

2009

# Removing the Digital Divide for Senior Web Users

Chiu Luk

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## Recommended Citation

Luk, Chiu, "Removing the Digital Divide for Senior Web Users" (2009). *Master's Projects*. 151.

DOI: <https://doi.org/10.31979/etd.kwty-8fyx>

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# **Removing the digital divide for senior web users**

## **CS298 Final Report**

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**April 26, 2009**

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## 1. INTRODUCTION

It is hard for the elderly to use the internet to find the resource they want. Usually help is needed for them to complete the task on the technology things. The main reason for this project is to research ideas on encourage senior people to make use of the web to locate helps they want, such as finding volunteers and professional helps. The scope of this project is to develop a new way of web access and content presentation methodologies that let senior people getting help from volunteers and various service providers more easily that incorporates social networking technology e.g. Facebook.

By incorporating the social network web site like Facebook into the web application, senior people will be able to find volunteering help or other related service providers through social networking. Volunteers will show up in Google map in search results for senior to easily locate helps. Senior people can also search for self help videos tutorials through the web application search engine.

A mobile version of the senior user application will also be developed for easy access on the road. Other features that benefit senior users includes voice input, control / content posting and collaborative social networking where a sponsors would sponsor a help task volunteer undertake.

## 2. PERVIOUS WORK

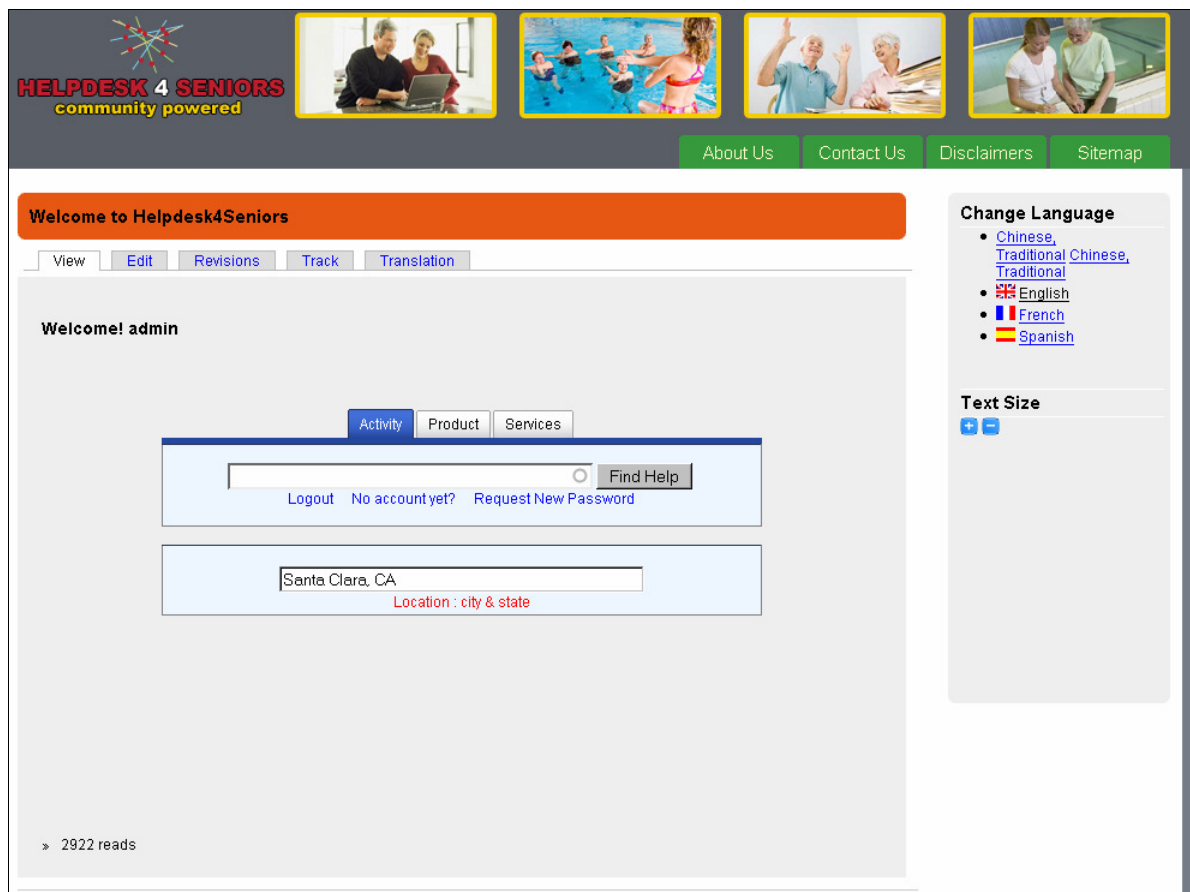
- Researched how to access Facebook data using the Facebook API, FQL and FBML.
- Researched information sharing between external web application and Facebook user account.
- Implemented Facebook video sharing application based on the Drupal web framework.
- Implemented Facebook account membership linking with external web application account.

## 3. INNOVATIONS AND CHALLENGES

- There are currently no easy to use online helping tools for low-tech senior people to locate volunteer help.
- There is currently no mobile application for senior people to locate volunteer help.
- The goal is to implement a web application that is easy to use for low-tech senior people that incorporates social networking technology.
- The project makes use of the popular Google map API for senior people to locate volunteer help.

#### 4. LOCATION BASED SEARCH ENGINE

The HD4S web site's main page is a location based search engine that let senior people to search for volunteers for hope. In Figure 1, it showed the search input fields, the first input is the help senior looking for, and the second field will enter the location where the volunteer located. The search engine also has keyword auto-complete feature which give hint for the search. After senior submitted the search, a Google Map will show the bubble which represented the volunteers located. Senior can click on any bubble inside the Google Map to get more detailed information of the volunteer that provides help.



The screenshot shows the Helpdesk4Seniors website interface. At the top, there is a navigation bar with the logo "HELPDESK 4 SENIORS community powered" and four images showing seniors in various settings. Below the navigation bar are links for "About Us", "Contact Us", "Disclaimers", and "Sitemap". The main content area has a "Welcome to Helpdesk4Seniors" banner. Below the banner are tabs for "View", "Edit", "Revisions", "Track", and "Translation". The "View" tab is selected, showing a "Welcome! admin" message. Below the message are tabs for "Activity", "Product", and "Services". The "Activity" tab is selected, showing a search form. The search form has two input fields: the first is for the help senior looking for, and the second is for the location where the volunteer located. The first input field contains the text "Santa Clara, CA". Below the input fields are links for "Logout", "No account yet?", and "Request New Password". A "Find Help" button is also present. On the right side of the page, there is a "Change Language" section with links for "Chinese", "Traditional Chinese", "Traditional", "English", "French", and "Spanish". Below this is a "Text Size" section with "+" and "-" buttons. At the bottom left, there is a link for "2922 reads".

Figure 1 – search main page

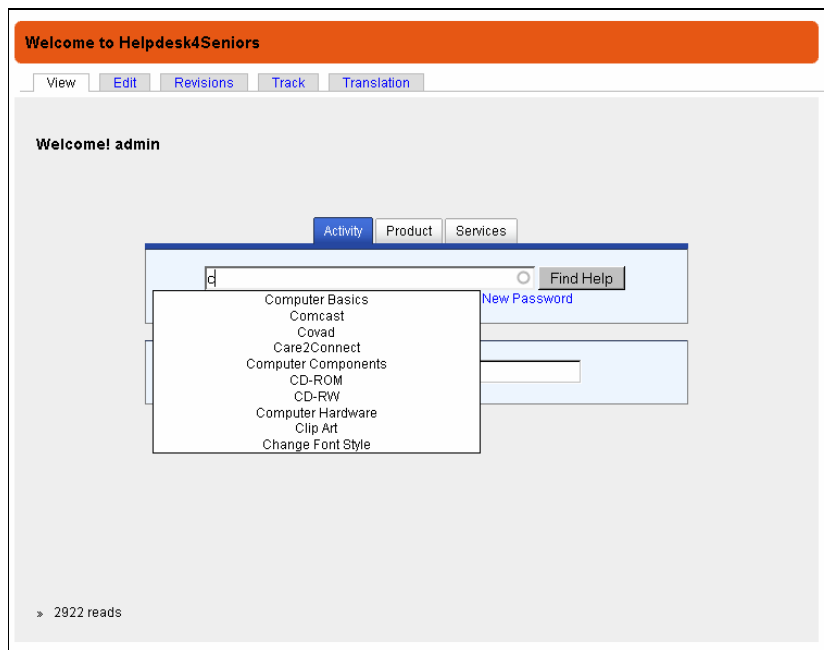


Figure 2 – keyword auto complete

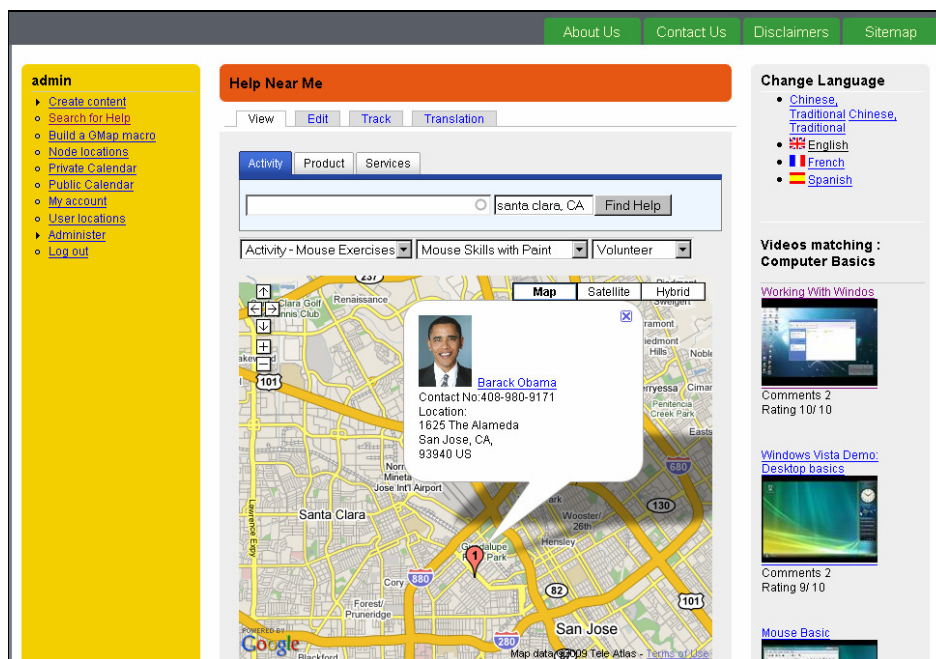



Figure 3 – volunteer show up on Google map



[About Us](#) | [Contact Us](#) | [Disclaimers](#) | [Sitemap](#)

**User Information**

[View](#) | [Edit](#) | [Track](#) | [Translation](#)



Volunteer Name: Barack Obama  
 Address: 1625 The Alameda, San Jose, CA 93940  
 Email: obama@hd4s.com  
 Home Phone: 408-980-9171  
 Cell Phone: 408-919-1161  
 Skills: My skills are ...  
 Interest & Hobbies: My interest and hobbies are ....  
 Goals / Interest in HD4S: My Goals / Interest in HD4S are ...  
 Days Available: Monday Wednesday Friday  
 Times Available: Mornings  
 About: Something about me ....  
 » [Add new comment](#) 33 reads

**Change Language**  

- [Chinese](#)
- [Traditional Chinese](#)
- [Traditional](#)
- [English](#)
- [French](#)
- [Spanish](#)

**Text Size**  

+

-

**Find it here**

Figure 4 – detailed information of the volunteer

**Help Near Me**

[View](#) | [Edit](#) | [Track](#) | [Translation](#)

**Activity** | Product | Services

Activity - Mouse Exercises

Mouse Skills with Paint

Volunteer

**Volunteer** | Sponsor | Organization

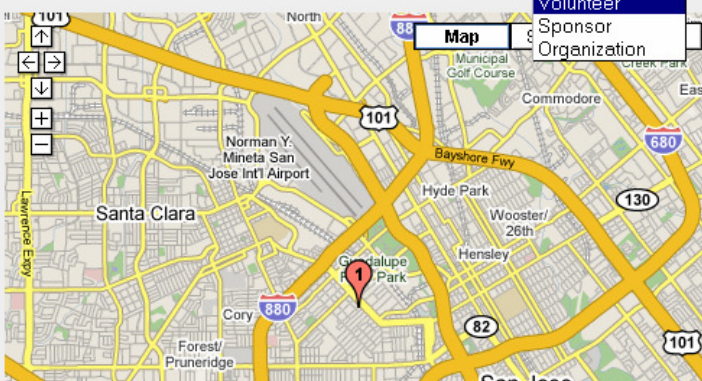


Figure 5 – help in santa clara

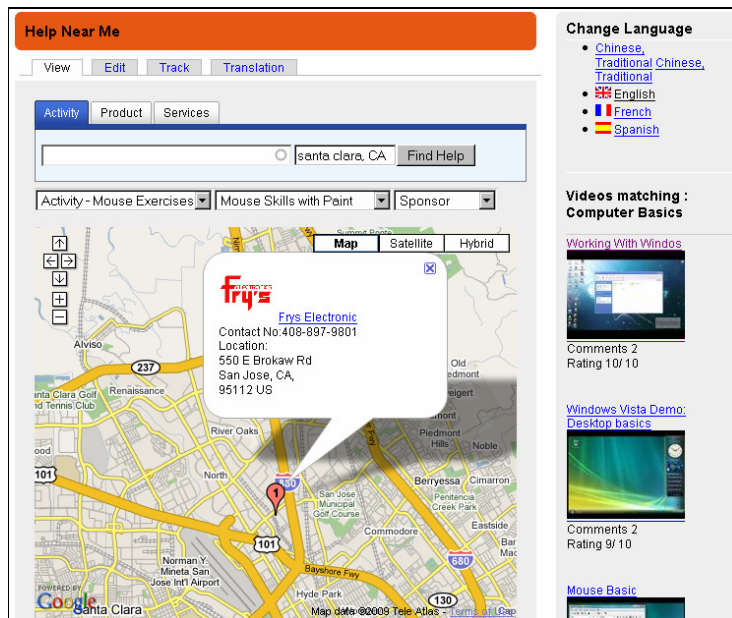


Figure 6 – sponsor filter applied

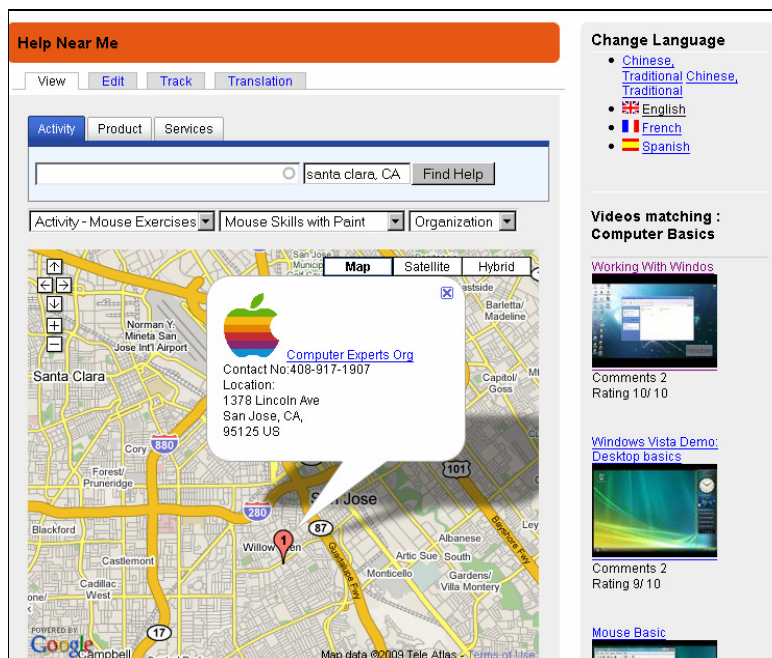



Figure 7 – organization filter applied

[About Us](#)
[Contact Us](#)
[Disclaimers](#)
[Sitemap](#)

### User Information

[View](#)
[Edit](#)
[Track](#)
[Translation](#)



Company Name: Fry's Electronic  
Contact Name: Jim Lee  
Address: 550 E Brokaw Rd, San Jose, CA 95112  
Email: frys@frys.com  
» [Add new comment](#) 34 reads

#### Change Language

- [Chinese](#)
- [Traditional Chinese](#)
- [Traditional](#)
- [English](#)
- [French](#)
- [Spanish](#)

#### Text Size

[+](#)
[-](#)


#### Find it here

Figure 8 – detail information of sponsor

[About Us](#)
[Contact Us](#)
[Disclaimers](#)
[Sitemap](#)

### User Information

[View](#)
[Edit](#)
[Track](#)
[Translation](#)



Company Name: Computer Experts Org  
Contact Name: Mary Banks  
Address: 1378 Lincoln Ave, San Jose, CA 95125  
Email: hd4sorg@hd4s.org  
» [Add new comment](#) 35 reads

#### Change Language

- [Chinese](#)
- [Traditional Chinese](#)
- [Traditional](#)
- [English](#)
- [French](#)
- [Spanish](#)

#### Text Size

[+](#)
[-](#)

#### Find it here

Figure 9 – detail information of organization

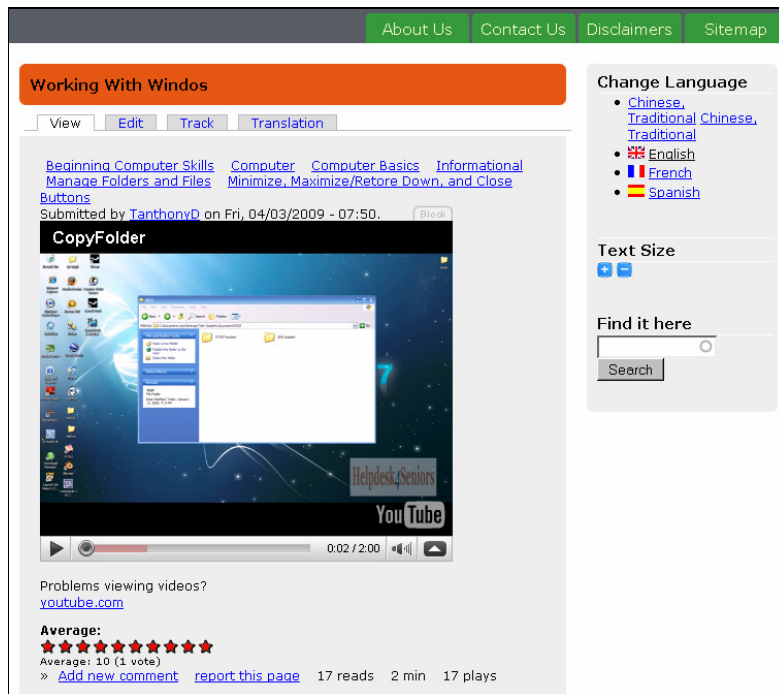


Figure 10 – video help

## 5. FACEBOOK APPLICATION



Figure 11 – Facebook Application running inside Facebook platform



Figure 12 – the server hosting the Facebook Application

### 5.1 Pros for using Drupal for Facebook

- The main purpose of Drupal for Facebook is show content of Drupal inside Facebook, for example, if user posts some content (video, forum, comment) in Drupal, other users will see the content in Facebook too.
- User gets all Facebook API and feature and large user base.
- User get both power of Drupal (CMS) and Facebook (SN)
- Faster development since Drupal is already a CMS, one can get content up and running quickly.
- Since Drupal is mainly for CMS, Drupal for Facebook enable the Social Networking part to merge with CMS.
- Any one with Facebook account is ready to post / upload content to CMS hosted by Drupal.

### 5.2 Cons for using Drupal for Facebook

- User got to stick with Facebook and cannot have standalone site.
- Since Drupal has Social Networking module also, it's more customizable than Facebook, if user stick with Facebook, user need to follow rules set by Facebook.
- Must use FBML for some tasks such as video embedding.

- User of Facebook can choose not adding your application where a subset of Facebook user is Drupal user.

## 6. FACEBOOK API

### 6.1 Facebook Markup Language

The Facebook Markup Language is a sibling of the HTML where the FBML had some of the HTML tag removed from its language specification. The FBML is basically an extension to existing HTML while it is also a subset of HTML language. The FBML starts with the namespace <fb: for example, the following FBML will embed video inside Facebook website:


```
<fb:swf swfbgcolor="000000" imgstyle="border-width:3px; border-color:white;"  
swfsrc='http://www.youtube.com/v/sodMI9LZXig&hl'  
imgsrc='http://www.oniva.com/upload/1356/Rayeath.gif'  
width='340' height='270' />
```

### 6.2 Facebook Application Configuration

User creates Facebook application by clicking on the Setup new application link and fill out all the necessary settings parameters such as hosting address, Callback URL.

Once the Facebook application name is entered, a set of security keys are generated, developer needs to use these secret keys to communicate between Facebook and their application hosted on their servers, furthermore, developer needs to tell Facebook where the application is hosted by entering the server IP address.

[Back to My Applications](#)

 **Edit chiuluk**

**Required Fields**

**Application Name**  
(Limit: 50 characters)

▼ **Optional Fields**

**Base Options**

**Developer Contact E-mail**  
(Limit: 100 characters)

For Facebook correspondence only. We will contact you at this address if there are any problems or important updates.

**User Support E-mail**  
(Limit: 100 characters)

Messages sent from users on your application's help page will be sent to this address.

**Callback URL**  
(Limit: 100 characters)

After logging into Facebook, users are redirected to the callback URL. See [authentication overview](#) for more details.

Figure 13 – After created application, user can edit details of the app



**chiuluk**  
**Directory Status: Not Submitted**  
 Once you have completed your application, you may [submit](#) it to our product directory.

Monthly Active Users	About Page Fans	Total Users
<b>0</b>	<b>0</b>	<b>0</b>

API Key  
c4e61984b41e72d719dc2d09e799857a

Secret  
90edd4518f4e964ea428f983d0ad2b41

[Advertise](#)

[DataStoreAdmin](#)

[Edit About Page](#)

[Edit Settings](#)

Figure 14 – a set of Keys get generated when developer create application

### 6.3 Facebook Client

Using the facebook client API involve several steps:

- Create the Facebook client object by sending the API\_KEY and SECRET\_KEY
- Generate a token and send to Facebook server
- Redirect to Facebook login page and prompt user for login
- Server will generate a session for communication

```
public static String API_KEY = "c4e61984b41e72d719dc2d09e799857a";
public static String SECRET = "90edd4518f4e964ea428f983d0ad2b41";

FacebookXmlRestClient client = new FacebookXmlRestClient(API_KEY,
SECRET);

String token = client.auth_createToken();

String url = "http://www.facebook.com/login.php?api_key="
+ API_KEY + "&v=1.0?"
+ "&auth_token=" + token;

Runtime.getRuntime().exec("C:\\Program Files\\Internet Explorer\\iexplore.exe " +
url);

System.in.read();

String session = client.auth_getSession(token);
```

Figure 15 – sample java code for Facebook API access

#### 6.4 Facebook API capability

Following is what Facebook API can and cannot do:

Can

- Access Facebook friend network data
- Facebook look and feel
- Access user profile information
- Embed media



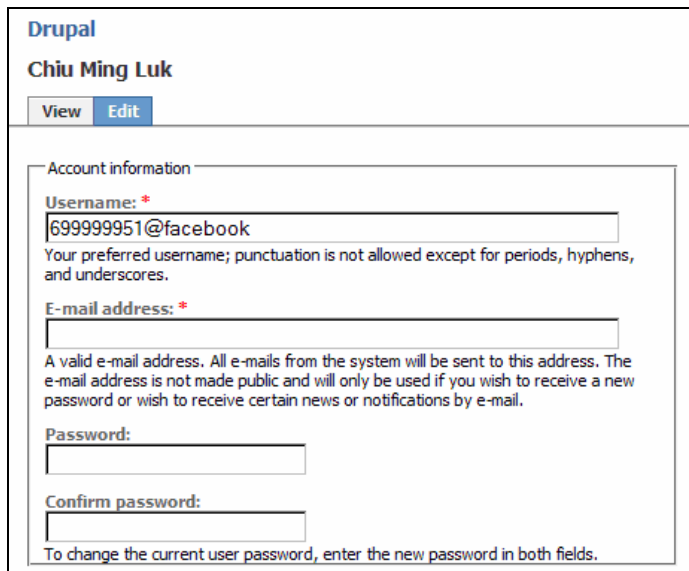
- Mobile support
- Facebook infrastructure – feed – comment ... etc
- Internationalization
- Define what can see and what cannot see by user
- build own social gaming platform that resides on one's own website but leverages the power of users' Facebook relationships
- site always host outside – can address from non-Facebook domain
- API access on external web site except fbml

Cannot

- Access user real email address

## 6.5 Drupal for Facebook

There are currently 2 versions for Drupal for Facebook, version 1 has some issue with the username with submitting comments and posting; while version 2 fixed the username problem.



The screenshot shows the Drupal user registration interface for a user named Chiu Ming Luk. It includes a 'View' button and an 'Edit' button. The 'Account information' section contains the following fields and instructions:

- Username: \***: A text field containing '699999951@facebook'. Below it, a note states: 'Your preferred username; punctuation is not allowed except for periods, hyphens, and underscores.'
- E-mail address: \***: An empty text field. Below it, a note states: 'A valid e-mail address. All e-mails from the system will be sent to this address. The e-mail address is not made public and will only be used if you wish to receive a new password or wish to receive certain news or notifications by e-mail.'
- Password:**: An empty text field.
- Confirm password:**: An empty text field.

At the bottom of the form, a note reads: 'To change the current user password, enter the new password in both fields.'

Figure 16 – after installing version 2, user name problem is fixed

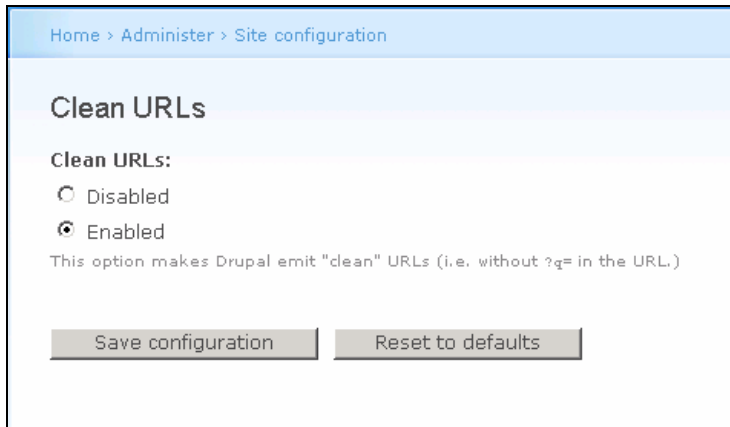
## 6.6 Drupal for Facebook Installation

Installing Drupal for Facebook requires developer to finish the following steps:

- Drupal 5.8 installed on a server machine
- Download the Facebook client API from Facebook web site
- Install Facebook-aware theme into Drupal theme directory
- Edit the settings.php to include the fb\_setting.inc
- Enable the Facebook module with in the Drupal admin page
- Edit Apache config files to enable mod\_rewrite for URL rewriting
- Enable Clean URLs inside Drupal admin page
- Create Facebook application within Drupal create content page and user can create a Facebook application just like create other contents

```
<Directory "C:/Program Files/Apache Software Foundation/Apache2.2/htdocs">
  RewriteEngine on
  RewriteBase /
  RewriteCond %{REQUEST_FILENAME} !-f
  RewriteCond %{REQUEST_FILENAME} !-d
  RewriteRule ^(.*)$ index.php?q=$1 [L,QSA]
</Directory>
```

Figure 17 – rewrite rules must be specified in Apache configuration file



Home > Administer > Site configuration

### Clean URLs

**Clean URLs:**

☐ Disabled

☒ Enabled

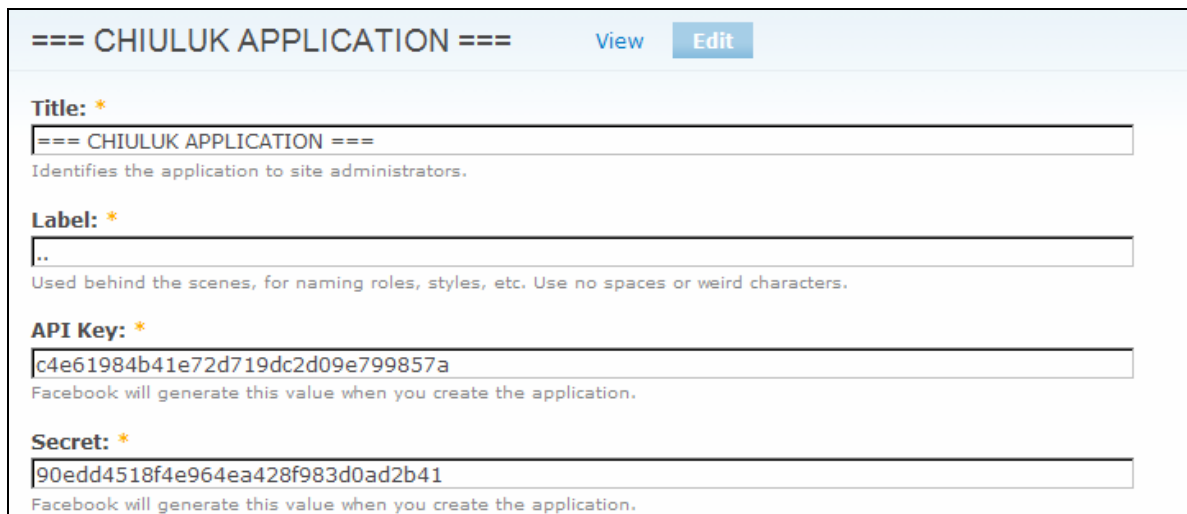
This option makes Drupal emit "clean" URLs (i.e. without ?q= in the URL.)

[Save configuration](#) [Reset to defaults](#)

Figure 18 – clean URL must be enabled for Drupal for Facebook to function correctly

## 6.7 Drupal for Facebook Configuration

The configuration of Drupal for Facebook involves or setting correct parameters when creating a Facebook application inside the Create Content page and setting parameters for mapping Facebook users into Drupal user accounts. The user profile in Facebook will automatically get mapped into Drupal database.



=== CHIULUK APPLICATION === [View](#) [Edit](#)

**Title: \***

=== CHIULUK APPLICATION ===

Identifies the application to site administrators.

**Label: \***

..

Used behind the scenes, for naming roles, styles, etc. Use no spaces or weird characters.

**API Key: \***

c4e61984b41e72d719dc2d09e799857a

Facebook will generate this value when you create the application.

**Secret: \***

90edd4518f4e964ea428f983d0ad2b41

Facebook will generate this value when you create the application.

Figure 19 – copy the secret Keys and info from Facebook

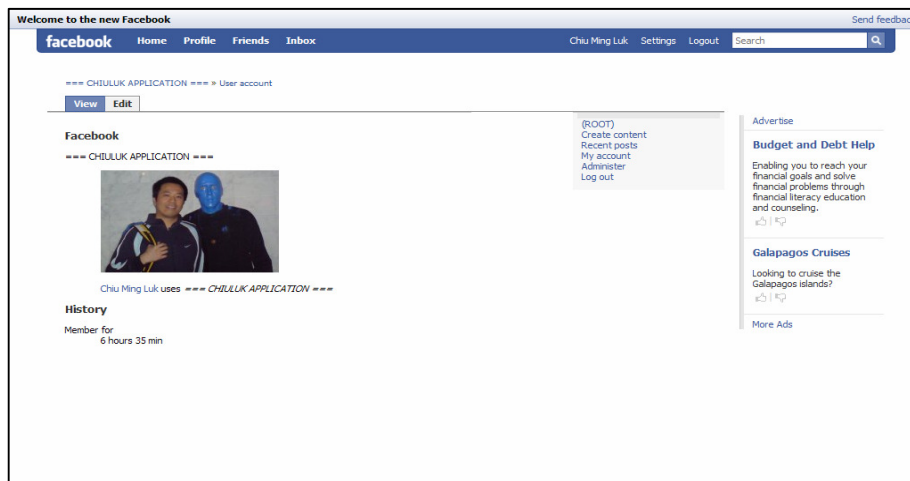


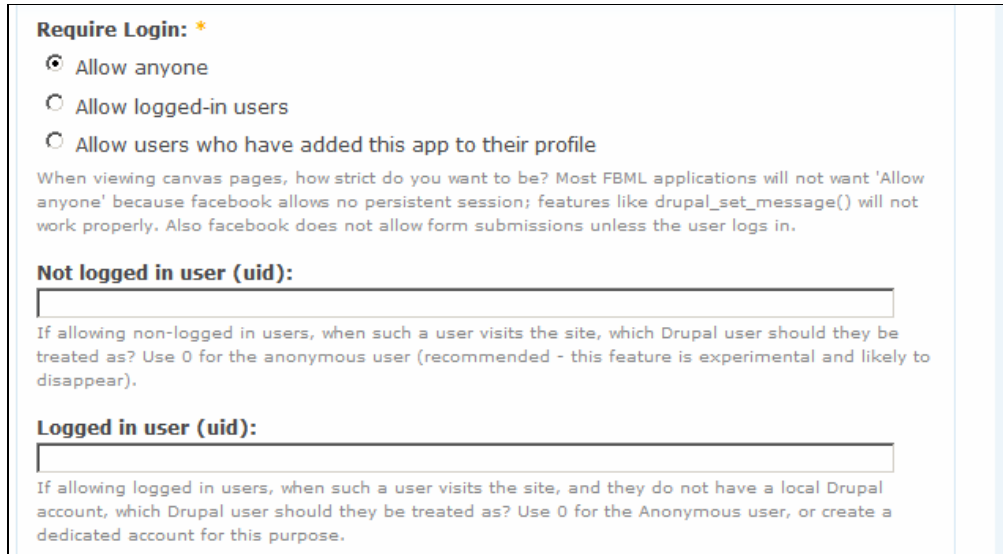
Figure 20 – user profile copied from Facebook to Drupal

When user log in to Facebook, local Drupal accounts get created automatically and mapped to user's Facebook account. According to the Drupal for Facebook configure page, there are several options for Create Local Account:

- Never
- If user has logged in
- If user has added this app

Also we can map accounts to Facebook

- Never map account
- Map account when user login



**Require Login: \***

- ☒ Allow anyone
- ☐ Allow logged-in users
- ☐ Allow users who have added this app to their profile

When viewing canvas pages, how strict do you want to be? Most FBML applications will not want 'Allow anyone' because facebook allows no persistent session; features like `drupal_set_message()` will not work properly. Also facebook does not allow form submissions unless the user logs in.

**Not logged in user (uid):**

If allowing non-logged in users, when such a user visits the site, which Drupal user should they be treated as? Use 0 for the anonymous user (recommended - this feature is experimental and likely to disappear).

**Logged in user (uid):**

If allowing logged in users, when such a user visits the site, and they do not have a local Drupal account, which Drupal user should they be treated as? Use 0 for the Anonymous user, or create a dedicated account for this purpose.

Figure 21 – User mapping and settings in Drupal for Facebook

After configured Drupal site and Facebook to point to Drupal site, we can logon to our Facebook account to view the Drupal content.

When clicking on the My Account link, user can configure their Drupal account settings. User can create a text post or video post by clicking on the Create Content link. User has read only permission when not logged in to their Facebook account.



Figure 22 – user can view Drupal content without logging in to Facebook



Figure 23 – Facebook content is same as view Drupal content

Suppose your Drupal site has its own membership, will the automatic account generated by Facebook allow users to access your Drupal application. The automatic account generated by Facebook will allow users to access my Drupal site also, a little think need to be done, inside Facebook, go to "My Account" > Edit then change the password to what ever password I like.

Suppose a Facebook member login to your Drupal application, what page will be displayed when he logs out of your Drupal application. It will bring user back to the Drupal site's main page, since it's same as clicking the Logout link in the Drupal site. We can also configure clicking Logout to bring user back to main page as demoed at <http://apps.facebook.com/drupalforfacebook>

What's good about the automatic generated Drupal accounts for Facebook members using your Drupal application. Facebook user don't need to manually create another account for Drupal, user can see Drupal content directly.

- User can login to Facebook and add this app (an account will created automatically for 1st time user)
- User can also do posting and write comments.
- User can visit the Drupal for Facebook application URL  
like <http://apps.facebook.com/chiuluk/>  
<http://apps.facebook.com/chiuluk/http://apps.facebook.com/drupalforfacebook>  
<http://apps.facebook.com/drupalforfacebook>  
a Drupal account will get created like <mailto:979073498@facebook>  
[979073498@facebook](mailto:979073498@facebook)  
but user will need to go to "My Account" > "Edit" to create a password, so that they can login to Drupal site account

- It is doubtful Facebook application has the ability to get a hold of user's Facebook password.
- In fact, none of email and password get mapped - when Drupal account get created automatically, only user need to manually enter password + email.
- Drupal ID like 699999951@facebook is randomly generated.
- Facebook application may not have the ability to gain access to user password, In fact, I tried to use my Facebook password but it won't work, unless I enter a new password.
- User can always go into "My Account" > "Edit" then change the username + password exactly the same as Facebook username / password. and then login to Drupal account
- I believe the automatic generated account is a temp account, user can always reset the username and password.

## 7. FACEBOOK INTEGRATION

### 7.1 Integrating Facebook and Buddylist2

Buddylist2 is the only choice for Drupal 5.x, one can add other user to the buddylist like go to user's profile and click "add to buddylist".

To insert the code for linking, one should be using the function inside fbconnect.module source code file near the function of fbconnect\_association\_form\_submit:

```
function fbconnect_association_form_submit($form, &$form_state)
```

As soon as Facebook uid is associate with Drupal uid, one can query the Facebook friends and add to buddylist.

Other possible place to insert code to integrate Facebook and buddylist2 is through corn job, a look into corn.php only has 3 lines, one can added the code in - drupal\_cron\_run()

```
include_once './includes/bootstrap.inc';  
drupal_bootstrap(DRUPAL_BOOTSTRAP_FULL);  
drupal_cron_run();
```

One can have a corn job execute every 5 or 20 min to reload all Facebook friends and add to buddylist.

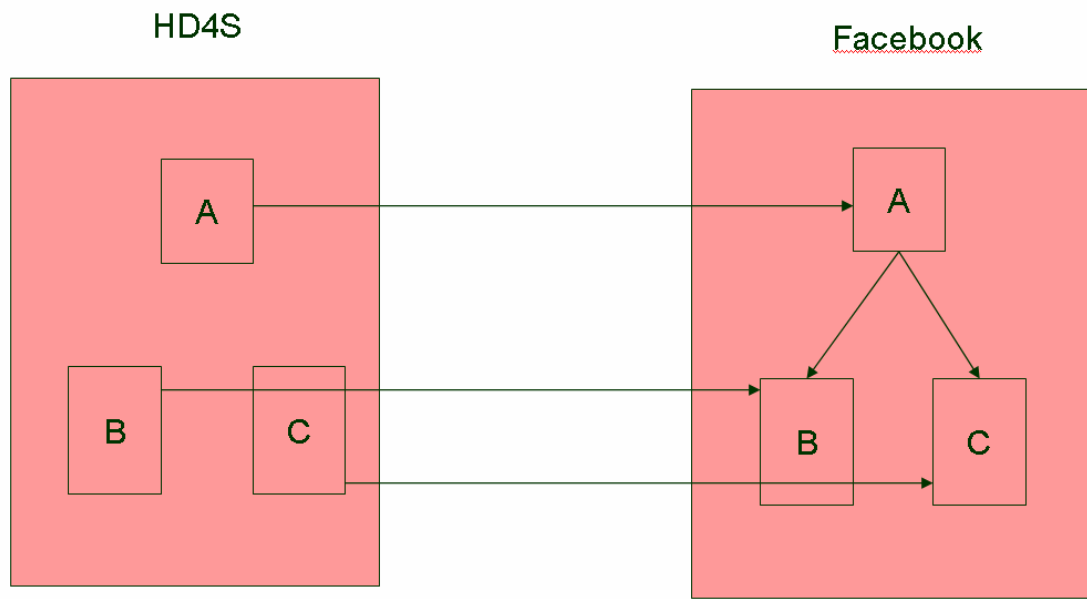


Figure 24 – Facebook integration

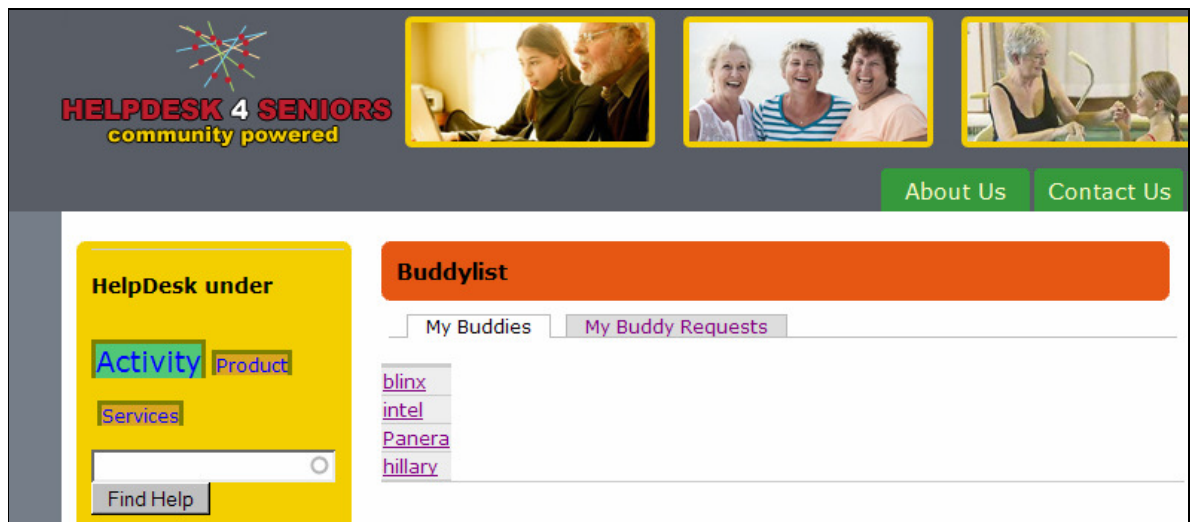


Figure 25 – buddylist



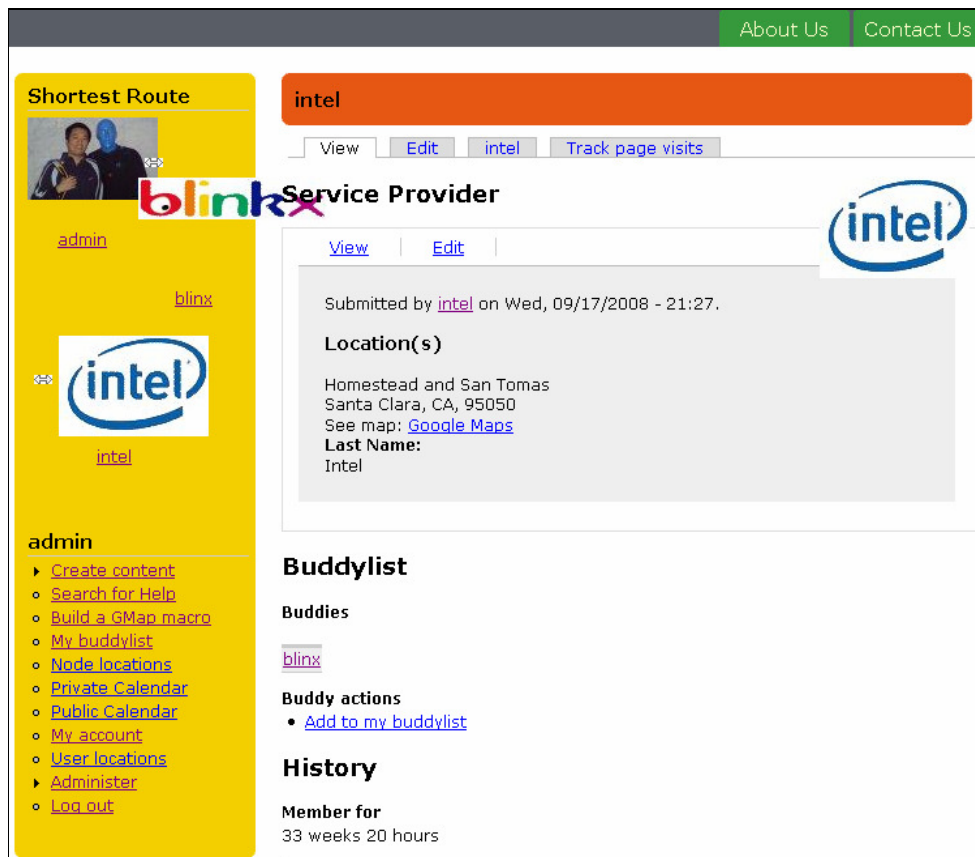


Figure 26 – Connect with Facebook

## 7.2 Linking with Facebook

One has to logout Facebook and logout HD4S, Facebook keeps the session, once the user clicks the logo, it will bring up the two choices:

- Don't have an account? Create an account now
- I already have an account, I'd like to use Facebook Connect features.

but if the user logs out both HD4S + FB, then it will pop up a Facebook username/password popup and prompt you to sign up for a Facebook account.

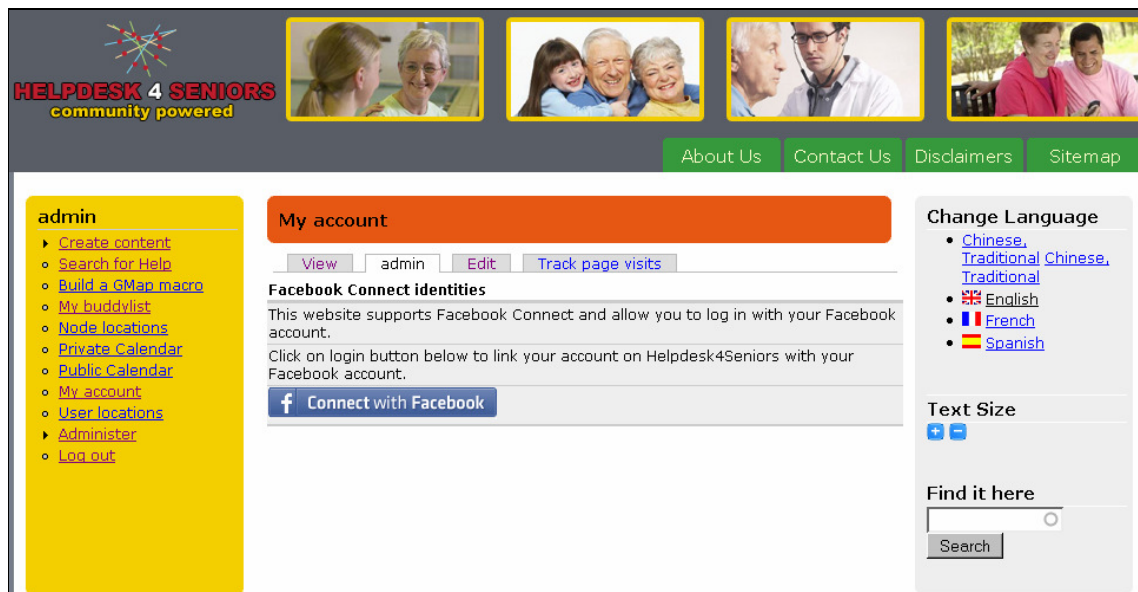


Figure 27 – Connect with Facebook

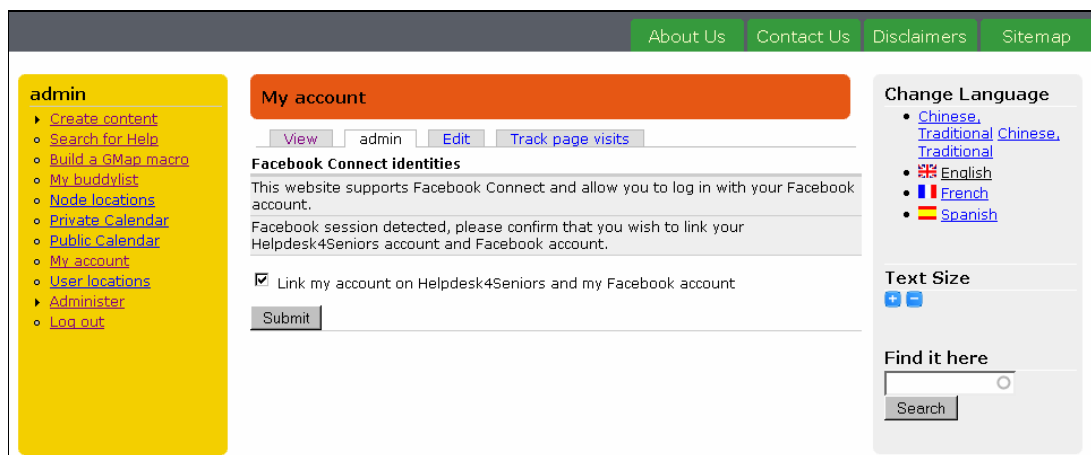


Figure 28 – Connect with Facebook

[About Us](#)
[Contact Us](#)
[Disclaimers](#)
[Sitemap](#)

**admin**

- ▶ [Create content](#)
- [Search for Help](#)
- [Build a GMap macro](#)
- [My buddylist](#)
- [Node locations](#)
- [Private Calendar](#)
- [Public Calendar](#)
- [My account](#)
- [User locations](#)
- ▶ [Administer](#)
- [Log out](#)

Congratulations! Your account is now linked to your Facebook account

**My account**

[View](#)
[admin](#)
[Edit](#)
[Track page visits](#)

**Facebook Connect identities**

This website supports Facebook Connect and allow you to log in with your Facebook account.

Your account is linked with your Facebook account.

☒ Use my Facebook picture on Helpdesk4Seniors  
Your picture will be updated every 24 hours.

☒ Let my Facebook friends see me on Helpdesk4Seniors  
My Facebook friends will be able to see that I own an account on this website.

☐ Facebook name : Chiu Ming Luk  
☐ Hometown location  
☐ Current location  
This information is displayed on my profile.

[Save settings](#)

**Change Language**

- [Chinese](#)
- [Traditional Chinese](#)
- [English](#)
- [French](#)
- [Spanish](#)

**Text Size**

[+](#)
[-](#)

**Find it here**

Figure 29 – Connect with Facebook

[About Us](#)
[Contact Us](#)
[Disclaimers](#)
[Sitemap](#)

**Shortest Route**

You are not in admin's social network. (No path from to admin)

**Navigation**


- [Search for Help](#)

**User login**

**Username: \***

**Password: \***

- [Create new account](#)
  - [Request new password](#)
  - [Sign in using Facebook](#)

 [Connect with Facebook](#)

**Facebook Connect**

[Don't have a account? Create an account now](#)

[I already have an account, I'd like to use Facebook Connect features.](#)

**Change Language**

- [Chinese](#)
- [Traditional Chinese](#)
- [English](#)
- [French](#)
- [Spanish](#)

**Text Size**

[+](#)
[-](#)

**Find it here**

Figure 30 – Connect with Facebook

[About Us](#)
[Contact Us](#)
[Disclaimers](#)
[Sitemap](#)

**admin**

- ▶ [Create content](#)
- [Search for Help](#)
- [Build a GMap macro](#)
- [My buddylist](#)
- [Node locations](#)
- [Private Calendar](#)
- [Public Calendar](#)
- [My account](#)
- [User locations](#)
- ▶ [Administer](#)
- [Log out](#)


Your Facebook connect settings have been saved.

**admin**

View | **admin** | Edit | Track page visits

**Volunteer**

[Create your Volunteer.](#)



**Sponsor**

[View](#) | [Edit](#)

[Computer](#)  
Submitted by **admin** on Sun, 07/20/2008 - 17:03.

**Location(s)**

855 Stevens Creek Blvd, Ste 2178  
santa clara, CA, 95050  
See map: [Google Maps](#)  
**Web Address (URL):**  
www.dell.com  
**Logo:**  
[http://98.207.217.219/files/sponsor\\_logos/dell\\_logo.jpg](http://98.207.217.219/files/sponsor_logos/dell_logo.jpg)

**Expert Organization**

[Create your Expert Organization.](#)

**Basic Information**

[Create your Basic Information.](#)

**Regular user**

[Create your Regular user.](#)

**Change Language**

- [Chinese](#)
- [Traditional Chinese](#)
- [Traditional](#)
- [English](#)
- [French](#)
- [Spanish](#)

**Text Size**

[+](#) [-](#)

**Find it here**

**Buddylist**

**Buddies**

NONE

**Personal information**

- Facebook name: Chiu Ming Luk
- Hometown location: San Leandro, California, United States

**History**

**Member for**

41 weeks 6 days

Figure 31 – imported Facebook information

### 7.3 Buddylist2 Shortest Route API

It is a Buddylist2 API that calculate shortest distance between 2 friends, for example, if friend is in this order:

- admin -> intel -> test

then the API will print the route like the following on the left side bar.

### 7.4 Algorithm for connecting friends

Using the Facebook API, there is function to found out if two users are direct friend or not. For instance using the following FQL query may found if two user in Facebook are friends or not:

```
SELECT uid1, uid2 FROM friend WHERE uid1=699999951 AND uid2=5240928
```

The algorithm is to build a graph of connected friends. For example, I have 5 users in HD4S is some how connected, use the Facebook API, to found out if 2 user is direct friend or not and construct the following graph:

User 1, 2, 3, 4, 5 are connected in the following way:

1-2  
1-3  
2-4  
2-5

Draw the graph in memory, then if we need to know distance of user 1 - 5, one can follow the graph and found distance is 1 - 2 - 5, which is distance 2.

A test of The FBML doesn't not seem to work inside the Drupal page, the one FQL test with all keys in the code works which includes facebook.php.

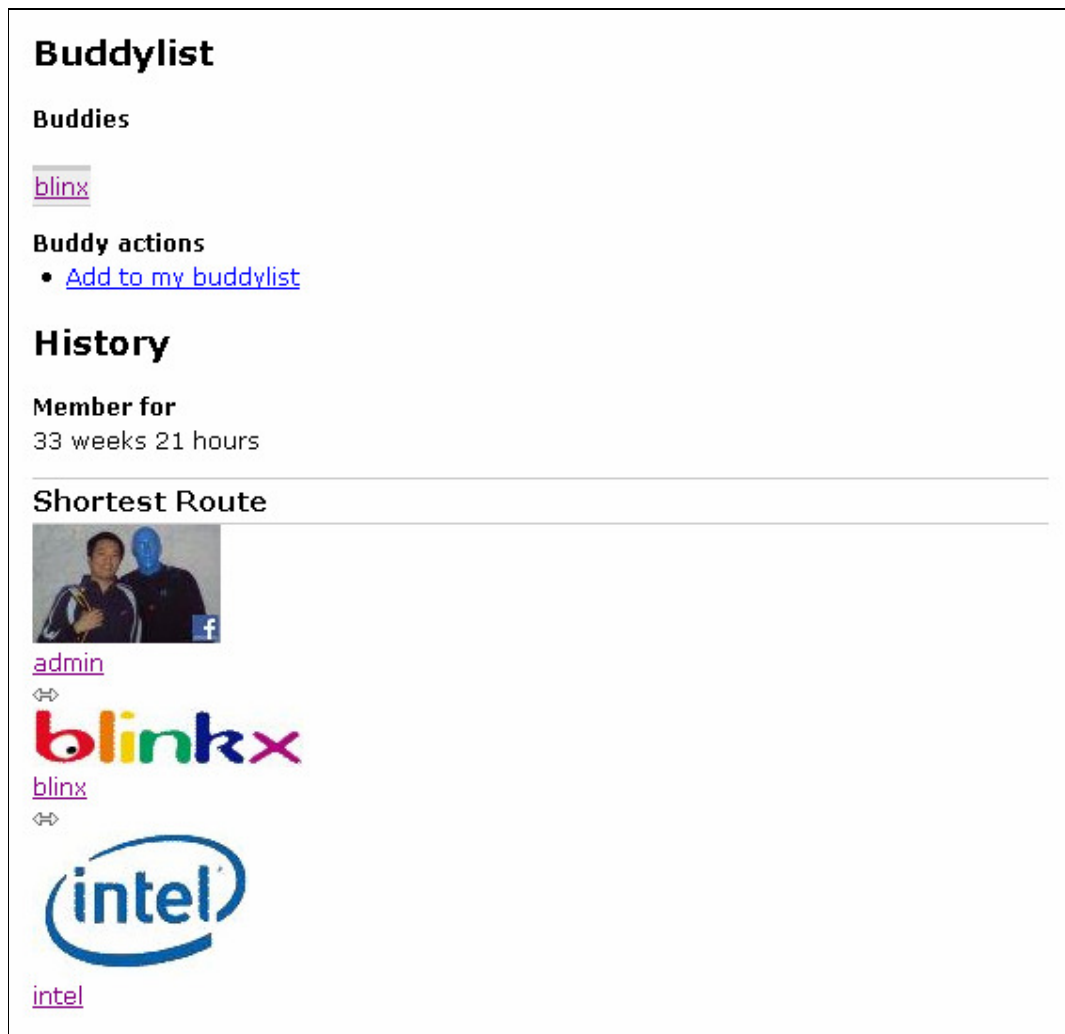


Figure 32 – buddylist feature

## 7.5 The GMap conflict

When one install Facebook Module under HD4S and the FBConnect module did not show up, there is evidence forum said that GMap markers and bubble won't show up after install FBConnect. It has been verified that FBconnect module conflict with GMap module that GMap makers and bubble will not show up if FBconnect is enabled. Digging further and it seems the Facebook Module's java script code:

- fbconnect.js
- featureLoader.js

are messing up the GMap JavaScript code that get calls before GMap scripts.

## 7.6 Calculating social distance

In a friend relationship more than friend of friend is not too useful as any, for friend distance  $> 3$  would same as a stranger to a user. it would be useful if the review is from a friend but friend of friend and beyond (Friend distance  $> 3$ ) is not much use, it means to user same as a stranger.

Immediate friends (distance 1) and friend's friend (distance 2) is in our interest here. Any friend distance above (distance 3) is useless in my opinion. One can write a loop for return

- Immediate friend
- Friend's friend

One had done test the buddylist2 module again:

- <http://drupal.org/handbook/modules/buddylist2>

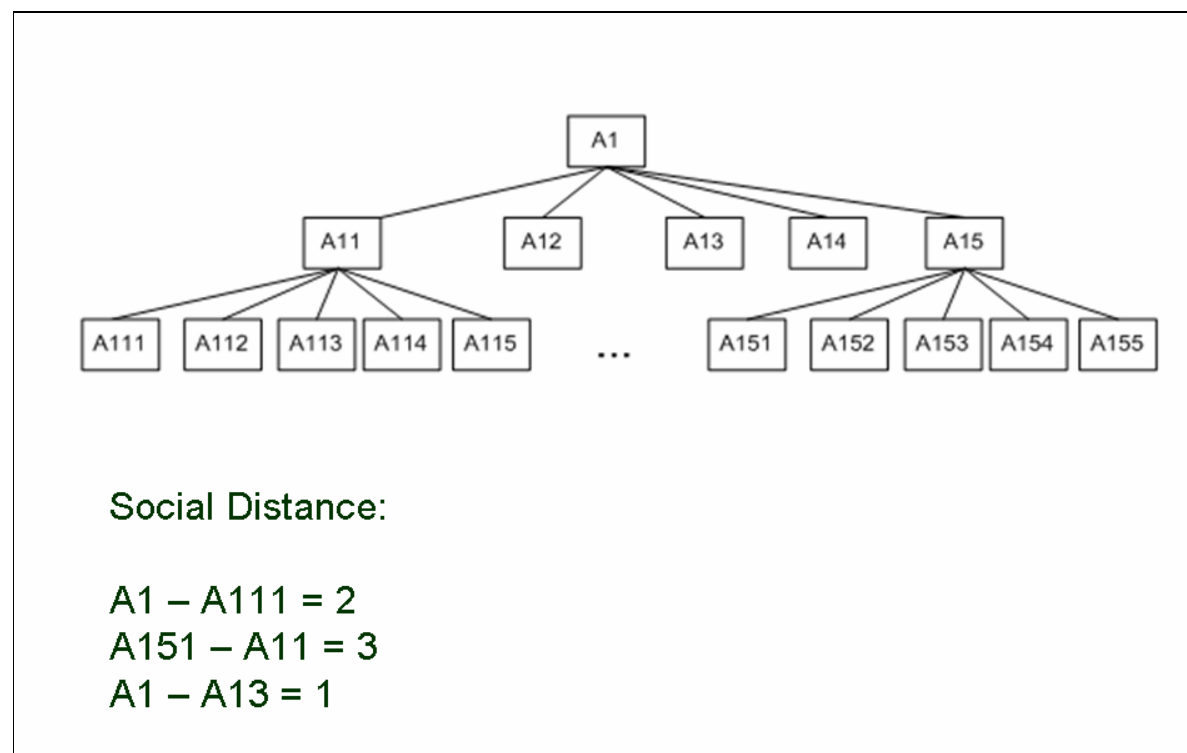


Figure 33 – social graph

## ■ Calculate Weighted Average

■ For the case of  
Distance = 2, 1 and 4  
Rating = 4, 1 and 4

### Weighted Average

$$\begin{aligned}
 &= 4 * (1/2) + 1 * 1 + 4 * (1/4) / (1/2 + 1 + 1/4) \\
 &= 4 / (7/4) \\
 &= 16/7 \\
 &= 2.3
 \end{aligned}$$

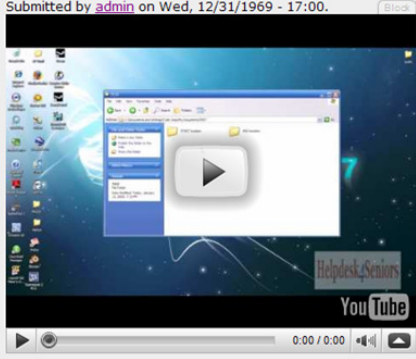
Figure 34 – social distance calculation

**A15**

- ▶ [Create content](#)
- [Search for Help](#)
- [My buddylist](#)
- [Private Calendar](#)
- [My account](#)
- [User Imports](#)
- [Log out](#)

**Video #1052**

Submitted by [admin](#) on Wed, 12/31/1969 - 17:00.



Problems viewing videos?  
[youtube.com](http://youtube.com)

Current User: A15  
Current UID: 237

User=F124 - Distance=5 - Rating=4 - Weighted=0.8

User=E113 - Distance=5 - Rating=4 - Weighted=0.8

User=A151 - Distance=1 - Rating=1 - Weighted=1

User=E135 - Distance=5 - Rating=5 - Weighted=1

User=A132 - Distance=1 - Rating=1 - Weighted=1

Weighted Average=1.77  
Regular Average=3

Submitted by [F124](#) on Wed, 12/31/1969 - 17:00.  
★★★★☆  
[reply](#)

Submitted by [E113](#) on Wed, 12/31/1969 - 17:00.  
★★★★☆  
[reply](#)

Submitted by [A151](#) on Wed, 12/31/1969 - 17:00.  
★★★★☆  
[reply](#)

Submitted by [E135](#) on Wed, 12/31/1969 - 17:00.  
★★★★☆  
[reply](#)

Submitted by [A132](#) on Wed, 12/31/1969 - 17:00.  
★★★★☆

Figure 35 – weighted average



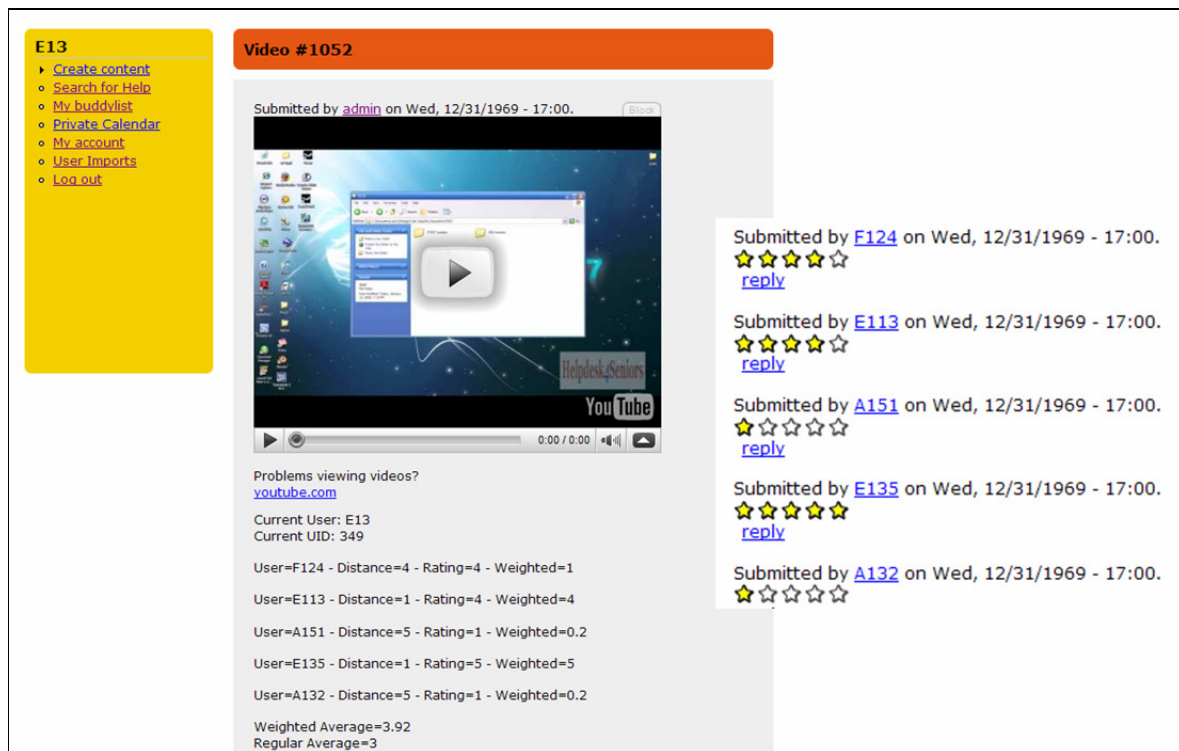


Figure 36 – weighted average

## 7.7 Friend Detection

In order to get friends is limited only to currently logged in user's immediate friends.

Looking through FQL or Facebook API, there are function to found out if the user are direct friend or not by the following query

- `SELECT uid1, uid2 FROM friend WHERE uid1=6999999951 AND uid2=5240928`

There is only three functions in the API to get friends, and the friend list is only for logged in user's friend list, that means we cannot give any two user and get all their friends.

- `<facebook.friends.areFriends>` Which is the API call to found how if a pair of user id are actually friends or not.
- `<facebook.friends.get>` Which returns the ids of the logged in user's friends list.
- `<facebook.friends.getAppUsers>` Which return the ids of the logged in user's friends who is also currently logged into the Facebook website.

There is another very good module call "Friend" module but it only works for Drupal 6.

Instead of using both Facebook and buddylist2, One can also force user to use Facebook if they want any friends connected. It may become too messy to keep two separate social graph combine Facebook and buddylist2, so user can either do not want to social, or they sign up Facebook and connect to Facebook if they want to connect to any friends.

### Tools

[API Test Console](#) [FBML Test Console](#) [Feed Template Console](#) [Registered Templates Console](#)

You can experiment with functions and responses, and see what content Facebook Platform makes available. Select the method you wish want to call and the format of the return values.

User ID

Application

Test Console

Response Format

XML

Callback

Method (Documentation)

friends.get

Call Method

The PHP request code will show up here.

The results of your method call will show up here.

Figure 37 – Facebook Test Console

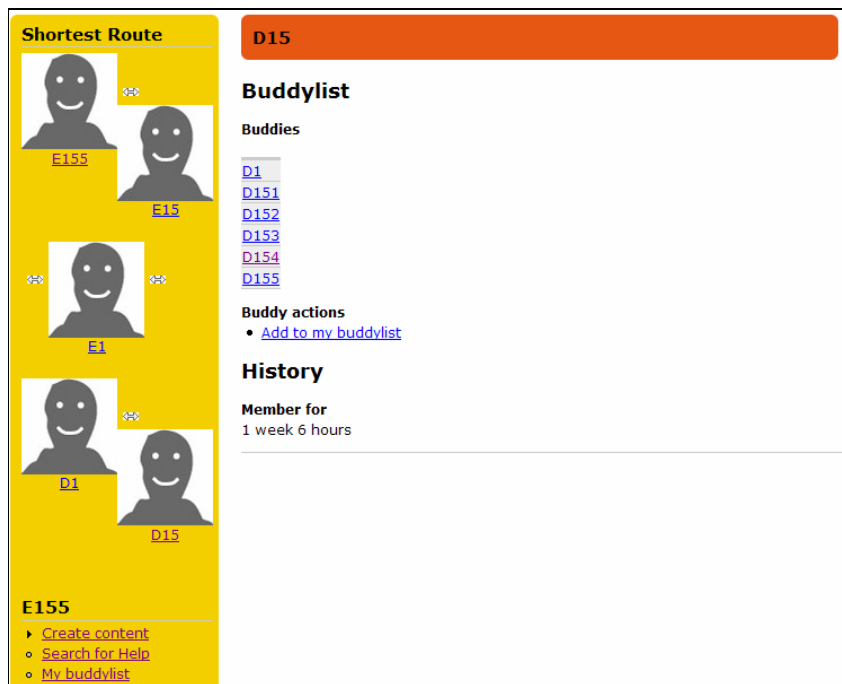


Figure 38 – shortest route in social graph

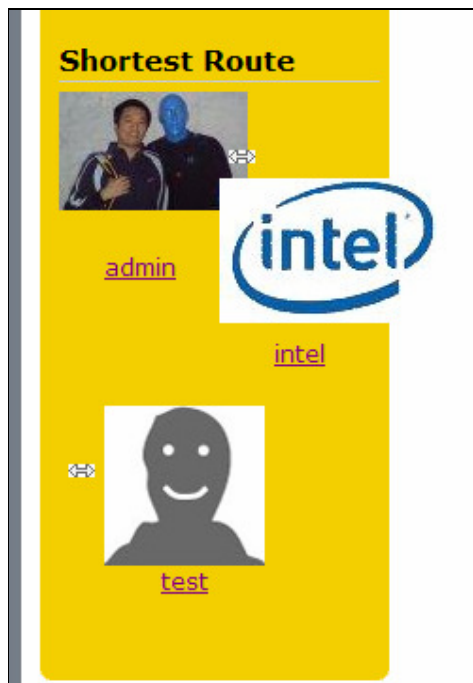


Figure 39 – the route of friends

## 8. COLLABORATIVE FILTERING

### 8.1 Embedded Media Field Module

This is a module that lets user to embed video content in their web sites.



The screenshot shows a web form for a forum post. At the top, there is a 'Forums:' label with a star icon and a dropdown menu currently set to 'General Discussion'. Below this is a 'Body:' label with a star icon. The body text area contains the following HTML embed code: `<embed src="http://www.youtube.com/v/Yr5aCcJ7vUQ&hl=en&fs=1" type="application/x-shockwave-flash" allowfullscreen="true" width="425" height="344"></embed>`

Figure 40 – instead of submitting the video URL, user can manually enter code

### 8.2 Video Module

This module allows users to submit videos to a Drupal site. Also Video module has the capability to view video online or download the video to local machine.

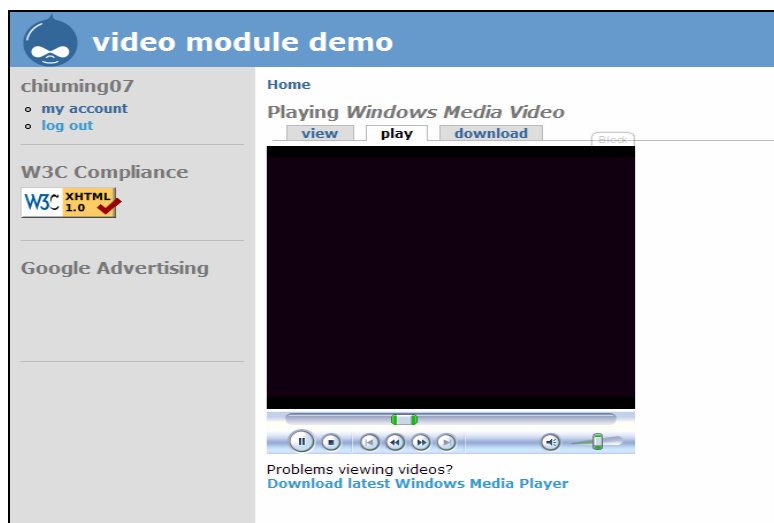


Figure 41 – video module demo site

### 8.3 Video issue on Facebook API

In order to embed video in a web page, developer needs to use the <embed> tag or <object> tag, but Facebook disallow the use of those tag, instead, Facebook needs to use their own custom tag <fb:swf> to post flash video content. A work around is to post both tag twice in order for user to see the video content in both Drupal and Facebook web site. Furthermore, in order to submit FBML, user must use the PHP code input format.

<b>Body:</b>
<pre>&lt;fb:swf swfbgcolor="000000" imgstyle="border-width:3px; border-color:white;" swfsrc='http://www.youtube.com/v/ar-5UkeF3s0&amp;hl' imgsrc='http://www.oniva.com/upload/1356/sky.gif' width='340' height='270' /&gt;  &lt;embed src='http://www.youtube.com/v/ar-5UkeF3s0&amp;hl' type="application/x-shockwave-flash" allowfullscreen="true" width="425" height="344"&gt;&lt;/embed&gt;</pre>

Figure 42 – one way to fix the video tag problem is to enter tag twice

### 8.4 Recommendation System

To setup the Recommendation System, one needs to Install buddylist2 and test the database table on how to relate Facebook Connect table with buddylist2 users.

Given two HD4S users, the algorithm of finding how trustful of two users by finding social distance between them. What if the two user is not connect through any friend, that means it's distance zero trustfulness.

Any user in HD4S can rating any other users, if two users is not connected at all through any friends, then the rating will have zero effect on a user.

The recommendation system will recommend one's friend or friend's friend who has high rating and offering help. Then recommendation system recommends volunteers to seniors who's friend or friend's friends got high rating. he rating would be how helpfulness a volunteer is to expects.

## 8.5 Similarity rating

By calculating how similar two user is given by the Pearson correlation formula below.

$$sim(c, p) = \frac{\sum_{i \in I} (r_{c,i} - \bar{r}_c)(r_{p,i} - \bar{r}_p)}{\sqrt{\sum_{i \in I} (r_{c,i} - \bar{r}_c)^2 * \sum_{i \in I} (r_{p,i} - \bar{r}_p)^2}} \quad (1.1)$$

Where the variable are explain in the following

- $\bar{r}_c$  is the average of the user c give ratings to items
- $r_{c,i}$  is user c give rating to item i
- $\bar{r}_p$  is the average rating of user p
- $r_{p,i}$  is user p give rating to item i
- I is items where both user c and p give rating to

User Name	Sim(c,p)
E131	1
A12	0.99
D135	0.99
A151	0.7
F135	0.65
F122	0.6
F123	0.58
E143	0.57
B112	0.56
A132	0.56
B155	0.55
A112	0.54

Figure 43 – user similarity

User ID	User Name	Sim(c,p)	Video ID	Your Rating	User Rating	You Avg	User Avg
384	F134	0.02	1010	5	5	4.57	4.52
384	F134	0.02	1012	5	4	4.57	4.52
384	F134	0.02	1022	4	4	4.57	4.52
384	F134	0.02	1006	5	4	4.57	4.52
384	F134	0.02	1008	5	4	4.57	4.52
384	F134	0.02	1025	4	5	4.57	4.52
384	F134	0.02	1028	4	4	4.57	4.52
384	F134	0.02	1033	5	5	4.57	4.52
384	F134	0.02	1035	5	4	4.57	4.52
384	F134	0.02	1039	5	5	4.57	4.52
384	F134	0.02	1045	4	5	4.57	4.52
384	F134	0.02	1046	4	4	4.57	4.52
.							
385	F135	0.65	1010	5	5	4.57	4.5
385	F135	0.65	1014	4	4	4.57	4.5
385	F135	0.65	1015	4	5	4.57	4.5
385	F135	0.65	1000	5	5	4.57	4.5
385	F135	0.65	1007	5	5	4.57	4.5
385	F135	0.65	1024	5	5	4.57	4.5
385	F135	0.65	1031	5	5	4.57	4.5
.							
386	F14	-0.04	1006	5	4	4.57	4.47
386	F14	-0.04	1008	5	5	4.57	4.47
386	F14	-0.04	1031	5	4	4.57	4.47
386	F14	-0.04	1035	5	4	4.57	4.47
386	F14	-0.04	1039	5	4	4.57	4.47
386	F14	-0.04	1047	4	4	4.57	4.47
386	F14	-0.04	1049	4	4	4.57	4.47
.							
387	F141	-0.26	1012	5	5	4.57	4.54
387	F141	-0.26	1022	4	5	4.57	4.54
387	F141	-0.26	1000	5	4	4.57	4.54
387	F141	-0.26	1007	5	5	4.57	4.54
387	F141	-0.26	1008	5	4	4.57	4.54
387	F141	-0.26	1024	5	4	4.57	4.54

Figure 44 - intermediate results

## 8.6 Find $\text{sim}(c,p)$ members

By using the formula (1.1), and substitute all values into the formula, we will come up with a value of -1 to 1. If the value is close to 1 that means very similar, if the value is close to -1 then that means it is very not similar.

## 8.7 Video recommendation

In order to recommend item, we need to found the predicted value of an item, the following is the Resnick formula we used for item predicted rating. After calculated all items predicated rating, we rank them and give the top items as recommendation items.

$$P_{c,i} = \bar{r}_c + \frac{\sum_{p \in M} \text{sim}(c, p)(r_{p,i} - \bar{r}_p)}{\sum_{p \in M} |\text{sim}(c, p)|} \quad (1.2)$$

Video ID	P(c,i)
1053	2.27
1058	2.19
1056	1.98
1002	1.92
1001	1.85
1036	1.84
1038	1.82
1012	1.82
1052	1.81
1028	1.79
1049	1.79
1035	1.78
1033	1.78
1011	1.78
1041	1.76
1044	1.76

Figure 45 – predicted video rating



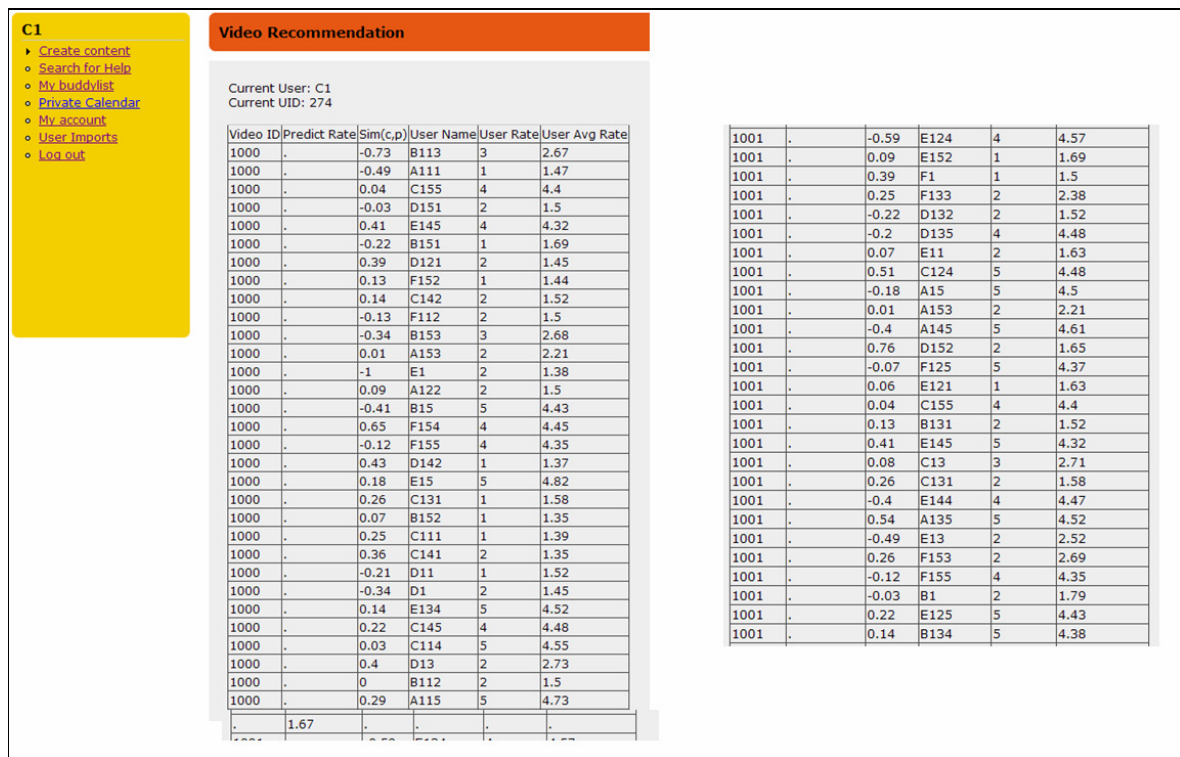


Figure 46 – intermediate results

## 9. MOBILE API

### 9.1 Support for Mobile Devices

Following modules support mobile devices includes

- mobile
- mobile theme
- browscap

It seems that the combo of browscap and mobile theme will detect my old palm web browser, but on opera mini, it will go to the theme switching site and then switch between mobile of normal theme for some reason.

### 9.2 Mobile devices and JavaScript

Almost all mobile browser do not support JavaScript, That means we may want to cut the GMap feature on mobile phone.

The accessibility module will do the device detection and theme switching

- <http://drupal.org/project/accessibility>

One can installed the module but it has some problem with XHTML not well formed.

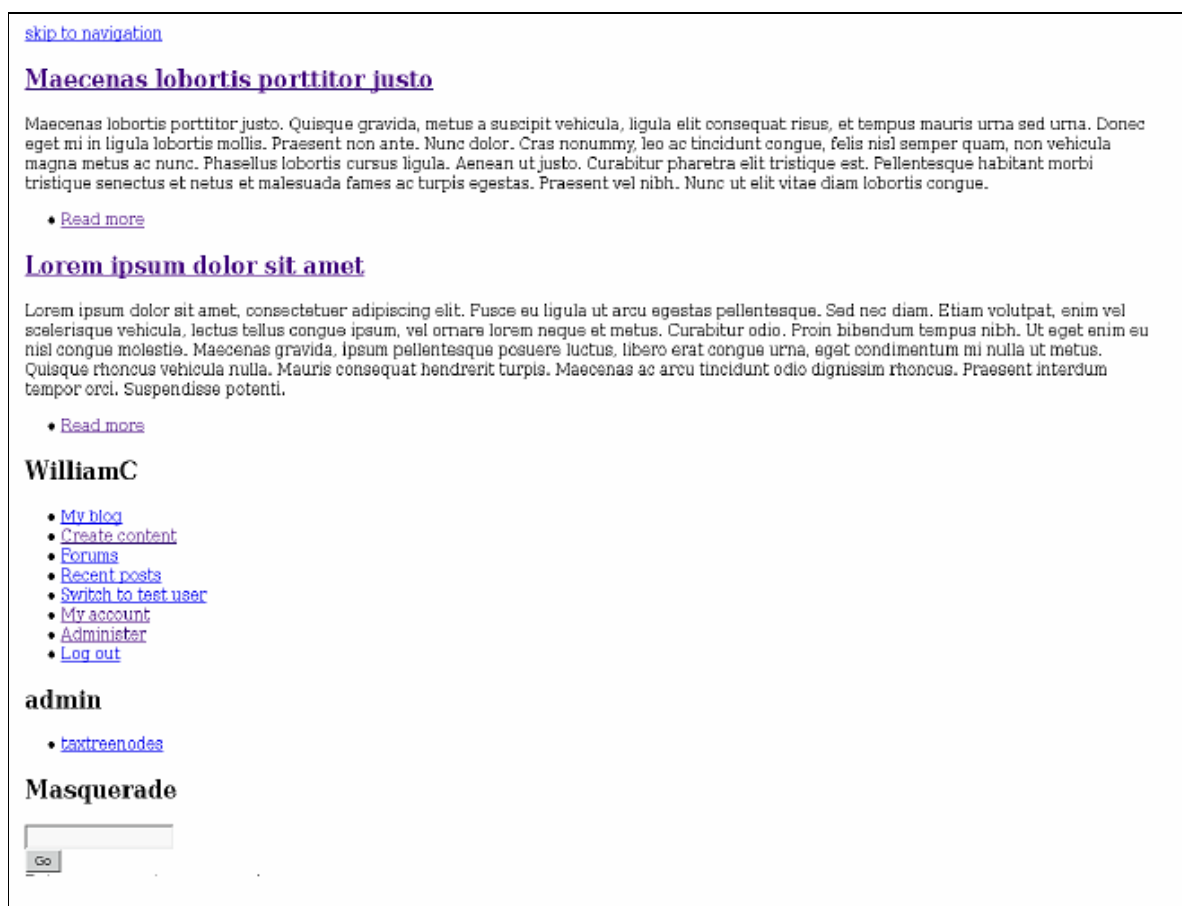


Figure 47 – Mobile version of a Drupal site

## 10. MULTIPLE MEMBERSHIP

According to HD4S profile.xls, expert organization should show:

- first name
- middle name

- last name
- gender

But expert organization did not have gender field, an organization should have a first name and last name either. That's why one show expert organization only a company name.

For volunteer, It did not show the Profile, Skills, Interests and Hobbies, because the volunteers are from old membership data where does not contain those fields. One can create some new volunteers tomorrow and generate some Profile, Skills, Interests and Hobbies data fields to show. Also the Profile field does not exist for any user type and is a mistake in the HD4S\_Profile.XLS.



**Please Select One or More User Type**

Roles:

- ☐ Regular User
- ☐ Volunteer
- ☐ Expert Organization
- ☐ Vendor / Sponsor

Please choose one or more user type(s) that you would like to register for

Figure 48 – Multiple Membership

## 11. CONCLUSION AND SUMMARY OF FEATURES

The challenge part of the implementation is the Facebook integration. We need to extend the Facebook Connect module to fit our needs as some features requested seem not to exist in the module. We also need to fix the Facebook Connect module and GMap module conflict, which is a known problem, following summaries the features of HD4S:

- Allow cell phone users to access Website from their cell phones, design mobile theme with abbreviated content and images, use the Drupal Mobile Module.

- Design APIs for each selected cell phone, for different mobile browser too such as safari, pocket IE, opera.
- Create social networking infrastructure among members. Those with common review and interest profiles can be socially connected. (Or define a metric for connecting them socially), use FQL to query users with similar interests and make suggest once user log in
- Display relevant content and activities based on member's social networking profile and how his or her socially connected friends have done (or are interested), show which of your Facebook friend has recently joined HD4S and update in your HD4S account.
- Integrate Facebook resource to enrich the website. Promote membership and publicity of your website with Facebook APIs, in HD4S web site, user can invite Facebook friends to join HD4S
- Lower security and fraud risk by applying social network to the website. Help seeker can choose a volunteer that his / her friends knows by looking into his friends list.

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Thanks For Reading