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**ONLINE COURSEWORK
SUBMISSION FROM PILOT TO
UNIVERSITY-WIDE
IMPLEMENTATION: RATIONALE,
CHALLENGES AND FURTHER
DEVELOPMENT**

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Online Coursework Submission from Pilot to University-wide Implementation: Rationale, Challenges and Further Development

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Overview of the OCS Project

The paper outlines the development of a University-wide Online Coursework Submission system (OCS), which was funded by the University of Essex Teaching and Learning Innovation Fund in 2004-05, before being rolled-out across the University in 2005-06. The OCS project was informed by much smaller systems already running in three departments and a University-wide survey of departmental coursework submission requirements.

The project sought to establish a single system that would meet the needs of staff in departments, would facilitate coursework administration, management and quality assurance, and help to address rising workloads associated with these processes. The OCS system was also designed to support submission of coursework to the JISC Plagiarism Detection Service, now Turnitin UK.

The introduction of OCS coincided with the university's adoption of zero tolerance marking (ZTM) and one of the central reasons for adoption by departments has been to assist with the management and arbitration of the new ZTM policy.

The general drive behind the adoption of a university wide electronic submission system was not what might ordinarily motivate such a project, namely the need for supporting widespread electronic marking, indeed one of the key reasons uptake of OCS has been so rapid is precisely because the system does not force departments or individual members of staff to adopt electronic marking. Rather the central motivating factors lay with easing the administrative burden of ZTM and providing easier routes for departments to deliver on quality assurance, submission monitoring, facilitating JISC plagiarism checking as well as supporting staff who do wish to either receive work electronically (such as in code-based assignments in the Electronic Systems Engineering (ESE) and Computer Science (CS) departments) or wish to mark, in some form, electronically. The area of online marking is certainly one in which the University is interested, but it is likely that a pilot would be undertaken in the first instance.

Rationale

The use and uptake of VLEs within higher education is variableⁱ; VLE versions also vary in terms of functionality. At the University of Essex there is no requirement on staff to make use of the VLE, WebCT, and the version does not interface fully with University Management Information Systems (MIS) and Student Records Databases (SRDB) . Whilst VLEs have online submission tools for coursework submission, the onus is on staff to enable submission for any courses that they run within the VLE. The experience for both staff and students is therefore quite uneven. It was clear that there was need to implement a complementary system tailored to University requirements, which could be taken up by larger numbers of staff.

Usability was a key aim of the OCS system. The project team sought to establish a system, which would not require any set-up by staff, (unlike a VLE) The OCS was embedded within the University Student Portal to facilitate access by students.

In 2005-06 the functionality and interface of the OCS system were improved to accommodate two key issues highlighted by the pilot process:

Scalability: the pilot system was extremely labour intensive from a systems management point of view. Each course and assignment together with student upload directories and permissions had to be setup manually, which meant that when broadened out to include, potentially, all departments and hundreds of courses scalability became a serious issue.

Electronic / hard-copy disparity: outside of a context in which the work would be viewed and/or assessed in electronic form, students were still required to submit a hard-copy version of their work alongside their electronic submission. Departments raised valid concerns at the pilot stage that there is potential for students to submit one version of their work electronically and another in hard-copy, thus circumventing the effectiveness of electronic plagiarism checking. Additionally, one department involved in the pilot did not have simultaneous hard-copy and electronic deadlines as work was submitted in class rather than to a central office meaning that students with classes later in the week could attempt to gain additional time by submitting incomplete work online and continuing to work after some of their fellow students had submitted their work at an earlier class, which is clearly unfair. In general terms it became clear that some kind of mechanism was required to ensure, as far as possible, that work presented in hard-copy form would match that submitted online in electronic form.

These two issues, together with the requirement that adoption of electronic submission should not equate to an adoption of electronic marking, which would have drastically reduced uptake of the final system, meant that the delivery of electronic submission via a VLE (in our case webCT) was not feasible.

To begin with, VLE integration with our MIS student records and courses databases is minimal, to the extent that there would have been little difference in terms of scalability between operating electronic submission via the pilot system and via a VLE – in fact the former would have been the preferred option had it been a choice between the two as there was less work involved

in setting up student directories for an assignment under the pilot system than there would be under the VLE. Given that the requirement was for a system that required minimal additional input, and that any setup workload could be handled by departments' administrative sections, an in-house system appeared to be the only way to achieve the aims of the project.

The in-house solution becomes more pressing when considering the additional problem of version disparity between electronic and hard-copy submissions. VLE's do not commonly consider the issue of this kind of disparity. To deal with the possible disparity between hard-copy and electronic copy a facility known as 'watermarking' was developed. After submitting their work (the system supports a variety of formats) to the system, students select the 'watermark' option. This requests a special copy of their work to be produced, which is delivered in PDF format to the student via the upload page for that assignment. The student then downloads the watermarked file and prints it off for hard-copy submission. The 'watermark' is a string of information that the student cannot derive independently of requesting a watermarked copy through the system and appears on every page of the document. It is the printed version of this file that students must submit to their department, who can check the authenticity of any particular watermark by comparing it to the reports produced by the OCS system.

Together, these factors formed the basis of the decision to pursue an in-house rather than a VLE-based solution to the university's electronic submission requirements. The final version of this solution was implemented utilising ASP.Net web forms for the staff and student front ends and .Net windows services that provide the back-end functionality responsible for the management of the watermarking system and production of assignment zip files and reports.

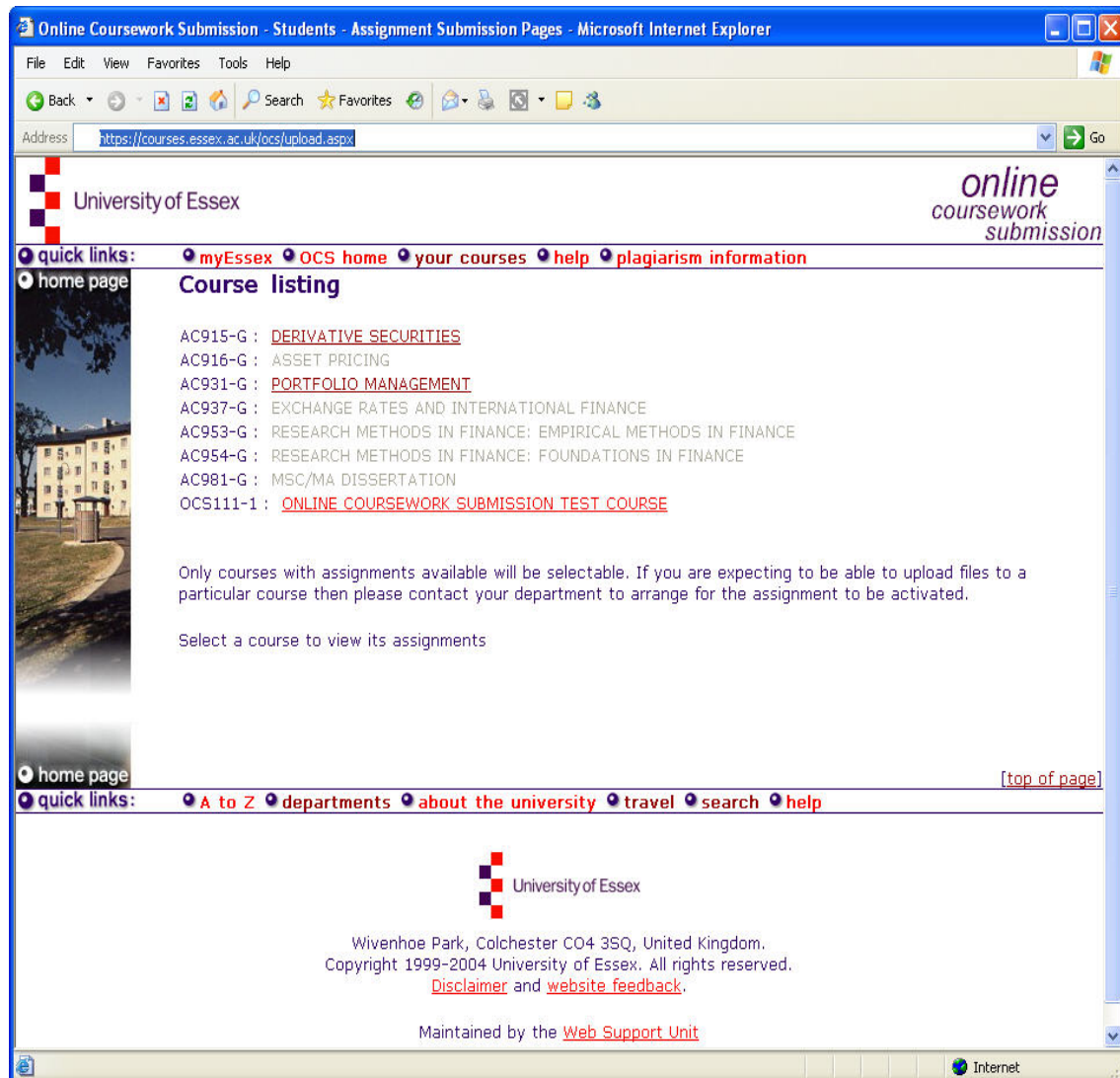
Progress and Challenges

In the pilot phase, 2004-05, the OCS Project developed a range of Web content to support the OCS, this included a dynamic test directory, to enable staff and students to practice uploading files; a set of Help pages; an About section, that explained the functionality of the OCS system; and an interactive plagiarism tutorial for students. The outcomes of the pilot, which ran in eight departments, found that students were generally comfortable with the idea of remote submission, expressing very strong support for it. Staff feedback was also, on the whole, positive, although a number of issues were apparent, most notably on departmental processes and communication between administrative and academic staff, on issues associated with anonymity and departmental policy on deadlines.

In 2005-06 the development of OCS into a university-wide system kept all of the central features that existed in the pilot but was enhanced in terms of user interface, with a style consistent with the Essex University corporate layout, and, in technical terms to meet those elements involved in MIS integration and watermarking as described in the second section of this paper. There also had to be a significant increase in the complexity and presentation of the reporting available to administrative staff.

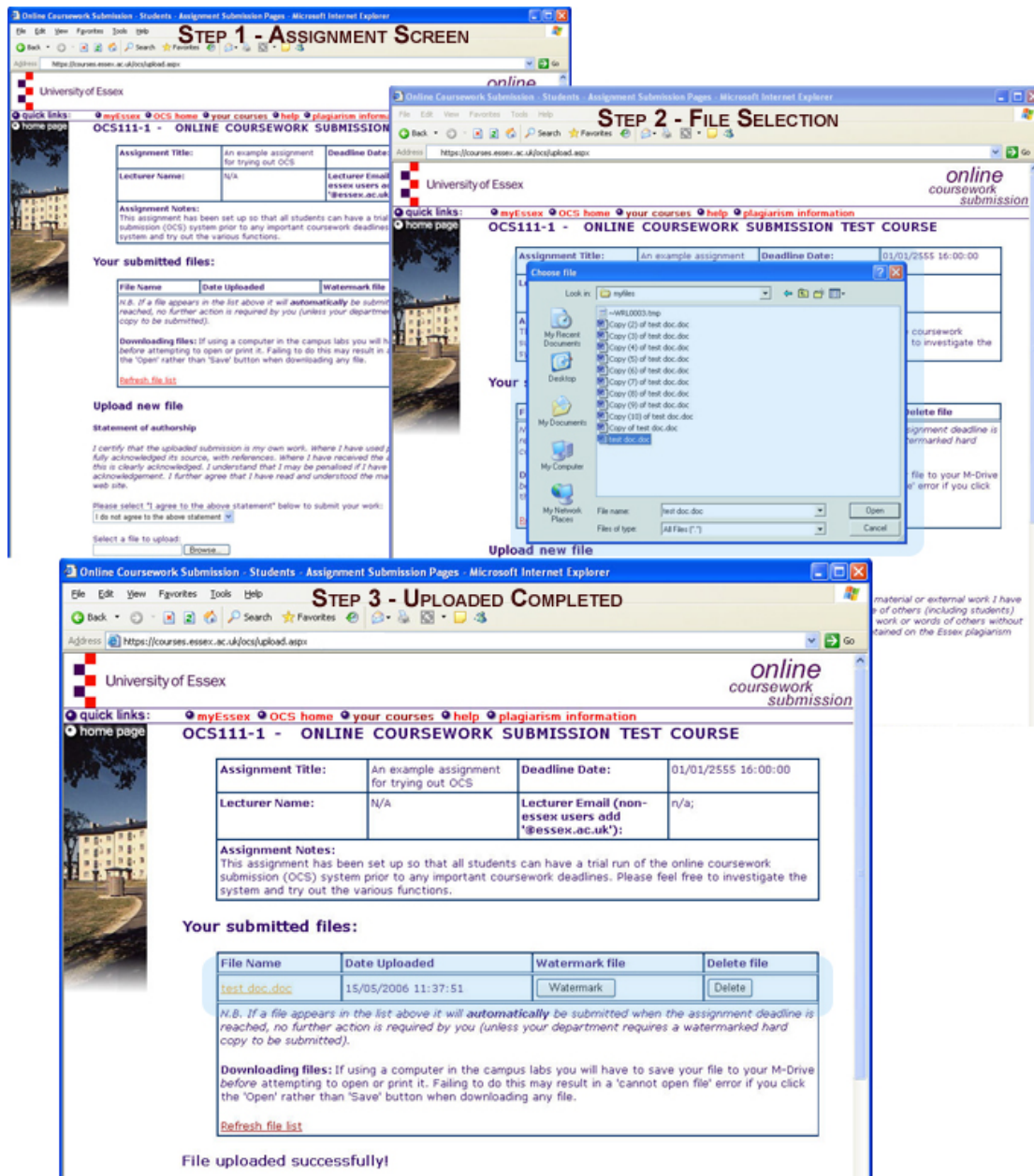
Student Interface

The student interface was overhauled for final release. Whilst there were no serious objections raised to the pilot interface, it was a departmental rather than an institutional design and as such the decision was taken to reformat the presentation to match the university's corporate pages.



Most students will enter the OCS system via the university's student web portal, myEssex. The portal site checks the OCS database to obtain a list of assignments for that student's course list and provides dynamic links directly to the assignments page for that course. Students can also visit the OCS web front end directly should the portal site be temporarily unavailable.

To upload a file for a particular assignment is a simple three step process.



From myEssex they select the course link for which they wish to submit. Secondly they confirm a statement of personal authorship and select the file they wish to upload. Finally they click on the 'Upload file' button and complete the process. Watermarking, where necessary, requires a single mouse-click to send the request which is then processed as described below.

Watermarking

Several options were explored when determining how best to achieve this, including some external software solutions, but these were deemed either unreliable or financially non-viable. In the end a combination of two separate windows services, running on the data-store server, handle the watermarking process.

When a user requests a watermark copy of a document they have submitted to OCS, it is renamed according to a specific convention and copied to a directory watched by the *OCS printer service*. When this service detects a new document it opens it (the service uses .Net's interoperability with MS Word to handle the process and allow for greater customisation of output) and prints it to a PDF file using a third-party PDF printer driver. This printer driver automatically outputs to a preset folder, which is watched by the second service in the process – *Watermark watcher*.

When *Watermark watcher* detects the presence of a new file in the output directory it parses the filename and queries the OCS database to determine which course/assignment/student directory the file should be returned to. On a successful move of the now watermarked file back to the users' directory a confirmation email is sent to the student to notify them of the completion of the process. This last step is important as the whole process is effectively a giant printer queue serving the whole student population and as such students know that watermarking is not instantaneous and to allow sufficient time for it to complete. In reality the process is extremely quick, most documents take under a second to be produced and process completion is normally somewhere in the order of ten to fifteen seconds

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online coursework submission

quick links: myEssex OCS home your courses help plagiarism information

home page

OCS111-1 - ONLINE COURSEWORK SUBMISSION TEST COURSE

Assignment Title:	An example assignment for trying out OCS	Deadline Date:	01/01/2555 16:00:00
Lecturer Name:	N/A	Lecturer Email (non-essex users add '@essex.ac.uk'):	n/a;

Assignment Notes:
This assignment has been set up so that all students can have a trial run of the online coursework submission (OCS) system prior to any important coursework deadlines. Please feel free to investigate the system and try out the various functions.

Your submitted files:

File Name	Date Uploaded	Watermark file	Delete file
test_doc.doc	15/05/2006 11:38:54	Conversion complete	Delete
test_doc.pdf	15/05/2006 11:39:14	Conversion complete	Delete

*N.B. If a file appears in the list above it will **automatically** be submitted when the assignment deadline is reached, no further action is required by you (unless your department requires a watermarked hard copy to be submitted).*

Downloading files: If using a computer in the campus labs you will have to save your file to your M-Drive before attempting to open or print it. Failing to do this may result in a 'cannot open file' error if you click the 'Open' rather than 'Save' button when downloading any file.

[Refresh file list](#)

Your marked (and returned) work:

File Name	Date Returned
Your marked work.doc	15/05/2006 11:41:49

This is a list of files that the person marking your work has returned. Clicking on them will prompt a download dialogue box to appear and you can either open them directly, or save them for offline viewing.

Downloading files: If using a computer in the campus labs you will have to save your file to your M-Drive before attempting to open or print it. Failing to do this may result in a 'cannot open file' error if you click the 'Open' rather than 'Save' button when downloading any file.

Staff interface

The original pilot contained no staff web interface as setup was administered by one person and assignment zip files were made available via a file share. The final release contains a full interface for staff that allows tiered (as described in 'anonymous submission' below) access to the assignment setup, reporting and zip file resources produced by OCS.

Setting up an assignment

As individual departments are responsible for setting up assignments for their courses it was important to devise an interface that was as simple as possible. Setting up an assignment consists in simply going to the OCS management page (the system automatically picks up department and staff status based upon login information and only presents the user with courses relevant to their department), selecting the course for which electronic submission is required and filling in a web form with a brief title, additional notes (which can be as verbose as the department likes) and a deadline date and time. Once this has been done a single mouse click enters the assignment into the OCS

database and from that point onwards any student registered for that course can submit their work.

The screenshot shows a web browser window titled "Online Coursework Submission - Staff - Assignment Management Pages - Microsoft Internet Explorer". The address bar shows the URL: <https://courses.essex.ac.uk/ocs/setup.aspx>. The page header includes the University of Essex logo and the text "online coursework submission".

Navigation links include: [OCS home](#), [assignment management home](#), and [help for staff](#). The main heading is "New Assignment for: PY111-1- INTRODUCTION TO PHILOSOPHY".

Fields in bold are required.

Assignment Title:	<input type="text"/>
Assignment Year:	Select a year Select the academic year the assignment is valid for.
Assignment Notes:	<input type="text"/>
Notify with anonymous report	<input type="text"/> Enter Essex usernames (no '@essex.ac.uk') in this box for people who should receive an anonymous list of submissions. Separate each username with a semicolon, e.g. "username;anothername;yetanothername;" (no quote marks).
Notify with named report:	<input type="text"/> Enter Essex usernames (no '@essex.ac.uk') in this box for people who should receive a named list of submissions. Separate each username with a semicolon, e.g. "username;anothername;yetanothername;" (no quote marks).
Deadline date (the date and time by which the assignment should be submitted):	<input type="text"/> This should be of the form "dd/mm/yyyy hh:mm:ss", e.g. 27/09/2005 16:00:00
Lecturer Name:	<input type="text"/>
Lecturer Username:	<input type="text"/> Enter the lecturer's username here. This field is for information purposes only and does not receive any reports (unless also included in one of the report fields above)

Buttons:

Footer navigation: [home page](#), [A to Z](#), [departments](#), [about the university](#), [travel](#), [search](#), [help](#). [top of page]

This is a considerable reduction on the administrative burden of the pilot system and requires no technical know-how whatsoever, other than the use of a web browser of course.

If alterations need to be made to a particular assignment staff can easily do so via the same form.

Accessing reports and zip files

This is via the web interface, meaning that staff can access student work and reports for any assignment submitted via OCS from any computer with internet access and a web browser installed. The user simply logs in as normal, selects the course they require downloads from and then picks files from the list contained within each assignment listed for that course.

University of Essex

online coursework submission

quick links: [OCS home](#) [assignment management home](#) [help for staff](#)

home page

Assignment list for course:
PY111-1 - INTRODUCTION TO PHILOSOPHY

Code	Title	Deadline Date	Assignment Year	Download reports & work zip-file	Edit/Delete Assignment	Upload marked work
05a2	Spring term essay	27/03/2006 16:00:00	05	Anonymous report Anonymous report (watermarked work only) Named report Named report (watermarked work only) Report by Class group Assignments zip-file	<input type="button" value="Edit/Delete..."/>	Download empty folder set <input type="text" value=""/> <input type="button" value="Browse..."/> <input type="button" value="Upload"/>
05a1	Autumn term essay	05/12/2005 16:00:00	05	Anonymous report Anonymous report (watermarked work only) Named report Named report (watermarked work only) Report by Class group Assignments zip-file	<input type="button" value="Edit/Delete..."/>	Download empty folder set <input type="text" value=""/> <input type="button" value="Browse..."/> <input type="button" value="Upload"/>

[Return to course listing](#)

[Click here to create a new assignment](#)

home page

quick links: [A to Z](#) [departments](#) [about the university](#) [travel](#) [search](#) [help](#)

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Returning marked work online

The staff interface also includes the facility to return work with comments and marks to students online. Staff marking electronically simply re-zip the student directories extracted from the original OCS zip archive and upload the marked work zip file to the server, which processes it and creates 'marked work' directories for those students contained within it. This means that students who have not submitted work for a particular assignment do not see the 'Returned work' section and also that staff can return marked work incrementally, returning work as soon as it has been marked where this appropriate.

Reporting

The *Zip sweep service* is responsible not only for producing the assignment zip files that staff download if they wish to mark electronically or submit selected work to the turnitinUK system, but also the production of html reports that can be saved, viewed or printed through the staff OCS management web front end. Reports come in a variety of flavours, anonymous or named, full submission list or just watermarked files and combinations thereof.

Submission list for course: PY111-1 : 05a1		
Reg no:0530638 (course period: FY)		
File Name	Date Uploaded	Watermark Number
Philosophy Coursework 1.doc	[U] 12/4/2005 3:14:01 PM	D2250C032325FFD6159FF0DD52113387C704186C
Philosophy Coursework 1.pdf	[W] 12/4/2005 3:14:15 PM	4D8DEC1728D3CC5656C797A76E2B273E5CA4AB57
Reg no:0534536 (course period: FY)		
File Name	Date Uploaded	Watermark Number
PY111 Essay.doc	[U] 12/4/2005 12:28:23 PM	2CBE02AEDB1E658E17E13EB3B6576BBEB00669EE
PY111 Essay.pdf	[W] 12/4/2005 12:28:29 PM	EE53DA96024438276350DAC0433403535F5CF339
Reg no:0524229 (course period: FY)		
File Name	Date Uploaded	Watermark Number
One can flourish without being Virtuous. Final.doc	[U] 12/5/2005 3:15:28 PM	112B5273ABC06AB8BF4A82AEBCA9061B5D46CF6
One can flourish without being Virtuous. Final.pdf	[W] 12/5/2005 3:15:33 PM	CE777A84D417958BD82F6E1885DF7C53A4058264
Reg no:0526649 (course period: FY)		
File Name	Date Uploaded	Watermark Number
PHILO ESSAY.pdf	[W] 12/4/2005 5:46:34 AM	15B4C8BDC221EC36AC4922C34106464A11A92D58
Reg no:0428175 (course period: FY)		
File Name	Date Uploaded	Watermark Number
Aristotleessay.doc	[U] 12/5/2005 10:53:30 AM	A8F37D858809AADCC2D80755E0C9D4F6AB10DA66
Aristotleessay.pdf	[W] 12/5/2005 10:56:34 AM	58A05DF275C4C25D929E1F0DAB8095469A84A09C
Reg no:0520977 (course period: FY)		
File Name	Date Uploaded	Watermark Number
One can flourish without being virtuous.doc	[U] 12/5/2005 1:30:23 PM	06130903651E8A51726AF75D790D9AF42218091C
One can flourish without being virtuous.pdf	[W] 12/5/2005 1:30:28 PM	ABB71E3AAB6F293182E32723F91ADBC56E14531D
Reg no:0522082 (course period: FY)		

[N.B. this is an anonymous report]

Anonymous submission

Anonymous submission is not a university-wide requirement yet, but many departments operate anonymous submission using the student registration number as an anonymous identifier. As such all assignment directories are named by registration number (in the pilot the student computer logon was used, but this was not felt to be anonymous enough as it is a composite of first name, initials and last name) and a tiered access system was set up to control access to reports that contain identifying information. Departments are advised to only assign 'administrative' access (which includes the setup, editing and deletion of assignments as well as full report access) to central administrative staff and lower tiered access to academic staff (of which there are two varieties, one that only allows access to anonymous reports and the other that allows full report access – in both cases full access to the zip files is possible).

Restricting the number of staff with the highest tier of access has helped to maintain the 'hub-spoke' model of administration that many departments operate, whereby any changes to essay deadlines or requirements are fed to students via the administrative team. As noted earlier, one of the issues

raised by the pilot was that of academic and administrative staff communication – one of the benefits of tiered access is to prevent such miscommunication.

MIS Integration

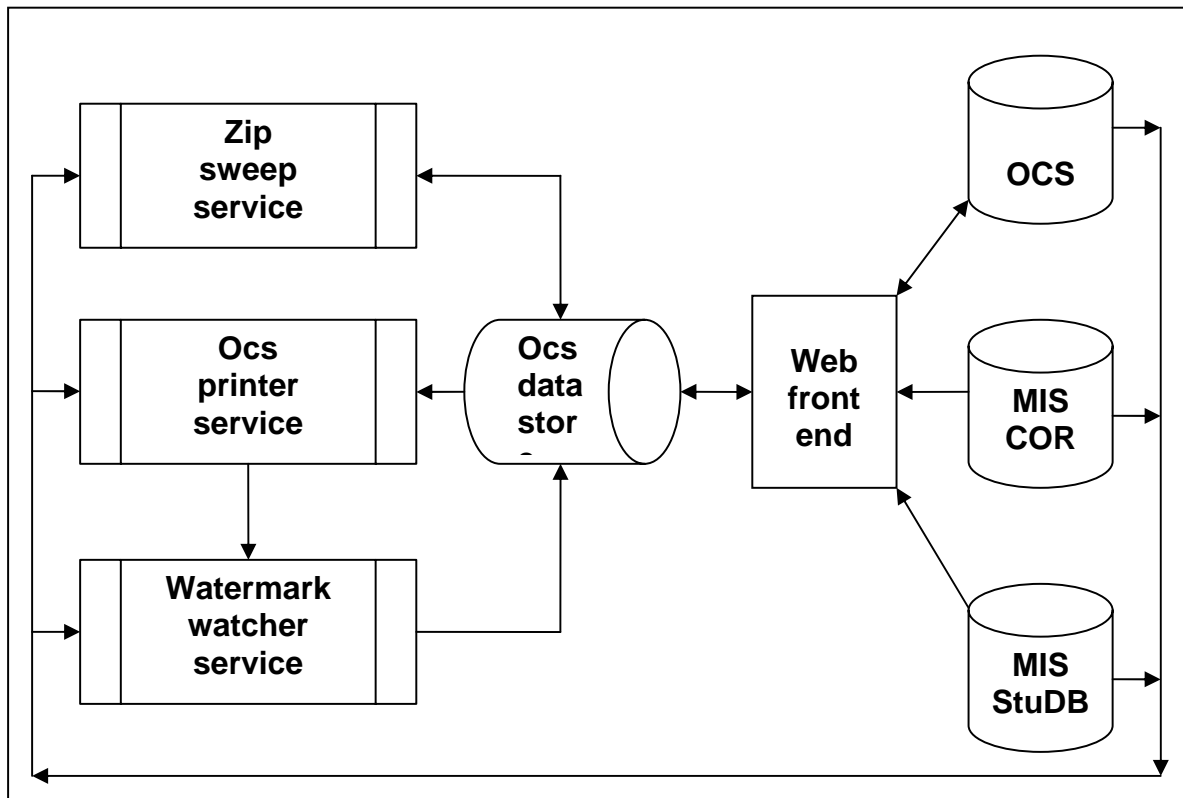
MIS integration was handled by coding the web front end and the backend services to hook directly into the MIS databases that contain the relevant student and class information. Given that the databases are SQL Server and the coding was done in a .Net environment this was especially easy to achieve. This data layer is extractable and can be re-coded to meet future needs and further development as well as export to external institutions, without necessitating a re-design of the presentation layer (the web front end).

Unique Software

One department that expressed an interest in adopting OCS, but that had very specific post-processing requirements, was provided with a special software tool that allowed them to continue to use their own special anonymous number system. The department in question also wanted to remove the burden of sorting through piles of submitted work and decided to take on the print-out of any work for staff who did not want to review and mark electronically.

As such a Windows application was devised that takes the standard zip file output produced by OCS and processes the student work contained within it. The process examines each student folder, opens the submitted work file, inserts a cover and mark sheet automatically and then adds in that student's anonymous number. The whole batch of essays is then sent automatically to a high volume networked printer/photocopier that produces a stack of printed and stapled essays that the administrative staff can simply place directly into the marking staff's post-tray. It also produces a new zip file that contains electronic files that have been made completely anonymous, even down to file author information being removed and replaced by the student's anonymous number.

OCS System Flow Diagram



Key

Zip sweep service: this is a .Net windows service that routinely checks for assignments with deadlines that have past and generates assignment zip files and system reports for staff download via the web front end.

OCS printer service: this .Net windows service operates a PDF printer driver that takes a file requested for watermarking (by a student) and outputs a PDF version of the file with watermarking information inserted within it.

Watermark watcher service: a companion .Net windows service to the OCS printer service; watches the output directory where finished watermark files are sent and re-routes them back to the student and notifies them via email of its availability.

Note: OCS, MIS COR and MIS StuDB are SQL Server 2005 databases

Conclusion

Recommendations and future plans

The survey on departmental coursework submission in departments, which was undertaken at the outset of the project, ensured that the project was tailored to needs and addressed specific concerns within departments. This approach also helped to engage the buy-in of a number of Departments.

The OCS system has generated some interest from other universities, and the University is looking at ways in which it might develop the OCS more generally for wider uptake across the HE sector. At the University of Essex, the Learning and Teaching Unit will look at the issues associated within online marking, with a view to developing a pilot on online marking via the OCS in the future.

ⁱ VLE Surveys: A longitudinal perspective between March 2001, March 2003 and March 2005 for higher education in the United Kingdom, M Jenkins, T Browne & R walker,

http://www.ucisa.ac.uk/groups/tlig/vle/vle_survey_2005.pdf