

Project Number:	720270	Project Title:	Human Brain Project
Document Title:	Central Services IT / Web Tools Specifications		
Document Filename:	SP11 D11.2.1 FINAL_Resubmission		
Deliverable Number:	D11.2.1		
Deliverable Type:	Report		
Work Package(s):	WPs 11.2 & 11.5 (WPs involved in writing this document)		
Dissemination Level:	PU = Public		
Planned Delivery Date:	M06 / 31 Sep 2016		
Actual Delivery Date:	M10 / 19 Jan 2017, Resubmission 31 May 2017		
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Abstract:	The SGA1 is a demanding phase, in which there is a need to further professionalise a number of communication and coordination activities performed by SP11. A large number of website features are planned to enhance and support these activities, but implementing all of them with our limited in-house resources will take too long. This document shows what is planned for the various HBP websites and why.		
Keywords:	Subcontracting web development		



Document Status

Version	Date	Status	Comments
1	2017-01-15	Draft	First version with extensive input from Education team.
2	2017-01-17	Draft	Integrated feedback from Elisabeth Wintersteller
3	2017-01-18	Draft	Clean-up and removal of subcontract planned costs to allow for public dissemination.
4	2017-01-18	Final	Inclusion of extensive edits by Guy Willis and addition of an additional mockup.

Table of Contents

1. Executive Summary	4
2. Introduction	5
2.1 The Human Brain Project (HBP) and its Central Services.....	5
2.2 Aim/purpose of this document	5
2.3 Structure of the document	5
3. The HBP public website (www.humanbrainproject.eu)	6
3.1 History	6
3.2 Strategy	6
3.3 Features	10
3.4 Plan	12
4. The HBP education website (education.humanbrainproject.eu)	14
4.1 History	14
4.2 Strategy	14
4.3 Plan	17
5. The HBP's EMDESK project coordination tool (emdesk.humanbrainproject.eu)	18
5.1 History	18
5.2 Strategy	18
5.3 Plan	18
6. The HBP's Project Lifecycle App (PLA) project coordination tool	19
6.1 History	19
6.2 Strategy	19
6.3 Plan	20
7. Conclusions	21
Annex A: Glossary	22

List of Figures and Tables

Figure 1 : Mock-up of a responsive www.humanbrainproject.eu - large screen version	9
Figure 2: Mock-up of a responsive www.humanbrainproject.eu - handheld device version	10
Table 1: Planned Education Site Adaptations	14



1. Executive Summary

The SGA1 is a demanding phase, in which there is a need to professionalise a number of communication and coordination activities performed by SP11. A large number of web site features are planned to enhance and support these activities, but implementing all of them with our limited in-house resources will take too long. This document shows what is planned for the various HBP websites and why.

2. Introduction

2.1 The Human Brain Project (HBP) and its Central Services

The Human Brain Project (HBP) is a major international scientific research project, funded by the European Commission (EC) and with a planned duration of ten years. The project was launched in 2013 with the goal “to build a completely new ICT infrastructure for neuroscience, and for brain-related research in medicine and computing, catalysing a global collaborative effort to understand the human brain and its diseases and ultimately to emulate its computational capabilities.”

The fields of neuroscience, medicine and information technology each have important roles to play in addressing this challenge, but the knowledge and data that each is generating is naturally fragmented due to its origin in unconnected research domains. The HBP’s Central Services Subproject (SP11) is driving integration of these different contributions from an HBP consortium of 117 partners in 19 countries around the world, using custom-developed communication sites, web-based scientific management tools and tailored education programmes. Each of these integration activities plays an important role in the success of HBP researchers, HBP infrastructure activities or the communication of that success to the world at large.

2.2 Aim/purpose of this document

The aim of this document is to specify the planned enhancements for the following websites:

- The HBP public website (www.humanbrainproject.eu)
- The HBP education website (education.humanbrainproject.eu)
- The HBP’s EMDESK project coordination tool (emdesk.humanbrainproject.eu)
- The HBP’s Project Lifecycle App (PLA) project coordination tool

This document will explain why these sites need to be improved to achieve HBP objectives and which enhancements will be needed by the HBP in the SGA1 to strengthen critical activities.

Due to limited in-house IT human resources, the criticality of the functions provided by these sites and the urgent need to improve them, the overall strategy is to use subcontracting to implement the required enhancements. Given the disparate nature of the requirements, it is expected that more than one subcontract will be needed.

2.3 Structure of the document

Each of the above websites is the subject of a separate section below, each of which is divided into the following sub-sections:

- 1) History - this describes the history of the website to help understand the context of the planned changes.
- 2) Strategy - each website update is part of a bigger coordination and communication strategy and this section describes how the updates will contribute to that strategy.
- 3) Plan - this describes planned updates on a feature-by-feature basis.

3. The HBP public website (www.humanbrainproject.eu)

3.1 History

At the start of the HBP Ramp-Up Phase (RUP), it was identified that there was a need for an HBP public website and that this would need to be delivered within a 3-month timeframe. The in-house team responsible for the public website work had significant experience in Liferay, a Java-based Content Management System (CMS) and consequently decided to implement the public site using this technology. This allowed the team to deliver the HBP website quickly, using familiar technology. Numerous short-term design decisions were made to reduce cost and implementation time. This “quick-fix” approach was taken for the public website v1, because the incoming Communication Director was expected to drive a subsequent elaboration of a more comprehensive public website v2.

However, due to various issues - including the departure of Communication Director - the design of the public website was not fundamentally changed after the launch of the v1 site. Instead, the public website has instead been incrementally updated without changing the underlying technology or the fundamentals of the site design.

However, since the launch of the HBP in October 2013, there have been significant changes in a number of key factors touching on the public website. Firstly, the mobile audience for the web has grown substantially. Secondly, the development team has developed significant expertise in Python-based web frameworks and would prefer to leverage this expertise with a Python-based CMS framework. Thirdly, the Liferay platform has proved somewhat inflexible and inefficient as a CMS solution, as far as content presentation and updating is concerned.

3.2 Strategy

The current HBP public website has averaged 12,300 unique visitors per month. These visitors are consistently 70% +/- 5% new visitors, but the current analytics indicate that these visitors often do not access deeper information on the website.

So, it is clear that the public website receives significant traffic and consequently serves as a key channel to both inform the public and to direct interested site visitors to the HBP Collaboratory¹, where they can engage with the HBP Platforms². However, it is not currently connecting these visitors to the information relevant to them.

The HBP public website is a gateway for some very different user communities. To understand what is needed to satisfy better the information requirements of each, we must look at the objectives of these different target audiences:

- 1) Interested public
- 2) Informed public
- 3) Neuroscientific public
- 4) Potential Platform users

¹ The HBP Collaboratory is a flexible, extensible, interactive internet interface between the HBP's user communities and its scientific research Platforms. As its name suggests, it is specifically designed to facilitate ad hoc collaboration between researchers working in different sites but interested in the same scientific questions.

² The HBP delivers its scientific research capabilities through six ITC Platforms: Neuroinformatics (SP5), Brain Simulation (SP6) High-Performance Analytics and Computing (SP7), Medical Informatics (SP8), Neuromorphic Computing (SP9) and Neurorobotics (SP10).

3.2.1 *Interested public*

These users have no neuroscience background, but want to know more about the project and why it's important, but at a high-level.

3.2.1.1 Site objectives

- Inform the user of the high-level HBP objectives and their societal value.
 - Needs front page access to a clearly formulated Goals/Objectives page
- Make the visitor feel like the project is dynamic and producing interesting progress. To accomplish this, the public site will need:
 - Front-page access to Scientific American/Wired-style scientific journalism content, about the project. Lead each article with an image.
 - Journalistic articles to link clearly to deeper content (Deliverables, Platform pages, etc.)
- Highlight politically meaningful outputs that the HBP has produced.

3.2.1.2 Impediments to address

- Many will link to the public website from Twitter feeds on their mobile devices. The current mobile experience on the current public website is not good.
- The menu structure does not show many headings which are of immediate interest to this audience.
- The current presentation of content items allows a single photo of 1 of 3 current news highlights to be shown at one time (via carousel). The remaining items are not visible or are presented as text. This is not conducive to engaging visitors on desktop or mobile devices.

3.2.2 *Informed public*

These users might have a scientific or engineering background and some EC project knowledge. They may have heard about the HBP previously or are just learning about it for the first time.

3.2.2.1 Site objectives

- All objectives described in 3.2.1.1, plus:
- Highlight more detailed or scientific outputs of the project, be they infrastructure or science.

3.2.2.2 Impediments to address

- All objectives described in 3.2.1.2, plus
- Only report components are reported on the HBP front page currently.

3.2.3 *Neuroscientific public*

These public website visitors have a Neuroscience background and are likely to also have extensive experience with EC projects. They have likely to have heard of the HBP before.

3.2.3.1 Site objectives

- Understand the high-level HBP objectives.
 - Needs front page access to a clearly formulated Goals/Objectives page
- Find links to HBP activities which match their areas of interest.



- Needs an easy-to-find science feed which highlights developments and publications in specific areas of investigation.

- Find links to supplemental resources for HBP publications in the per-SP sections or the Collaboratory

3.2.3.2 Impediments to address

- No anonymous access to any content in the Collaboratory

3.2.4 Potential Platform users

These public website visitors may have heard about the HBP Platforms and want to know more. They must be able to find interesting information about Platform capabilities and connect to tools they are interested in from the public facing website.

3.2.4.1 Site objectives

- Find relevant Platform content via public search engines (Google, Bing, etc.)
- See relevant Component updates in the content stream of the public website

3.2.4.2 Impediments to address

- No anonymous access to any content in the Collaboratory
- No established development teams to ensure that per-SP content is high quality and engaging for Platform Users.

3.2.5 How to serve site visitors better

What is clear from this audience analysis is that there is a need for a more structured approach to the generation of content for the public website. However, this content stream must be matched with an updated design that highlights high-level goals of the project in visitor-relevant terms, while making more in-depth scientific content streams more visible.

The landing page is expected to be simple and responsive, to support a high-quality visitor experience regardless of screen size. Good examples of how to present scientific content can be found at sites such as nasa.gov. Taking the NASA site as an inspiration, it's not hard to imagine what a responsive, audience-accessible design might look like:

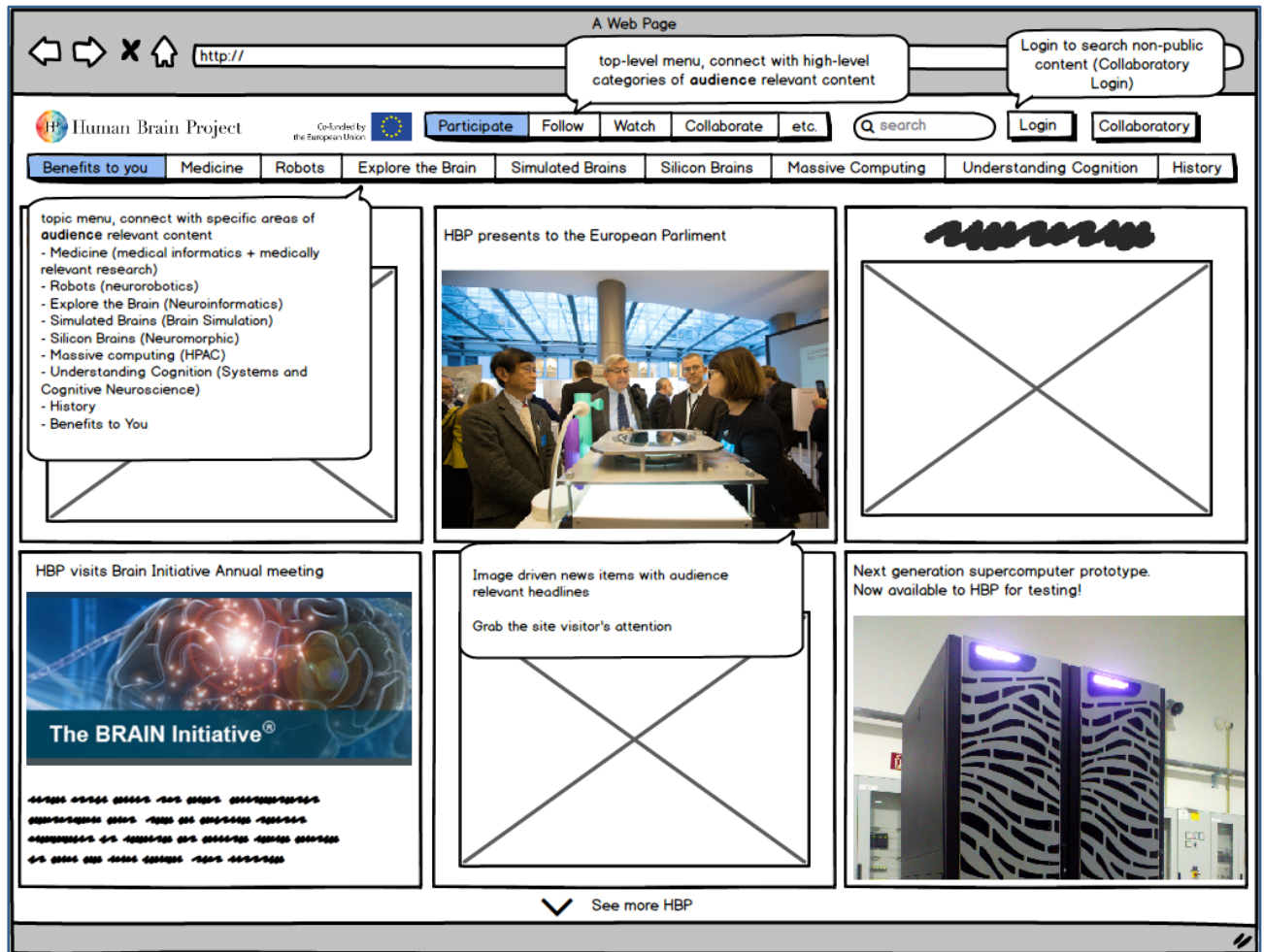


Figure 1 : Mock-up of a responsive www.humanbrainproject.eu - large screen version



Figure 2: Mock-up of a responsive www.humanbrainproject.eu - handheld device version

These mock-ups are intended to provide input to the design process which will be subcontracted and should not be considered representative of the final design. It is presented solely to show how a responsive design might highlight current HBP content and activities in a way which better engages the target audiences.

3.3 Features

3.3.1 Prioritised User Requirements

The following requirements reflect feedback from users who had previously been using the Liferay CMS or who were new contributors coming from the SPs. Many had web content development or software development experience and provided valuable input to the key user requirements.

- 1) Segmentation of the site into regions where SP contributor groups have more autonomy
- 2) Ability for SPs to post news and events to the public website without coordinator intervention.
- 3) More intuitive navigation structure for new visitors
- 4) More intuitive content creation menu structure
- 5) Better content editing interface

- 6) WYSIWYG preview functionality
 - a) * accurate preview rendering is not available under Liferay CMS
- 7) Event Calendar
- 8) Responsive Design - major site elements are usable using common interaction paradigms - eg. hamburger menu button, through criticised is a common design element: https://en.wikipedia.org/wiki/Hamburger_button
- 9) Documented Style-guide for SP content providers to ensure consistency between sub-sites.
- 10) Easy entry of YouTube and Vimeo videos in content panels, news items and events.
- 11) Categorisation of news and event items based on a defined set of tags for subsite, sp.
- 12) Filtering of news and event items in news summary views based on sets of tags.
- 13) Customised models with specialised summary navigation views for
 - a) Partner Institutions
 - b) Publications
 - c) Software catalog entries (specs, software and services)
 - d) Principle investigators

3.3.2 Prioritised Developer Requirements

These requirements were provided by the Collaboratory development team which was responsible for maintenance and feature upgrades on the previous www.humanbrainproject.eu site. They primarily represent features which are considered “web best practices” required to improve scalability and efficient deployment and operation of the website.

- 1) Global site monitoring performance using a service like Pingdom
- 2) Simplified deployment both for main site and extensions.
- 3) Reduced frontend node requirements - adequate performance of the Liferay site required frontend nodes to have a minimum of 4G
- 4) Migration of hosting outside of EPFL network to a commercial cloud provider
- 5) Redeployment must not cause more than 30 seconds of downtime.
- 6) Search-engine enabling site.xml is generated automatically from the DB site-map of the CMS to ensure site is properly indexed.
- 7) Deployment should require a single command-line command from the developer which executes in less than 2 minutes.
- 8) Python-based CMS, preferably based on Django - to more readily utilise HBP-PCO developer skillsets, tools and deployment practices.

3.3.3 Other Requirements

- 1) Page-load time for 95th percentile less than 2 seconds on 20Mbit link - based on best practices from Google (https://youtu.be/OpMfx_Zie2g) and Akamai
- 2) Design is responsive Major information regions are visible on an iPhone 4 screen (640x960 pixel resolution)
- 3) Design makes good use of the screen real estate for a large desktop screen (1920x1080 pixel resolution)

- 4) Server response time for 95th percentile page requests is less than 500 ms.
- 5) Database backups are performed by an automated system at least once every 24 hours.
- 6) In the event of catastrophic failure, site restore on same hosting provider takes less than 10 minutes including database restore.
- 7) Automated website publishing of Collaboratory software catalogue entries.
- 8) Automated website publishing of publication entries from the PLA database.
- 9) OpenID Connect authentication integration
- 10) OpenID Connect authorisation integration based on OIDC groups
- 11) Customised site-local search

3.3.4 Nice to have Features

- 1) Database backups are performed by an automated system at least once every 1 hour.
- 2) Automatic deployment from git repository.
- 3) Automatic pre-deployment tests.

3.3.5 Not required

- 4) Progressive Web App architecture
 - a) (https://en.wikipedia.org/wiki/Progressive_web_app)

3.4 Plan

3.4.1 Subcontract

Design and development service from a professional web firm to perform enhancements:

- 1) To enhance the responsive design. Current website design is usable on a mobile phone or small tablet, but numerous refinements are still needed. Notably:
 - a) Front-page highlighting of subsite navigation in mobile devices
 - b) Improving visual presentation of front-page and subsite front-page project specific high-impact graphics in both mobile and desktop.
- 2) To develop functionality for the entry and display of HBP specific models and views listed in requirement 3.3.1.13 above.
- 3) Search functionality with support for all site content as well as models described in 3.3.1.13 above.
- 4) Improve content stream functionality to handle tag filtering better.
- 5) Implement data-import functionality to facilitate low-error large scale updates for models in 3.3.1.13.
- 6) Implement support in the information design for the multi-phase nature of the various HBP-specific models (RUP, SGA1, SGA2, etc., all have different partners, PIs, etc.).

3.4.2 Complementary activities

The complementary activities below are being undertaken by the HBP internal teams to support the strategy change and the resulting development changes described above.

- Refocus internal writing effort. Tailored content streams need to be delivered consistently with the support of more dedicated professional writing resources.



- Encourage increased dissemination of HBP science and infrastructure developments via Twitter and Facebook, supported by better usability for mobile devices- This should encourage active HBP Twitter and Facebook users to direct their audiences to content articles on the public website.
- Increase coordination activities, to ensure that project scientists and engineers understand the why and how of updating Component content streams.
- Recruit and train community coordinators and designated SP web developers in the customisation of the per-SP spaces and content streams.

4. The HBP education website (education.humanbrainproject.eu)

4.1 History

The website of the HBP Education Programme was jointly developed by the HBP Central Services' IT function at the EPFL and the HBP Education Programme Office at MUI. It went online in April 2014 and serves as a website for WP.11.5 Education Programme Coordination (former T.13.4.3 Education Programme Coordination).

This was one of the first websites deployed by the T13.3.1 IT Service team. At that time, Liferay was selected as a viable choice because it offered significant functionalities which could be exploited for providing per-course sites and customised registration workflows.

4.2 Strategy

The existing Liferay-based website has served the Education Programme well, but is in need of some extension and adaptation in key areas. Since the goals and needs of the Education site are different from those of the HBP public website, expansion of the current Liferay functionality is considered the most cost-effective approach for improving the HBP education website. Adaptations in green are to be handled by the subcontractor and will be described in section 4.3 below.

Table 1: Planned Education Site Adaptations

Site	Current contents	Weblink	Adaptation for SGA1
Home	<ul style="list-style-type: none"> Start page of the HBP Education Programme website Account request for HBP Education Programme website News section Links to the project's main website 	https://education.humanbrainproject.eu/web/hbp-education-portal/home	Remove account request and replace by sign-in Implement news banner
About	<ul style="list-style-type: none"> Objectives of the HBP EP Target groups Educational activities for the scientific community Educational events planned for SGA1 Education Programme Committee 	https://education.humanbrainproject.eu/web/hbp-education-portal/about	Adaptation in case changes occur for the current contents
Educational Events	<ul style="list-style-type: none"> Information on upcoming and past events organised by the HBP EPO Event application for upcoming events Event guidelines 	https://education.humanbrainproject.eu/web/hbp-education-portal/courses	Separate application workflows Application for events organised by HBP partner institutions if they wish to take advantage of this offer

Platform Training	User	<ul style="list-style-type: none"> • Neuroinformatics Platform • Brain Simulation Platform • HPAC Platform • Medical Informatics Platform • Neuromorphic Computing Platform • Neurorobotics Platform 	https://education.manbrainproject.eu/web/hbp-education-portal/platform-user-training	Regular update according to information on HBP Collaboratory
Open Forum		<ul style="list-style-type: none"> • Access to the HBP Community Forum 	https://education.manbrainproject.eu/web/hbp-education-portal/open-forum	Exploit usage for HBP Curriculum discussion forum related to online lectures
Online Media		<ul style="list-style-type: none"> • Teaching material produced at workshops and schools organised by HBP EPO • Lectures provided by scientists recorded at other occasions 	https://education.manbrainproject.eu/web/hbp-education-portal/documents	Addition of online teaching material for HBP Curriculum
Sponsorship Opportunities		<ul style="list-style-type: none"> • Information on HBP EP sponsorship opportunities 	https://education.manbrainproject.eu/web/hbp-education-portal/sponsorship-opportunities	No adaptation
Student Representative		<ul style="list-style-type: none"> • Information about and contact of the HBP Student Representative in the HBP EP 	https://education.manbrainproject.eu/web/hbp-education-portal/student-representative	Information on and application for student representative in SGA2
FENS Satellite event 2016		<ul style="list-style-type: none"> • Summary of FENS Satellite Event as well as recorded videos, slides and photo collection 	https://education.manbrainproject.eu/web/hbp-education-portal/fens-2016	Move to educational events page
Young Researchers Budapest		<ul style="list-style-type: none"> • Summary of Young Researchers Event in Budapest 	https://education.manbrainproject.eu/web/hbp-education-portal/young-researchers-budapest	Move to educational events page
First HBP Student Conference		<ul style="list-style-type: none"> • General information on the first HBP Student Conference with references to more detailed information 	https://education.manbrainproject.eu/web/hbp-education-portal/first-hbp-student-conference	Move to educational events page
Contact		Contact Information of HBP EPO: <ul style="list-style-type: none"> • Email • social Media • Newsletter subscription 	https://education.manbrainproject.eu/web/hbp-education-portal/contact	Programme footer Move content to footer

All pages and contents are accessible to the public. They will be adapted accordingly for SGA1 as listed in the rightmost column of the table "Adaptation for SGA1".

Given the expansion of the HBP Education Programme by several Tasks, the HBP Education Website needs to be redesigned on two additional levels:

- 1) Adapt the public appearance of the website
- 2) Additional functions to be set up to operate actions defined in SGA1 work plan

4.2.1 Adapt the public appearance of the website

4.2.1.1 New design

The HBP Education Programme website visitors should be able to associate the HBP Education website with the main HBP public website. A standardised appearance of project-related websites needs to be implemented.

Required change:

- Design adaptation according to the main HBP public website

4.2.1.2 Improved navigation

When the website was first released, for various reasons, it was accessible only by the HBP community, i.e., Principal Investigators and students working on activities funded by the HBP. As a consequence, content as well as online teaching material were only available after login. Taking the comments of the first and the second HBP Technical Reviews into account, the website was subsequently opened up to the public.

The initial design was not intended for use by the general public. This resulted in a non-user-friendly display of the pages in the public area of the HBP Education website. As a result, utilisation is not very intuitive, especially the navigation through various (sub-) pages. The HBP logo currently works as 'home' button, which should remain to navigate to the start page of the HBP Education website.

Required change:

- Improve navigation interaction through different pages of the website
- Replace HBP logo with the latest version

4.2.2 Software support for SGA1 Education WP work plan

4.2.2.1 Application workflow

An application form was programmed for the website, which enables the HBP Education Programme Office to collect event applications. It allowed the collection of applications for schools and workshops in the RUP of the HBP. Given that the format of the workshops is changing and additional types of event, such as the student conference, will be organised, the current application form does not meet the requirements anymore.

Required change:

- Set up separate application workflows that can be adapted and modified for different event formats by the HBP Education Programme Office

4.2.2.2 Interactive tools for the HBP Curriculum

Currently, online lectures, including supporting teaching material, can be provided on the HBP Education website. To implement the HBP Curriculum fully, the site needs to be extended to allow discussion of questions that arise during the HBP Curriculum courses. Further, it is planned to have two to three interactive sessions during each of the five

courses, as the lectures themselves are recorded in advance. Students and teachers will be brought together in live sessions to discuss the respective lectures.

Required change:

- Link to public forum site – API driven from Lecturer Panel
- Search function for on-line media catalogue

4.2.2.3 Sign-in for interactive tools of HBP Curriculum

In general, it is recommended by IT experts that anonymous users should not be allowed to post to interactive tools, discussion threads or forums. Therefore, we plan to make available interactive tools that complement the HBP Curriculum online teaching material, i.e. discussion threads and interactive sessions which should be available to students upon sign-in. In addition, this will facilitate monitoring the success of the HBP Curriculum. The sign-in should be possible either with an HBP account, or via a Facebook or Google account. If an interested party has neither of the accounts mentioned, it should be possible to request an HBP account.

Resulting action item:

- Remove specific HBP Education website account request and replace by Collaboratory account support.

4.3 Plan

Summarising the strategy above for needed improvements:

- Support for the SGA1 workplan
- Adapt the HBP Education Programme website design according to the project's main website
- Easier navigation through different pages of the website
- Replace HBP logo with the latest version
- Set up separate application workflows that can be adapted and modified for different event formats by the HBP Education Programme Office
- Create categories in forum.humanbrainproject.eu for the HBP Education Programme
- Remove specific HBP Education website account request and replace by Collaboratory sign-in
- Search function for on-line media catalogue

5. The HBP's EMDESK project coordination tool (emdesk.humanbrainproject.eu)

5.1 History

The EMDESK web-based project management and reporting tool has been used by HBP to fulfil key budget and reporting functions during the RUP and the SGA1 preparations. However, it is not easy to use and was not designed to handle projects the size of the HBP. In addition, it is clear that additional metadata and analytics capabilities are required, as well as better extensibility.

However, it is also clear that EMDESK licensing must be continued as there are many functions for which there is no suitable replacement and many of SP11 staff and SP managers are comfortable with the limitations and capabilities.

To gain the flexibility and UI scalability needed to handle a project the size of HBP, the focus will be on gradually shifting planning and reporting work from EMDESK into the Project Lifecycle Application (see below), which has become increasingly important for the HBP as SGA1 has progressed.

This migration will be done carefully to ensure that development costs are minimised, while ensuring that HBP has clear reporting and planning processes.

5.2 Strategy

Continue with the EMDESK service contract, but without paying EMDESK for additional software extensions.

5.3 Plan

The EMDESK service contract for SGA1 has been renegotiated and will not include the substantial development/adaptation work carried out by EMDESK for HBP in the RUP.

The contract covers software licensing, support and monitoring by EMDESK administrators. The service will be deployed on HBP-controlled servers and backed up according to HBP Managed Tier data management recommendations.

6. The HBP's Project Lifecycle App (PLA) project coordination tool

6.1 History

The Project Lifecycle App (PLA) started life as an internal tool to help the Science and Technical Coordination Tasks of SP11 to collect and analyse information for SGA1 needed to understand connections between the project's planned outputs.

It became clear in the early stages of the HBP Data Planning and Implementation Team (DPIT) group tasked with resolving issues related to SP5 (Neuroinformatics Platform), that the PLA would serve DPIT's data collection and coordination needs very well. The PLA was subsequently extended by the HBP Science Coordinator, Martin TELEFONT, to support data needed for DPIT use case mapping. The data gathered during DPIT provided invaluable insights and analysis of the HBP, and shows great promise for helping to organise HBP's complex Task interdependencies and support coordination of the whole project with a much smaller coordination effort than would be required otherwise.

The PLA database will be a key source for analytical information, covering everything from publications and planning activities, through to software and service release tracking. If this database can be supported, as planned, by internal processes, which support continual reporting of project product-based planning information, the PLA could potentially produce automatic reports, substantially reducing the reporting burden on the project while increasing reporting detail and quality.

6.2 Strategy

The PLA has largely been built as a side project by a developer with little professional experience. The Collaboratory team has helped to troubleshoot some blocking technical issues, but has invested little time in improving the user experience for heavy users.

The PLA contains data models for the following objects supporting product-based planning:

- Scientific Use Cases
- Components (divided into the following categories: data, model, software, service, hardware and reports)
- Releases
- Subprojects
- Work packages
- Tasks
- Co-Design Projects
- Milestones and Deliverables

The PLA is already experiencing very heavy use by the project, even in its current, sub-optimal form. While longer-term metrics are not saved, the application regularly sees daily average traffic of 15-30 requests-per-minute. This means that the PLA is experiencing approximately 20,000 to 40,000 page loads per day. Improvements in usability should reduce this number on a per-user basis, as users find the information they need more easily, but the number of active PLA users in the project will grow as the information it contains becomes better and more relevant to day-to-day project activities.

To realise the promised benefits, the PLA must be extremely efficient, both for a data entry and as a project exploration tool. This will require significant investment in the following areas:

- Performance and usability of key data entry points:
 - Components
 - Use cases
- Web-based reporting suitable for internal analysis.
- History tracking of key data models.
- More fine-grained access control on all records.
- Report generation capability suitable for EC reporting purposes.

The PLA is a custom project management database built on top of the Django framework. Django is highly productive and well exploited inside the HBP-PCO. This has allowed the current developer to move very quickly due to well-tested best practices for the Django framework. Another advantage of this technology is that Django is a common and mature framework, so finding well-priced, quality contractors should be relatively easy.

The HBP-PCO is in the process of hiring a full-time software developer who will be tasked with extending the PLA as part of his/her job description. However, to make the PLA a truly productive tool, there is a need to complement the in-house developer with stronger web-development expertise.

It's important to note that improving heavily used portions of the UI can potentially save the project many person-hours per day, due to heavy use by a wide user base. There are expected to be approximately 50 heavy HBP users involved in coordination activities. There will also be a further 1,000 casual HBP users who will be exploring the neighbourhood of their part of the HBP.

Considering just the heavy users, if they spend 30 minutes per day in the PLA and our planned development work could save them 10 minutes due to improved usability, that translates to a daily saving of 500 minutes or 8.3 hours per day. Even with this rather modest estimate, PLA development could save the project 14 person months over the remainder of SGA1. In practice, it is expected that the activity levels of heavy users will be higher and consequently their time savings from development enhancements should actually be higher than this preliminary projection.

6.3 Plan

Attempting to improve the PLA quickly for both SGA2 planning and SGA1 reporting simultaneously will require multiple developers. The initial plan is to hire two freelance full-stack Django developers who will work as a scrum team with an HBP-PCO product owner to deliver iteratively user-prioritised feature enhancements continuously, while maintaining a solid production system.

The current priority list is expected to be as follows:

- 1) Performance and usability of key data entry points:
 - a) Components
 - b) Use cases
- 2) More fine-grained access control on all records.
- 3) History tracking of key data models.
- 4) Web-based reporting suitable for internal analysis.
- 5) Print reporting suitable for EC reporting.

7. Conclusions

The HBP-PCO is undertaking a programme of key improvements to critical web-based services necessary for coordinating the HBP, for educating its user base and for communicating its many progress and successes. This document shows that the problems we currently face are well understood and that the enhancement plans tailored to each of the four sites mentioned should deliver cost-effective value in the SGA1 phase.

This is the right approach, as SGA2 budgets for the respective sites are currently unknown. This approach will allow the project to take advantage of prior investments which are still viable, as in the case of the Education website. It will allow the project to start from a clean slate where more significant revisions are needed, as in the case of the HBP public website. Finally, as there is a need to scale up rapidly short-term development of key facets of each site, it is advantageous to bring in high-quality external contractors as soon as possible and to pair them with internal teams which can guide and maintain their enhancements. This approach will give the HBP the necessary flexibility to ensure efficient expenditure on subcontractors and maximise their positive impact on the project.

Annex A: Glossary

Term	Definition
frontend developer	A Web Developer who specialises in web design and web UI development.
backend developer	A Web Developer who specialises in the service tier and backend integration with databases and other web service APIs.
full-stack developer	A Web Developer who has a broader range of skills in both frontend and backend web development, but at some cost of specific expertise in either.