▶A Report on the Software system for ASSET

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A Report on the Software system for ASSET

Introduction

'ASSET: Moving Forward Through Feedback' is the title of a successful application from Reading University funded by the JISC Institutional Innovations funding stream in 2008. The funding provides the project team with the financial resources to implement a novel IT solution and pedagogic approach to address one of the most intractable challenges in higher education, that of enhancing the engagement of both students and assessors in the process of feedback on assessments.

The word ASSET is a contraction of ASSessment Enhancement Tool. At one level, it is intended to help students appreciate that assessment feedback is not an end in itself but rather an integral part of the learning process in which the feedback can be fedforward into future assignments. At another level, ASSET is intended to engage the assessor more fully in the feedback process and thereby to provide a higher quality of feedback. In this way, both the learner and assessor become more reflective practitioners.

ASSET is as much a pedagogic approach as it is an IT solution and though this report covers mainly the software considerations, the project overall will have its focus on the pedagogic approach.

Origins of ASSET

It is worth considering the origins of the ASSET approach as it demonstrates the pedigree of the present proposal and shows that it builds upon work that has already been highly-rated in student evaluations.

Podcast vs podfiles

The origins of ASSET lie in a learning approach developed by the author of this report while he was a Principal Lecturer at the University of the West of England, Bristol. The author experimented with podcasts as a way of delivering instructive audio and video files to support his teaching of bioscience students. However, podcast technology does not encourage interaction between learner and teacher as the digital podcast files are transmitted uni-directionally from producer (teacher) to consumer (learner). Also, from student evaluations, it became apparent that students were largely downloading the files and archiving them for later use. The author could not evaluate student engagement as only a few students had downloaded the files and then shared them amongst their peers, who could not be bothered to download the files for themselves. Actively downloading podcasts (through RSS subscription) on an individual basis was important as it allowed students to receive updated files as they became available. Students who were given files from friends quite often were unaware of updated files. Evaluation of student engagement through podcasted statistics therefore often underestimated usage.

Audio & Video Podfiles

In the next stage of development and to encourage more individual students to engage fully, the audio and video files were no longer made available for download. Instead, the files were available through a commercial program called PointCast which allowed video files to be viewed through a webpage containing a flash player and a playlist.

An example of this approach can be found at: http://science.uwe.ac.uk/medialibrary/sgomez/bfd.

At this stage of development, the majority of the files were in video format, usually either flash video (.flv) or windows movie video (.wmv) as these were the two most popular video file types on the internet. The files were produced in exactly the same way as for podcasting but were not available for download, a key feature of the podcast approach. The author developed a new term, podfiles, to distinguish them from podcasts. The term, podcast, originates from 'pod' a relatively small, self-contained unit or entity and 'cast', from the files being broadcasted. When deciding on the term 'podfile', it was important to retain the concept of a 'pod' or unit of information as each podfile covered a particular physiological principle which was self-contained yet connected to other 'pods' of information.

As the term podcast is dominant in both the IT world and with the general public, the podfile approach has often been referred to as podcasting and the subtleties of the different approaches have been lost in translation.

The need for a Web 2.0 approach

The final stage in the development of the podfile approach and the one that has laid the foundations of the proposed ASSET system was making the video podfile available through a Web 2.0 delivery system.

There are many interpretations of the meaning of Web 2.0. This is because the term is not a definition but rather a statement of intent and to illustrate a quantum step in the evolution of the internet from its beginnings as a collection of author-controlled webpages (Web 1.0) to resources containing user-generated content (Web 2.0).

This sea-change in attitude to ownership of web-materials has many resonances with recent trends higher education, particularly with respect to students becoming more partners in the learning process rather than mere consumers.

Three websites epitomize the ethos of Web 2.0 and they are mentioned here because elements of these would be useful in the ASSET resource.

Wikipedia

http://en.wikipedia.org/wiki/Main_Page

At one level, Wikipedia can be looked upon as an on-line encyclopedia. However, it is much

more than a source of information as it has been built up by a community of users, many of whom have expert knowledge in a particular field. The resource is often maligned because users can just as easily contribute misinformation as established facts or knowledge. The resource is, however, moderated by a team of so-called 'wikipedians' who are immediately alerted to any changes made and can either revert the changes (if they are malicious or incorrect) or approve them.

In numerous evaluations, Wikipedia has been found to be more accurate than many 'traditional' encyclopedic online resources. Even though many lecturers warn their students off using Wikipedia, nonetheless it is the first port of call for students looking for information and explanations. The enormous range of information contained within Wikipedia is shown by the fact that almost any search on Google brings up a link to Wikipedia within the first 5 suggested links. In fact, because of this rarity, it is an internet sport to find search terms that fail to bring up a link to Wikipedia in the first 5 links.

There are many elements of Wikipedia that would benefit the ASSET resource:

▶ User-generated content. In a resource aimed at improving learning from feedback, it is important that users (in the form of students and assessors) can also contribute their experiences and perceptions of feedback.

▶ Accountability. On Wikipedia, only registered users can contribute content through a password-controlled login. Any user found repeatedly contributing malicious content can be locked out of the site. Although this censure may not be applied to

users of ASSET, all users (especially students) should be made aware that they are accountable for any content they contribute.

As Wikipedia has grown enormously, it is now allowing anybody to change pages even anonymously. This change in approach is driven by the belief that more people will contribute as well as reviewing and 'policing' the content. Wikipedia now logs IP addresses as well as accounts, and lock them if malicious activity is found.

▶ Moderation. User-generated content needs moderation. With Wikipedia, user-generated content automatically appears on the resource and any moderation occurs *post hoc*. This is both a strength and a weakness. As mentioned previously, moderation is performed by dedicated wikipedians as well as other end users.

▶ *Recommendation: Any user-generated uploaded comments or content for ASSET, at least initially, is moderated before being visible on the site.*

▶ Wide range of content. In a user-generated resource, the content reflects the interests of the users. As such, Wikipedia contains a wider range of entries than a traditional encyclopedia. Many of the current entries in Wikipedia would never find a place in resources which are controlled wholly by publishers. An advantage of a resource whose content is largely generated by the users is a greater potential for user engagement as it reflects the users interests and needs. At the last count [Dec 2008] there were some 2,670,650 articles available in English.

▶ *Recommendation:That ASSET should have the capacity for users to determine, generate and upload content.*

▶ Discourse. A feature of Wikipedia of which not many people are aware is the background discussion relating to the article. In the screenshot below from a typical article, the 'article' tab is displayed by default.

Tabs relating to a Wikipedia article

However, if the 'discussion' tab is selected, visitors can read the discourse between contributors to that article. From an educational viewpoint, more can be learnt from the discussion about the article than the article on its own.

▶ *Recommendation: For ASSET to have a discussion or comment facility to allow for discourse between learner and assessor and between learners.*

You Tube

 http://uk.youtube.com/

As Wikipedia has become the number one site as a source of information, You Tube has become the iconic one-stop shop for video entertainment. Like Wikipedia, none of the content has been generated by the owners of the website. Instead, the millions of videos on the resource have been uploaded by visitors to the site.

A large fraction of the content includes illegal videos originating from ripped DVDs or recordings of television programmes. The vast majority of video content has been made by amateur filmmakers using digital video cameras or mobile phone cameras.

Even though You Tube has been the subject of legal action because of some of its protected commercial content, it has earned itself a high level of respectability and many organisations (BBC, news and music companies and film studios) make some of its content (TV programmes, news items, music videos and film trailers) available through You Tube. Her Majesty The Queen even had her 2009 Christmas message officially put on You Tube.

Video format has proved highly popular and it is estimated that some 14 hours of video are uploaded to You Tube every minute!

There are a number of features of You Tube that could be adopted by the ASSET resource.

▶ Simple user-friendly layout. The webpage consists mainly of the video player so focus is maintained on the video content. Navigation around the resource is uncomplicated and the controls of the video player are familiar to users.

▶ Search facility. Because of the large number of videos on the site, videos are tagged with key phrases in a searchable database.

▶ Related videos. You Tube suggests other videos that the viewer might want to watch. By providing this facility, the viewer is kept on the resource and their interests are widened.

▶ Comments and rating. Another way of interacting with the You Tube resource, in addition to uploading and viewing the videos is to comment and rate them. Many of the comments may seem banal to people not

interested in that particular video but for that community such comments are valuable.

▶ Most popular videos. For many people, what other people are watching can influence their watching behaviour and is affirmation that others are using the site. There is now a growing industry in trying to produce a video that is watched by millions of others.

▶ What people are watching now. This feature draws the interest of people joining the site to see what others are viewing out of curiosity.

▶ Viewing only and not for downloading. The content of You Tube is for viewing only and there is no built-in facility for downloading the videos. However, numerous websites now offer the ability to download videos from You Tube. There are no statistics available for the number of videos downloaded in this way but it seems to be popular based on the proliferation of websites offering this service. Some new web browsers tools are becoming available to facilitate download.

▶ Mobile devices. With the growth in internet connected mobile devices (mobile phones pdas and netbooks), the video content becomes highly accessible.

■ *Recommendation: to incorporate as many of these features into ASSET as possible. The majority of users of ASSET will be You Tube viewers and therefore will find the resource environment highly familiar.*

Facebook

http://en-gb.facebook.com/

The final member of the trio of iconic Web 2.0 websites is Facebook which contains a number of social networking features that would be useful in an educational resource.

▶ The facility to communicate with a subset of members in the form of friends or particular social circles.

▶ Invitations to take part in some activities.

▶ Uploading personal items, such as photographs.

▶ Privacy settings. The user can decide what different groups of people can see

UWE Tube

Many of the features of Web 2.0 were incorporated into a resource, called UWE Tube, used by the author of this report to deliver instructional videos. The development of UWE Tube was instrumental in the ASSET proposal and the experience gained in developing the resource will be of enormous value in informing the ASSET project.

UWE Tube was used to deliver the video podfiles mentioned earlier and addressed many of the shortcomings related to making the videos available through PointeCast.

The features of UWE Tube that are recommended to feature in ASSET include:

▶ LDAP authentication. This allows students and staff to use their university usernames and passwords to access the resource.

▶ Controlled access. Previously, videos were accessed without having to log in. The ability to log in allows the resource administrators to track usage of the system and makes the users accountable for interactions such as uploading content or leaving comments.

▶ Anonymity. Being able to adopt a persona or profile that makes them anonymous to other users of the site. Within the site their identity is known but only to the administrator.

▶ Web-based. This makes the system accessible from any internet enabled computer or mobile device.

▶ Searching for videos. It is envisaged that the resource will build in number of videos and therefore a means for searching for relevant videos is essential.

▶ Related videos. Videos need to be tagged so videos of a similar theme can be presented to the user.

▶ View, pause, rewind and fast forward. Although some students preferred to view the videos in groups, the majority preferred viewing the videos individually so that they could determine the speed at which they worked through the video.

▶ Uploading content. As a Web 2.0 resource, it is essential for the users (both learners and staff) to upload videos without having to funnel content through a single gatekeeper.

▶ Usage statistics. The further development of the resource needs to be informed by reliable data and this is provided by statistics relating to how many users have logged in, which videos are they viewing, for how long are they watching particular videos etc.

▶ Rating videos. A major feature of many Web 2.0 sites is the ability for the users to rate the material on the site. Not only does this influence the behaviour of other users but it also informs the project team on the suitability and quality of the content.

▶ Channels. It is likely that videos will be put on the site that represents a wide range of assessments and interests. Subdividing the resource into channels each of which has a particular theme will be useful. Users should have access to material in all the channels.

▶ Playlists. This is a concept highly familiar to many users of digital music. There needs to be a facility for the assessor to define playlists (akin to 'serving suggestions') and for learners to rearrange content into personal preferences.

▶ Access on mobile devices. With the growth in internet enabled mobile devices, the resource needs to be available on such devices.

Student evaluation

UWE Tube was used to support four main activities; three were related to specific modules and one was employer engagement.

The resource was introduced in September 2008 at the start of the academic year. Therefore UWE Tube is a very recent resource and there has been insufficient time to conduct an in depth evaluation. Because of the recent nature of the system, the majority of video content has been produced by the author of this report. However, a few students have started to upload their own videos and to make comments and ask questions on the site.

The videos on UWE Tube support the lectures delivered during the modules mentioned. Students are expected to view and take notes from the videos relating to a particular topic before attending the lecture on that topic. Because most of the content for that topic is covered in the videos, the lecture takes on a different flavour in that it is no longer content-driven and more time can be spent on interacting with the students through quizzes and assessments.

UWE Tube is open to all members of staff and students at UWE but it's been targeted at restricted groups in the first stage. The numbers of students involved have been: 110 (Human Physiology; level 2 module), 45 (Brain Biology and Behaviour; level 2 module) and 70 (Brain Function and Disorder; level 3 module). The Employer Engagement aspect is open to all students in the university though there has been no publicity.

The pedagogic value of UWE Tube to the learning process is being evaluated once the exam results from these modules have been completed and this will occur at the end of January 2009.

Some initial anecdotal findings include:

▶ High levels of compliance by students in viewing the learning materials before each lecture. This is shown in the statistics of students logging into UWE Tube before the lecture and the number of students who come to the lecture with handwritten notes (as no handouts are provided by the lecturer).

▶ High levels of student satisfaction. In informal evaluations, through talking with students, unsolicited feedback, questionnaires and focus groups conducted by fellow students have all shown high levels of satisfaction. Indeed, many students have joined the modules once they heard that UWE Tube was being used to support these modules.

Origin of the UWE Tube software

The software underpinning UWE Tube was customized from a software program called CORE (Collaborative Online Resource for Education) developed by a company called Pentachoron, based in Sweden.

CORE offers much of the functionality of a Web 2.0 video delivery system and has proved successful with UWE Tube. It was instrumental in the ASSET bid to JISC and provided a live demonstration site in support of the application.

Options for the ASSET software

In deciding upon the best software option for ASSET, it was stated in the JISC application that various approaches were going to be considered and this report goes towards aiding that discussion. The two forerunners are: using the CORE system and producing a system from 'scratch' based on components that can be 'mashed' together. The frontrunners are discussed in detail later in the report.

Other options are briefly discussed here.

Clip Share. It has previously been suggested to the project team that there are various

commercial software options that provide a solution to our functionality needs. In my searches, I found only one product that comes close to that required for ASSET and that is Clip Share (http://www.clip-share.com/; though products such as vidiscript and DZOIC cliphouse have similar characteristics but are less versatile). It has a number of useful features such as its video delivery system and low price. In order to gauge its pedigree, I wanted to see how it was applied by current users. At the time of this report, three example sites were provided; one called God Tube (containing religious videos) and two porn sites (which I did not want to view even for the purposes of scientific enquiry!).

Clip Share sells itself in the following terms,

'Video Uploading, Hosting, Sharing Script / Software.

Start Your Own Youtube Clone Site.
With a huge variety of features and options, at an extremely affordable price, ClipShare is the ultimate script for starting your highly profitable video sharing community website just like the big boys: Youtube, DailyMotion, Metacafe, or Google Video.'

> There is a Clip Share forum and most of the discussion revolves around services, hosting and script modifications. The software does not have an educational pedigree and it is not known if access can be LDAP authenticated, an important requirement for the ASSET system.

▸ **You Tube**. A zero cost option, as far as software costs are concerned, is to use a video delivery system already available on the internet. There are precedents for using widely and freely available internet programs in JISC projects. Indeed, one project funded by JISC in the same funding stream as this

project, uses 'Google documents', which offers a suite of Windows Office-type programs but are free to use and allows an easy way to share documents between dispersed contributors.

I would not recommend using You Tube as the basis for this project. The videos that will be produced for ASSET will be 'dispersed' amongst the millions of videos already on You Tube. Users, especially students, can become easily distracted by a multitude of videos of a 'more entertaining' nature. An ASSET channel could be produced on You Tube for free, however, in my evaluations with students, they might start off in the educational channel but can see 'related' videos which are not related in content but in name.

I performed a search on 'asset' (at the time of writing this report) and found 31,300 videos as diverse as a flipbook animation, basset hounds and George Bush as an asset(!).

A search for 'assessment' produced 8,450 returns on medical tax and self-assessments. A search on 'Reading' produced 169,000 returns on subjects such as the Reading music festival but mostly on reading as a verb rather than a proper noun. 'Feedback' produced 133,000 videos and 'assessment feedback' produced 57 results though none of the top 20 results had anything to do with our project.

It could be argued that more precise search terms would yield more appropriate videos. However, we need to rely on students, whose motivation may not be high, typing in accurate search terms and not getting distracted by inappropriate videos.

A stronger objection to using public

websites such as You Tube is that many students and staff may not want their videos to be seen by people outside the university or their module group. When developing a channel for UWE Tube to accommodate videos of employers, all the employers approached said that they would refuse to supply videos if they were to be put on You Tube, though they were happy to engage if access were to be limited to staff and students at a particular university.

A channel could be produced in You Tube specifically for ASSET videos but even this channel can be accessed by the general public.

The YouTube API (http://uk.youtube.com/dev) could be used to develop a bespoke ASSET service, which used YouTube as a Video storage database. This would rectify the problems of the "disappearance" of ASSET video among the vast numbers of ordinary videos, however it would not help with privacy of the video, as all the videos would be available to the public. Assessment video probably shouldn't be public

▸ **Blackboard and Sharepoint**. From an institutional point of view, there are benefits from using the university's virtual learning environment (VLE). The main reasons for considering the university's VLE include: the large investment made by the university in its IT system and also that students and staff know the environment and have access to it. It is generally agreed that Blackboard is a 'clunky' piece of software more suited to document delivery than a Web 2.0 learning environment.

The ASSET software system has to be *fit for*

purpose and the present build of the VLE at Reading University does not allow for the functionality required to deliver videos in the way required for the project.

▸ I am not totally familiar with the particular build of Blackboard for Reading University but I am led to believe that Blackboard Academic Suite can deliver video, however the structures and approaches needed around assessment videos are not present. However, if we were to use another system that was fit for purpose then by using plugins via Blackboard Building Blocks it could link with Blackboard. This would have the added benefit of enabling the creation of plugins for several different VLEs, such as Moodle and thereby extend the applicability of ASSET in the HE Sector.

▸ Without using plugins, Blackboard is protected by strict licencing agreements that would make adapting it both legally and financially prohibitive and delay the ASSET project.

Recommendation: To align with an institutional approach offered by Blackboard, it is recommended that the ASSET system is linked to the VLE so that users can gain access to ASSET through Blackboard rather than the ASSET being part of Blackboard. Because each university has a bespoke build of Blackboard based on its licencing agreement, if ASSET were to be integrated within Blackboard then it would limit other universities adopting ASSET as they would require the same version of Blackboard as at Reading University.

Sharepoint is Microsoft's version of a document sharing program. Although Sharepoint has been designed to share

electronic files, its uptake across the university is usually poor. In its native configuration, videos would appear as a list of links and would require further programming so that it resembles the system we require. This is likely to add to the costs for the system and we need to ensure that licencing agreements are adhered to.

There are some content management systems (CMSs) such as (plone, drupal or Joomla). These would benefit from no licensing costs and high flexibility. However, they may still not be as flexible as the API solution with CORE.

Some features of ELGG would be useful to ASSET, such as its social network features. However, incorporating this system would need many bespoke solutions to provide the assessment features required of ASSET.

CORE: strengths and weaknesses

The time span for the ASSET project is limited and the software solution is only one aspect of the project. The majority part is the pedagogic aspect and evaluation of the potential for enhancing assessment feedback.

There are compelling reasons why the project should use CORE software for the ASSET system:

▶ CORE offers a tried and tested system that meets the criteria required of the ASSET Web 2.0 system. Further functionality of being able to upload documents in addition to audio and video content has been discussed with the CORE developer and it has now been added.

▶ The software is LDAP compliant and therefore allows anyone with a Reading University login to access ASSET with the same username and password.

▶ CORE has a feature that allows non-Reading University users to be added without going through LDAP.

▶ CORE was instrumental in the project proposal to JISC and produced a website to illustrate the features of the proposed system. CORE formed the basis of UWE Tube on which the ASSET approach was founded. If the Nolan principles of ethical behaviour are applied CORE should be a frontrunner in the candidates for the ASSET software.

There are a number of perceived weaknesses with CORE:

▶ It has been produced by a small start-up company set up by two former IT students. This in itself is should not be a concern as higher education now promotes entrepreneurship and enterprise. However, it is important to establish a service level agreement in which Pentachoron undertakes an agreement to support the software and in return is preferentially approached to produce any reasonable updates. Failing this support, Pentachoron must agree to allow other nominated programmers to make the changes.

▶ Access to CORE through Blackboard. At present CORE is a standalone web-based system.

Recommendation: Ask the Pentachoron developers to produce an API for the program that could interface with a plug in for Blackboard. In this way, CORE could appear seamless with Blackboard.

▶ Licencing agreement. In order for ASSET to be sustainable outside the JISC funding period it would be preferable to have little

or no on-going costs. As CORE is associated with an annual licence fee, this would add to the on-going costs.

Recommendation: negotiate with Pentachoron to buy the ASSET version of CORE out-right so that there are no continuing on-going licencing costs. Because the background IPR has been established before the start of the project and because CORE forms the basis of numerous systems outside Reading University (for example UWE Tube, Wessex Water's Ripple and ceppl.net at Plymouth University), Pentachoron will probably wish to retain its IPR. This it can do so and updates can be performed under the terms and regulations for purchasing the software.

Mash up: strengths and weaknesses

The term 'mash up' can be interpreted in two ways:

1. A single service or system put together by combining many separate services together;
2. A service or system allowing many new services to be made

An example of the first interpretation could be using, say, YouTube combined with website services such as Google Friend, and widgets like 'nabble'. Such an approach has advantages and disadvantages. However, on balance the disadvantages outweigh the advantages. Two advantages are flexibility and low costs. Flexibility - because a large range of different services can be used and when new ones arise, these can be incorporated if appropriate. Low cost – because many of these systems are available free of charge or for a small fee. The

disadvantages are many and more serious.

▶ **Hidden costs.** Some services incur licencing costs. Sometimes they are offered free of charge initially and then as the product matures in its development, a fee becomes applicable. It would be difficult to future proof ASSET on this basis against on-going costs.

▶ **Privacy** – some of the software services currently available may make data on users available to other services and it would be very difficult to control this. Any misuse of user data may reflect poorly on the University.

▶ **Sustainability** – using third party services, especially where the service is available free of charge, leaves one vulnerable to the continued existence of the software. For instance, what would happen if underlying services ceased operating or changed their service in a way that affected ASSET's use of the service?

▶ **Loss of control** – building the ASSET system on top of other people's build of their own software may limit future developments of ASSET.

▶ Branding and aesthetics – branding and the user interface of ASSET should look distinctive and give users confidence that this resource is one produced by a higher education institution. Using different services, each providing a particular functionality is likely to cause confusion amongst users and appear as a blend of other systems rather than a coherent approach.

The second interpretation of a 'mash up' solution to ASSET was described earlier. That is, to use the CORE system as the base service. CORE is known to provide most of the functionality required. Then to have an API which will enable other tools and services to be integrated with CORE.

There are numerous advantages with this approach:

▶ Fast prototyping – because the CORE system already exists, the ASSET system can be rolled out and prototyped rapidly even before the API has been developed, as users can access the resource through a direct weblink. This will give the project team time to produce and upload videos, and conduct initial evaluations. The focus can then be kept on the pedagogic aspect of the project rather than on prototyping other systems.

▶ Flexibility – on production of the API and appropriate plugins, the CORE system, can be integrated seamlessly with other systems, such as Blackboard and Moodle. This is more likely to encourage uptake of ASSET by other institutions.

Recommendation

▶ To use CORE as the base system for the ASSET system.

▶ To negotiate a deal and a price with Pentachoron so that there are no on-going licencing costs and the payment for the software is one-off.

▶ Commission Pentachoron to produce an API that will allow ASSET to interface with plug ins for VLEs such as Blackboard and Moodle. The plug in to be produced by the ASSET software developer.

▶ To make the ASSET API and VLE plug ins available to the higher education sector free of charge to any institution wishing to adopt the ASSET system.