, which carries out step-by-step searching (and uses semantic keyword searching throughout the ViPi ontology) by following the “narrow down” of results paradigm. With this advanced search functionality, the User is able to find subjects of interest among all posted Learning objects.

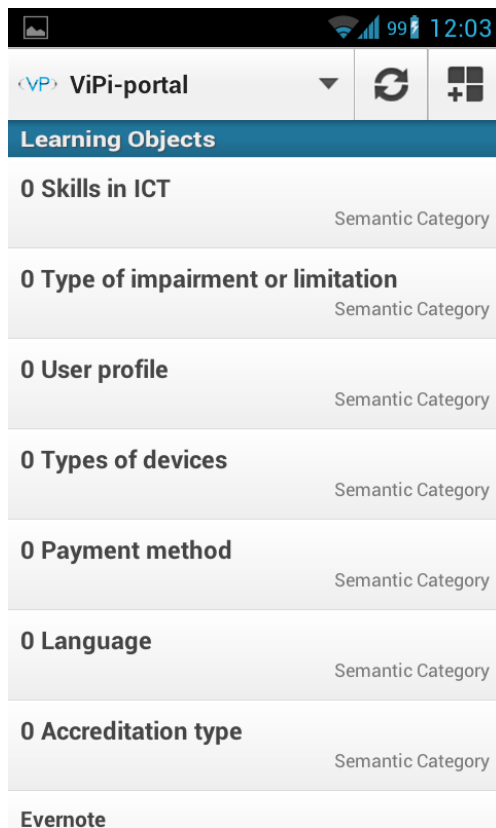


Figure 7: Semantic step-by-step search (advanced search) throughout ViPi ontology

3.6 Using the ViPi mobile social network

The mobile ViPi client has the ability to take advantage of the social networking nature of the ViPi platform comprising:

- Sharing with the Community (Facebook, Twitter, etc. depending on which social networking applications the User has already installed on his / her mobile)
- Commenting on postings: The User has the ability (but always depending on the access level of his / her profile) to comment on the posted to ViPi platform information, creating in this way a social discussion on relevant to ViPi scope subjects
- Rating postings

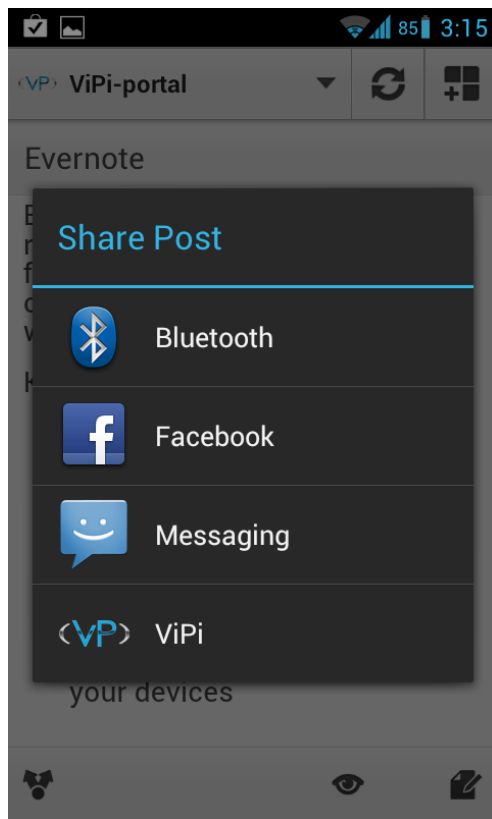


Figure 8 Ability to share a ViPi posted information with the Community

3.7 Playing serious games (mobile versions)

The Users will have the opportunity to download Learning material from the ViPi platform, either through the main (desktop) site or through the mobile ViPi client. Serious games constitute a major type of Learning Objects, and as such can be either installed and played as native Android applications, or through the integrated browser as flash games.

4 Adopted Technologies

The following subsections present the main Android technologies that have been used for the development and the operation of the client, in order to provide to the Users Accessible and friendly experience.

4.1 Design Philosophy of the Native Android ViPi app

In order to keep the development neat and simple in terms of having design compatibility with both smartphones and tablets, we introduced to the design of the ViPi client the paradigm of “fragments”. Android¹ introduced fragments in Android 3.0, primarily to support more dynamic and flexible UI (user interface) designs on large screens, such as tablets. Because a tablet's screen is much larger than that of a handset, there's more room to combine and interchange UI components. Fragments allow such designs without the need for you to manage complex changes to the view hierarchy. By dividing the layout of an activity into fragments, you are able to modify the activity's appearance at runtime and preserve those changes in a back stack that's managed by the activity.

For example, a news application can use one fragment to show a list of articles on the left and another fragment to display an article on the right, side by side. Thus, instead of using one activity to select an article and another activity to read the article, the user can select an article and read it all within the same activity, as illustrated in the tablet layout in the following figure.

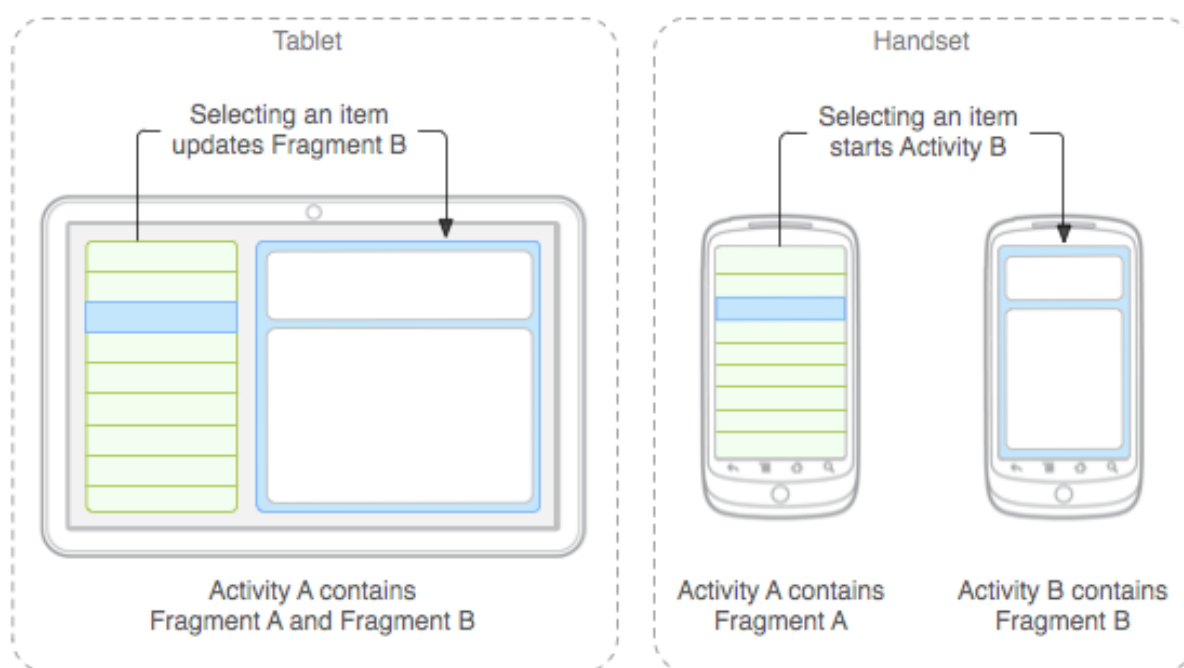


Figure 9 An example of how two UI modules defined by fragments can be combined into one activity for a tablet design, but separated for a handset design

ViPi mobile client fragments have been implemented as a module, making them reusable for other activities (if necessary). This is especially important because a modular fragment allows changing

¹ <http://developer.android.com/guide/components/fragments.html>

fragment combinations for different screen sizes. By designing ViPi mobile app to support both tablets and handsets, reusing fragments in different layout configurations we managed to optimise the user experience based on the available screen space.

4.2 Android SQLite

In order to have the availability to browse through the available ViPi portal information (e.g. browsing the ontology), once the client connects to the ViPi service through the RPC-XML interface, it retrieves and stores the information locally. That facilitates the mobile User in the means of even if the connection is lost it will not be noticed by the User, who will continue browsing through the posted information. Of course, attachments such as Learning Objects are not automatically downloaded. Once the connection with the service is again active, the application checks for new information to update the already stored.

4.3 Gestures

ViPi mobile client has been designed to take advantage of all current accessibility and user friendly experience provided by the Android 4.0.x operating system, but also keeps compatibility with older versions such as 2.3.x and 3.x. We believe that further to the Text-to-Speech operation, major accessibility functionality is covered by the Gestures and more specifically the recent “explore-by-touch” gesture, which was introduced with Android 4.0.x. In the following paragraphs we summarise the core supported gestures and the actions they perform.

Touch screens are a great way to interact with applications on mobile devices, where users can easily tap, drag, interactively zoom-in/out, or slide the screen, quickly performing specialised actions in their favourite applications. Gestures are a common feature in touch or multi-touch screens and hence are commonly used in smartphones and tablets. Gestures allow users to interact with applications by manipulating the screen objects provided.

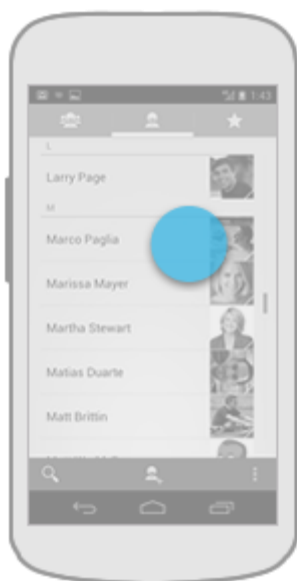


Figure 10: Touch gesture

Touch gesture - Triggers the default functionality for a given item.

Action: Press, lift



Figure 11: Long press gesture

Long press gesture - Enters data selection mode. Allows you to select one or more items in a view and act upon the data using a contextual action bar. Avoid using long press for showing contextual menus.

Action: Press, wait, lift



Figure 12: Swipe gesture

Swipe gesture - Scrolls overflowing content, or navigates between views in the same hierarchy.

Action: Press, move, lift



Figure 13: Drag gesture

Drag gesture - Rearranges data within a view, or moves data into a container (e.g. folders on Home Screen).

Action: Long press, move, lift



Figure 14: Double touch gesture

Double touch gesture - Zooms into content. Also used as a secondary gesture for text selection.

Action: Two touches in quick succession

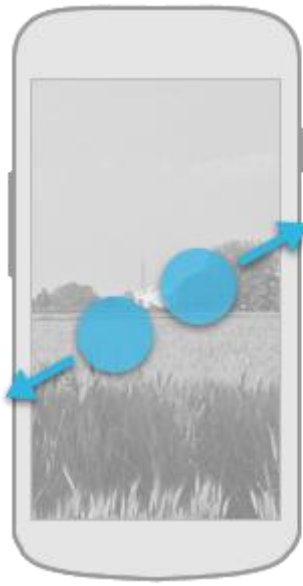


Figure 15: Pinch open gesture

Pinch open gesture - Zooms into content.
Action: 2-finger press, move outwards, lift



Figure 16: Pinch close gesture

Pinch close gesture - Zooms out of content.
Action: 2-finger press, move inwards, lift

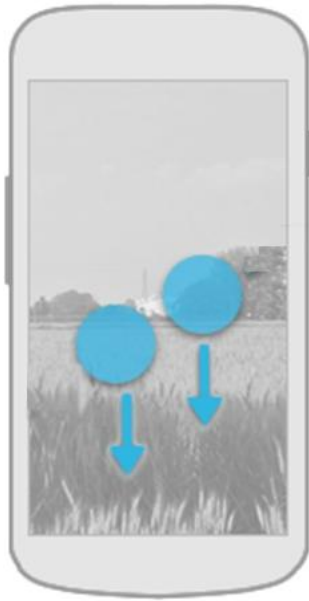


Figure 17: Two finger scroll gesture

Two finger scroll gesture - Scrolls content up / down.
Action: 2-finger press, move up / down, lift

The most important is the **explore-by-touch** mode that lets the User navigate without having to see the screen. Touching the screen once triggers audible feedback that identifies the UI component below; a second touch in the same component activates it. For example, Users with vision loss can explore the screen by touching and dragging a finger across the screen to hear voice descriptions of the content. Because the explore-by-touch mode works like a virtual cursor, it allows screen readers to identify the descriptive text the same way that screen readers can when the user navigates with a d-pad or trackball—by reading information provided.

5 ViPi Semantic Content Management (VSCM) in ViPi mobile client

ViPi mobile client communicates with ViPi integrated platform through web services (XML-RPC, which we discuss in the following section) in order to retrieve the active ontology (structure and children-posts) that facilitate the Users with carrying out semantic search on the existing Learning Objects of the platform.

5.1.1 XML-RPC Interface

The VSCM plug-in also exports the ViPi platform's functionality, by extending the WordPress XML-RPC interface, enabling access to ViPi portal content by the ViPi mobile application. For this purpose, the numerous required functions for making the mobile client work towards achieving the required functionality have been developed & deployed. (for more details, please refer to "D13 Integrated ViPi Platform")

6 Annex I: ViPi mobile app – UML activity diagrams and description

The present section focuses on presenting the functionality of the Android mobile client of the ViPi platform in the UML language and accompanying descriptive. Each functionality will be graphically presented in steps, called activities, to produce a relevant “activity diagram”. Activity diagrams in Unified Modelling Language (UML) are typically used for business process modelling, for modelling the logic captured by a single usage scenario, or for modelling the detailed logic of a business rule. In many ways UML activity diagrams are the object-oriented equivalent of flow charts and data flow diagrams (DFDs) from structured development.

In the following pages, the main operations of the ViPi mobile client for Android will be broken down to simple serial activities to help us understand how the client will operate as a whole and will help us also for the design and the development of each module the client will consist of. Each activity diagram will be accompanied by a brief explanation of each operation / functionality and the main activities presented in it.

6.1 User Login and reading of article list

The following activity diagram presents the most basic operation of ViPi client, which is its instantiation. The User will start the ViPi app and will read (or hear through text-to-speech) the first postings (the “front page”) provided by the platform. We mention at this point that Users who will only read the content provided will not be asked to login (or register). Login will be required only when the User will decide to comment or vote on a posting (article).

The main activities comprise:

- ✧ Starting the mobile app
- ✧ Request the “front page” articles
- ✧ Input authentication credentials (in case of commenting or voting)

In all following activity diagrams the activity “NARRATION”, which is actually the text-to-speech functionality of the Android accessibility API is assumed for preserving space and visibility of the figures to the reader.

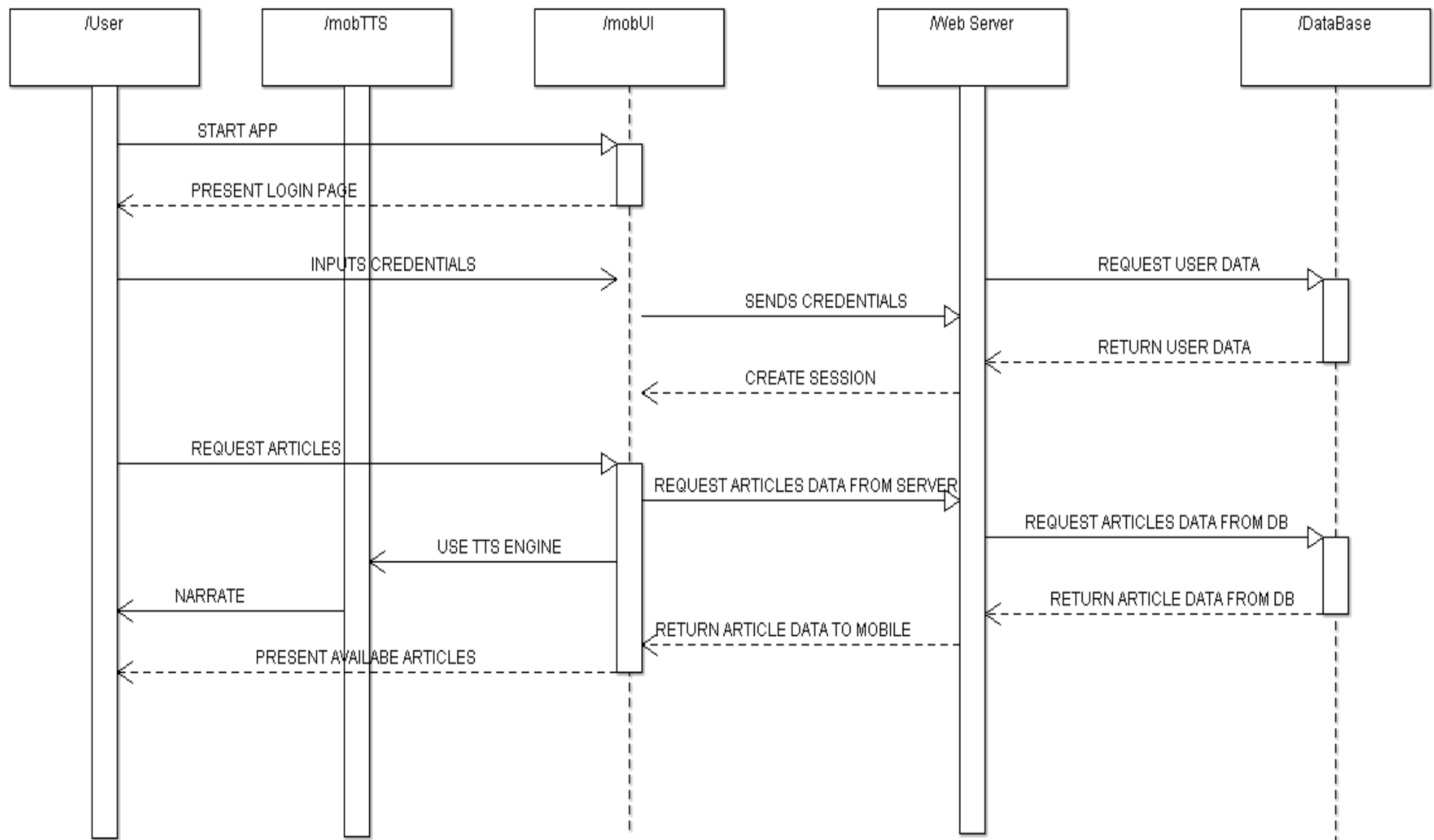


Figure 18 User Login and reading of article list

6.2 User requests to read news list

The User selects a specific category (either via browsing or searching) of posted articles. Searching functionality is presented later as separate activity diagram. The system presents to the user a list of relevant articles and the user selects one of them to read. The user has the ability to comment (if logged-in) and share it on a Facebook / Tweeter etc. account.

The main activities comprise:

- ✧ Request news list
- ✧ Read more (read the full article)
- ✧ Commenting on the article
- ✧ Tweet / share on Facebook

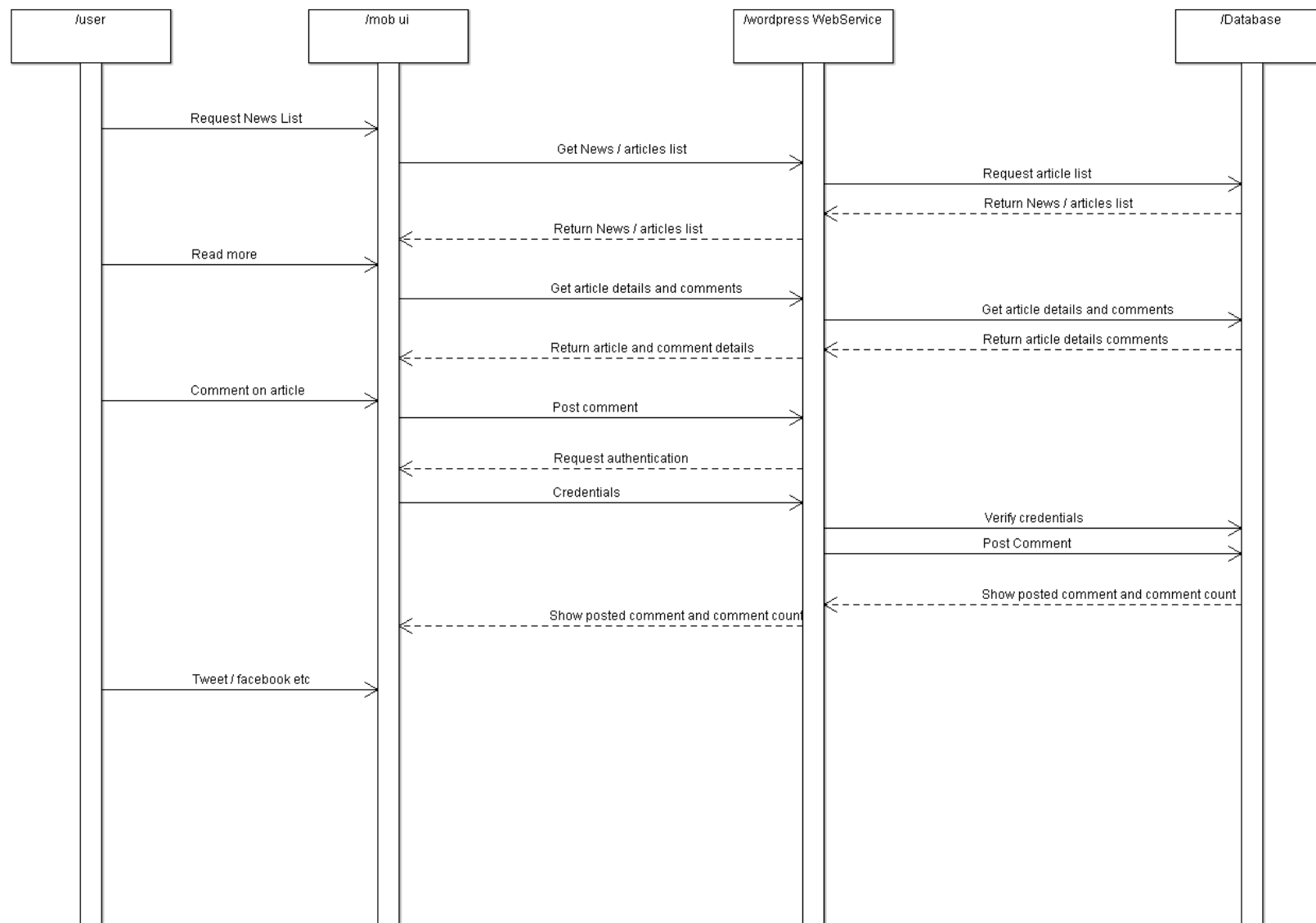


Figure 19 User requests to read news list

6.3 User searches and requests learning material

The User selects a specific category of LO (either via browsing or semantic search). Searching functionality is presented later as separate activity diagram. The system presents to the user a list of relevant LOs and the user selects one of them to read. The user has the ability to post new LO (if logged-in as author), check his/her uploaded learning material, and rate the LO.

Similar to the afore-mentioned functionality, operates the request for retrieving list of links and list of serious games.

The main activities comprise:

- ✦ Request LO list
- ✦ Request links list
- ✦ Request serious games list
- ✦ Retrieving list of uploaded LO (requires authentication)
- ✦ Uploading a LO
- ✦ Rating a LO

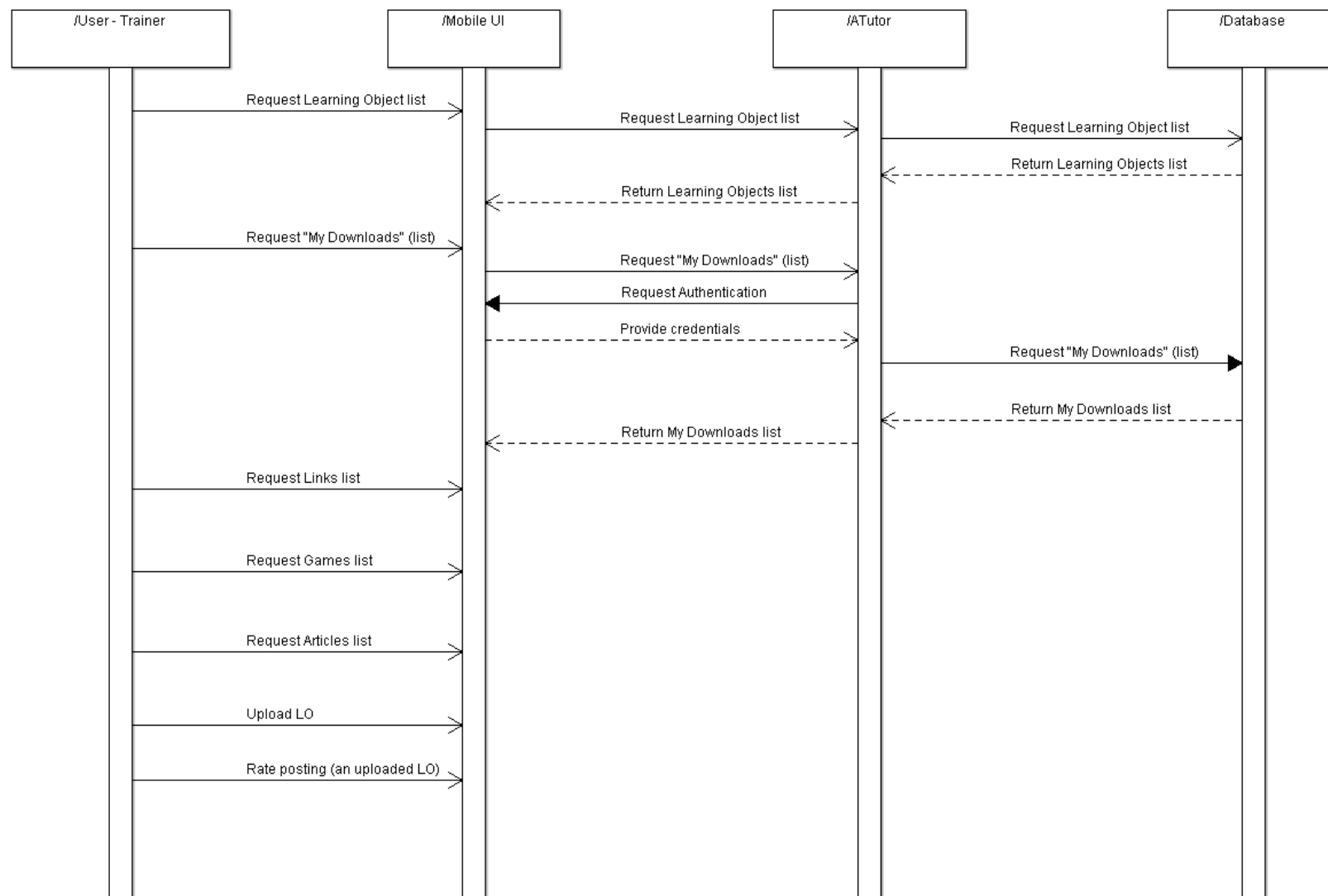


Figure 20 User searches and requests learning material

6.4 User requests to use semantic search

The User searches for LO by using the advanced (semantic) search. The search occurs in steps according to the criteria he/she selects. Due to mobile device limitations in terms of the screen / display they use the criteria search will take place in serial steps that will narrow down the expected results. For this reason, we propose the use of drop-down menus. Selection of a criterion of the first drop-down menu will feed the second which until then will be empty. This operation will continue according to the available criteria of the ontology used and practically is the opposite paradigm of the bread crump. Alternatively the search can be carried out through keyword search.

The main activities comprise:

- ✧ Search with selection criteria
- ✧ Search through keywords

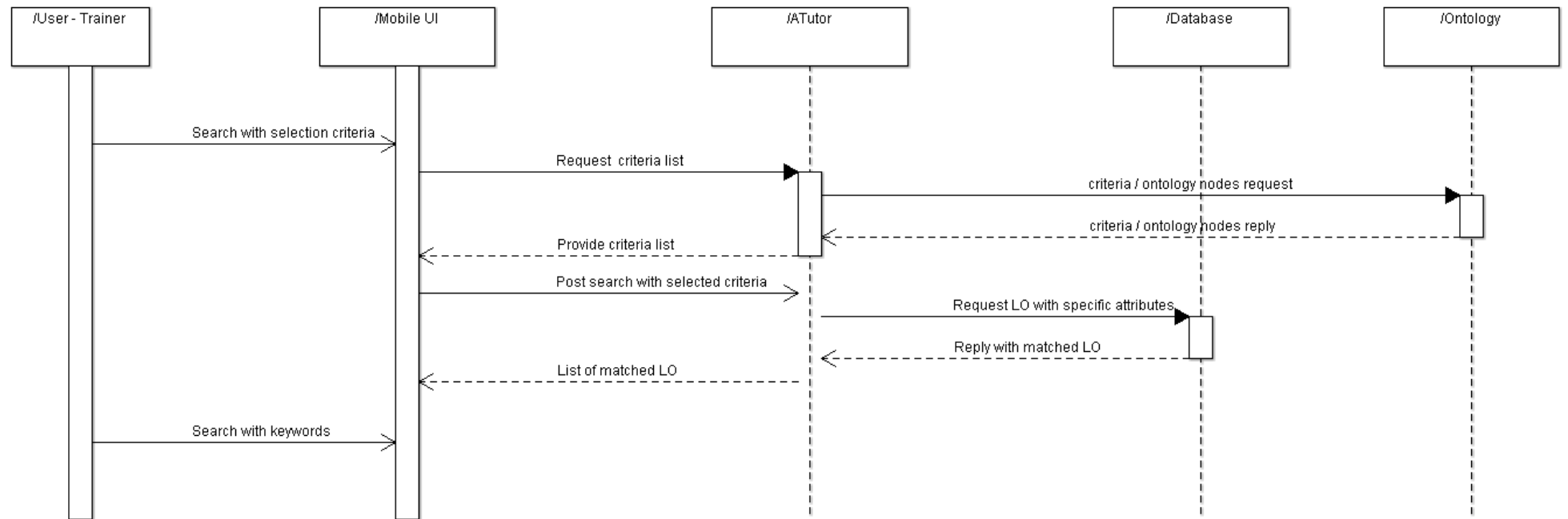


Figure 21 User requests to use semantic search

6.5 User uses the Community

In sections 3 and 4 the user was able to activate the community features provided by ViPi platform and its mobile client (Tweet, share on Facebook, rate, comment, etc.), In this section we present the activities that follow such operations, which is actually to present to the user ratings (and comments) done by previous users.

The main activities comprise:

- ✦ Present ratings and comments

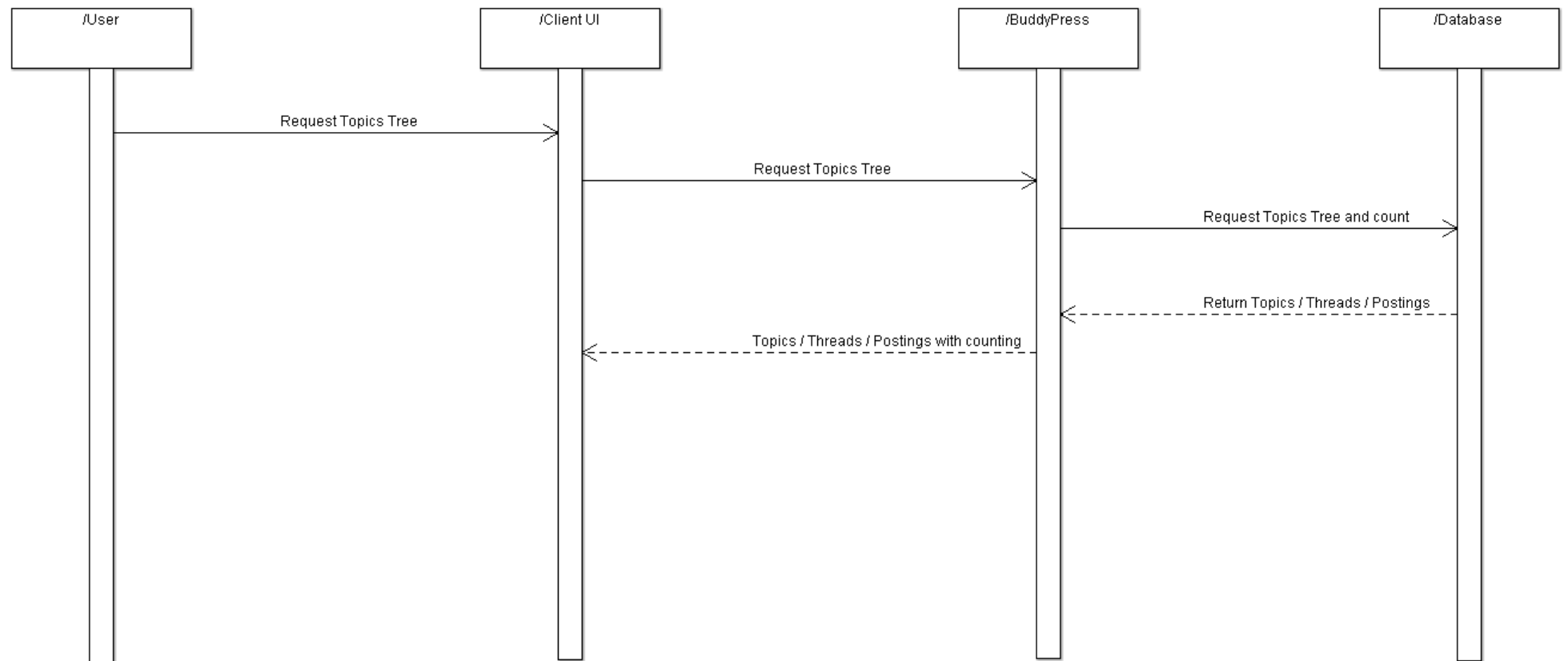


Figure 22 User uses the Community



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