ICE Week, background

This week at the Australian Digital Futures Institute we're taking a look at ICE: the Integrated Content Environment, an open source software system which is now part of the core infrastructure at USQ.

The ADFI team are spending all week exploring new stuff and considering what ICE 3 might look like and how it might fit with or merge with our other project, The Fascinator.

The week kicked off with a couple of sessions with the USQ community. The first session was by invitation, we asked a number of USQ staff who have engaged with ICE over the last few years along, including some who have been vocal critics. The second session was an open-invitation ADFI event. In both cases we went through this agenda:

- How did we get here? (and what did we learn?)
- Your concerns
- What should we do next?

Bron Chandler has summarised some of the points already, It's half way through the week now and I have been jotting down my thoughts in this post since Monday. This is a bit long winded, but I hope it is a useful record of some of the lessons learned from the last few years of content-creation systems at USQ. It's on my blog, so it's my opinion, comments are welcome to expand, clarify, correct or argue.

Remember that USQ is a distance education-specialist and produces lots of courseware, book-length study materials that are delivered in print/PDF and/or HTML to thousands of students. Teaching and learning is not all about courseware, of course, but courseware is a big part of what we do, and that's what ICE was developed for.

History

FrameMaker

Adobe FrameMaker has been used since the 1990s at USQ to produce courseware for print. It's still used for some print-only courses (largely ones with lots of maths I think). The problem with our use of FrameMaker is all the manual steps involved. Authors submit manuscripts in Word, these are converted to Frame by operators, largely by hand, and then proofing is done by the academics in Word with track changes, or on paper with corrections. Staff in Electronic Publishing Services then have to update the Frame documents change-by-change. This legacy process is being phased out, but these things take time.

USQ has never had a fully automated web-conversion process for FrameMaker documents although there have been a couple of attempts, and there is now a process for converting to ICE in a semi-automated way. In a decidedly un-automated process from 1999 or so until 2003-ish USQ used to send FrameMaker documents over to NextEd at the USQ Toowoomba campus to have courses converted to HTML by hand. This was a process which I recall costing circa $5000 US per course payable every semester, because of the almost complete lack of automation they had to be redone with each offering. Apparently some of the HTML courses from the NextEd days are still extant and being maintained using DreamWeaver and the like.

Bron Chandler and Ron Ward and I from the current ADFI team all worked for NextEd, and we still go to

the support-group meetings from time to time but I think we're getting better.

At NextEd I devised a word-processor based publishing system built around FrameMaker which would have slashed the cost of producing courses for both print and HTML at USQ. The system used Frame's structured editing mode using XHTML as a document model, so you could produce high quality print documents and export them straight to the web – and because it used styles in FrameMaker you could import word processing documents and have FrameMaker automatically add structure. NextEd got a pilot system up in a few weeks, with help from Allette Systems. I thought it was rather a good idea but USQ was not interested in that, or our other publishing system the CPS, because they had other plans, in the form of an XML system.

Lessons learned?

I think it was pretty broadly recognised that all the manual work involved in producing courseware this way was not sustainable and not sensible which is why USQ tried to build an XML publishing system. The main lesson here is that systems change can take a long time in a university and document conversion is always slow and expensive, which is why we still have some FrameMaker documents.

LaTeX

Before looking at the XML world, though, there's another legacy system, LaTeX.

- Used in some technical disciplines.
- No universal web conversion (really, there isn't).

There's not a whole lot to say about this, the people who know how to use it continue to do so to produce courseware, and it continues to make no inroads into other disciplines, I hear, though, that in engineering they are starting to get new staff who don't know LaTeX. The problem is that Word and OpenOffice.org are not great when it comes to very large amounts of Maths, and ICE uses OpenOffice.org to make PDF, which is a bit buggy for maths so there is still a place for LaTeX, even if it is embedding LaTeX in word processing documents and automatically rendering the maths at least until further investments are made in ICE to improve its MathML support. USQ needs to work this out.

Participants in the sessions this week emphasised some of the good points of LaTeX:

- BibTex referencing is vastly superior to anything else, we heard. (I'm not an expert but I believe (via Bruce Darcus) if this is true it is only so for some scientific disciplines. ICE works with the university supported EndNote and with the open source Zotero).
- LaTex's rendering is better than we produce using ICE/FrameMaker. (Certainly true for maths, probably not that important for most of the rest of what we do – but even if you can produce PDF with links is that enough? For web use I'd like to see more usable fluid materials like the stuff we did in ICE-TheOREM with live, interactive chemical models embedded in web pages, or interactive maps for documents with geographical references, easy in HTML and not possible in PDF.)

We had a follow-up meeting about LaTeX (and online document editors, more of which later) and reached the conclusion that ICE might be able to help manage LaTeX files and bundle them as courses, if communities of users could agree on which LaTeX stlyes or macros to use. Some people insist that for maths-heavy courseware the only practical delivery medium is PDF.

Lessons?

We've learned that where a community is using a tool that meets their requirements it is best to leave them to it. Apparently, though there is pressure on some of the LaTeX users to use ICE as per USQ policy. Me, I think the policy should be based on performance outcomes not mandating how people should achieve the outcomes. I'd love to see a competitor/successor to ICE emerge from someone who's a bit feral and won't use the corporate tools (but it aint going to be LaTeX-based).

GOOD

The GOOD system (Generic Online Offline Delivery) was USQ's was a very big, complicated bespoke XML system which never realised its claimed potential. The idea was to build a semantically aware highly structured courseware production system.

There were several issues with GOOD:

- Converting content from FrameMaker was a very **costly, slow process.**
- Despite the best efforts of the team to design the one true Document Type Definition (a DTD was an ancient kind of document schema they had back in the twentieth century) for USQ courseware, there was **exception after exception** as more disciplines came on board and wanted different conventions, referencing systems, extensions to the table model and so on and so on, with every discussion ending up in a big meeting to see whether a change was needed. Being a university we didn't count the cost of those meetings, but I bet it added up, let alone the cost of all the changes.
- It was slow to render documents, so changes like sorting out pagination or fixing typos were very painful.
- But the biggest issue was that **almost none of the lecturers used it, see below**.

Lessons?

There were lots of things that USQ should remember from the GOOD experience, most of which were well understood in the XML/SGML community before the project started, but there's nothing like experiencing these things for yourself:

- **Top-down mandating of system is risky**, particularly if the people you're telling what to do are academics in an Australian university. They're not process workers who will take orders.
- **Don't build a big system without sorting out basic issues** like what editor you are going to use and testing to see whether the user community will be able to use it and actually do so.
- The system produced HTML and PDF from the same source document alright but then so did the demo system we built at NextEd using FrameMaker at about 100th of the cost. I think maybe GOOD would have had more traction i**f all that semantic markup had been used to better effect**, so people could see the point of the extra work and cost involved. When I joined USQ I worked with the GOOD team (particularity Oliver Lucido who now works with us in ADFI) to demo some of the potential but our proposals never made it into the learning management system which the students used.

CPS

The NextEd Continuous Publishing System was my baby at NextEd, sponsored by another current USQer Cameron Loudon who ran the conversion team. It was a word processor based HTML publishing system which many of our clients used and which was used for the company intranet. But even when customers didn't fully embrace it for courseware, we were able to use it internally to dramatically cut costs.

- Server based like ICE server.
- Used an earlier version of ICE templates (inherited from Standards Australia where I helped set them up for writing standards).
- No print output.
- Banned at USQ's Distance and e-Learning Centre. (True, even though there was a small user community who liked it, and it was open source it was considered a risk to use. I think one of the issues was whether the open source code was truly clean-room open, and then there was the GOOD system with which the CPS competed (except for the lack of print output)).

Lessons?

The CPS worked pretty well. Ron Ward did most of the work on the later versions, and together we learned a lot about modern software development and how to keep things as simple as possible. For example lots of the features we thought we needed it turned out we didn't and even with the simplest possible model we could think of for document-reuse across semesters it was too hard for most users to get their heads around.

It was eventually made open source, but too late, meaning that all that work died with most of NextEd's business. I resolved that if I worked on software for other people again I would either (a) get paid substantial amounts of money or (b) get to release the software under an open source license so I could build on it in future, never mind the other potential benefits of open source software.

The big thing that I miss about CPS which is so far not present in ICE is that it was very much driven by metadata, which means that courses self-assembled as you uploaded and described parts of a course. This is an area we are exploring with our ICE/Fascinator mashup which we hope will be used to serve all the universities policies and procedures in a faceted, browse/search interface before too long.

ICE

Regulars here probably know more than they want to about ICE and you can read about it on the website, and in various papers (Sefton et al. 2009; Sefton 2006; Sefton 2007).

- Originally called GOOD-lite (2004) for (internal) marketing reasons and changed immediately to The Integrated Courseware Environment for (external) marketing reasons. (Then we changed Courseware to Content to go after a grant.)
- Approved within DeC without the benefit of the kind of USQ governance we now have.
- Grew organically from a user-base of one.
- Core system in 2009.

Lessons?

Lots of lessons, but we're still working out what they are. The big ones for me are:

- Trying to build a replicated version controlled content management system as well as the core ICE function which was to make HTML and PDF courseware from word-processing files was a big mistake, cost us a lot for limited benefit. My fault, I think for getting carried away with architectural space-travel. We're going to see if we can get away without using Subversion or anything remotely like it for future versions and focus on the things that ICE does that no other system does, mainly having good generic word processing templates and turning them into HTML. Yes it is strange that no other open system does this but no, we don't know of anything comparable.
- The agile, organic approach worked well to make the actual software but because we started the project under local governance, just before a big project to centralise uni IT services, by the time it was ready to roll out there was a whole new governance framework in place and it took longer than it should to navigate that. Future projects need to move into core mode much more smoothly.

Future directions?

I put up a slide for discussion with some bullet points, some brief notes here on each point:

- **Concept Maps? (Bron's summary)**

  Mark Phythian and co (Phythian & Das Gupta 2008) have been trialling Concept Maps as a learning and teaching aid. Mark started by wondering if Concept Maps could provide a navigation aid for courses, then started looking at how they might help learners. We had a meeting on Tuesday which affirmed that ADFI will keep helping with this line of research, with a view to building open tools for the use of concept maps in learning, teaching and research as indicated by ongoing evaluations like Mark has been doing.

  We also heard about Mind Maps (don't get me started on that one) and something called Argument Maps which were new to me . Duncan is exploring how work on Aus-e-Lit might be used in our tools to build concept-map-like navigation or aggregation in our tools.

- **Efficiency:**

  There were a few points that came down to ICE efficiency and performance; there are already processes under way to make ICE more responsive by getting some of the large video content out of it and into more suitable repositories, building towards university-wide media and courseware repository and discovery services. ADFI may have a role to play in developing some of this infrastructure, and we are gearing up to build and pilot some software along these lines in 2010.

  - **Media repository?**

    Yep, we know we need it and there are people looking at this. It is clear that we need some kind of repository of course content to remember what we served up to students; Bron Chandler is looking at the new version (2) of the Moodle learning management system to see how repository-like it is.

  - **Drop versioning from ICE?**

    It seems that the versioning is not one of ICE's most used features and people would be happy to sacrifice it for extra speed. Some of the maths and computing people would lament the loss of subversion, but I figure they know how to type: `svn add *; svn commit -m 'Finished for semester one!'`

  - **Syncing?**

    Ditto.

- **GoogleDocs and other online editors?**

  We had a group looking at online editors today. Stijn Dekeyser is particularly interested in either working with Google Docs and its APIs to do some ICE integration, or better yet designing a collaborative structured semantically aware editor. The latter sounds fun, but it would be a huge project and I think would be well beyond us without a very strong partner. We will look at opportunities for work in this area where we can. Via Anna Gerber I got a tip to look at Google Docs Base editor which uses the Google Docs APIs:

  > **AnnaGerber**
  >
  > @ptsefton Have you seen Google Docs Base Editor? http://code.google.com/p/gdbe/

- **Google Wave (no)**

  See my recent critique.

- **More LaTeX support?**

  I wrote about this above. If the LaTeX users can organise themselves, there might be a case for extending ICE's limited support for LaTeX to help with the course-management side of things. Look, if someone is telling a mathematician to dump LaTeX and use Word or openoffice.org just because university policy is to 'use ICE' then I think that's wrong and I'm happy to help them fight their case. But I'm also going to fight against everyone who wants to just put PDF on the web and not take advantage of the web in every possible way, so I support PDF-only courses only where they are so maths-heavy there is no other practical way to deliver them right now.

- **Ebook delivery**

  I have been using and loving an ebook reader on my android phone, which experience I will go into in more detail soon. There was interest in adding eBook publishing to ICE from both the library, where ex RUBRIC colleague Alison Hunter emphasised the importance of being able to deliver electronic books as part of the library of the future and from the Learning and Teaching Support Unit, where Michael Sankey thought eBook delivery would be important for open educational resources. (Which reminds me, need to make some more noise about Open Courseware and other open things we could be doing.)

  Linda Octalina and Cynthia Wong got ICE packaging books in EPUB format in less than a day and we're ironing out bugs and testing in Stanza on the iPhone and Aldiko on Android. When that's done we will had the plugin over to Michael at LTSU and see if we can get some trials going.

- **SiteCore/SharePoint?**

  These are the corporate web CMS and intranet systems. It would be nice if they could understand ICE documents; we're not going to tackle these this week, but I hope that USQ gets around to it one day. Given that we can produce high-quality HTML pages for courses from the tool that most people use for documents authoring (MS Word) it seems a pity not to extend that to more corporate documents. There is the forthcoming policies and procedure site which will show just how much **better ICE documents are** than standard ad-hoc unstlyed word documents.

- **Moodle tie-in?**

  This is a big one, for which we don't have a lot of data yet. Bron chandler is investigating Moodle 2.

- **Theses?**

  Nothing much to report since August, but I hope to talk more with people at ANU about theses, as I write this my honours thesis is not function in ePub format, possibly because the title it too long: *MAKING PLANS FOR NIGEL: Defining interfaces between computational representations of linguistic structure and output systems: Adding intonation, punctuation and typography systems to the PENMAN system.*

- **Journals (OJS)?**

  There's a project to get OJS up at USQ, and we have had a long running dialogue with the PKP folks

about ICE integration, but nothing new to report at this stage.

- **Annotations!!**

  There was strong support for taking the kind of in-document in-browser annotation we have in ICE as an authoring service and making it more generally available. Ron Ward is working with Duncan Dickinson to see if we can get the open Dannotate system going in our systems with a view to having rich discussions in-context as part of the teaching and learning process. We are keen to get annotations going for eResearch too, for peer review, and for public participation in research in our work with the Public Memory Research Centre.

- Various contributions about potential functionality from Michael Sankey (thanks!): syndication of audio and video content from YouTube, Facebook, inline quizzes, infopath/Sharepoint forms integration. Implementation of a global glossary and integration with and Mahara.

  We're going to find out more about Mahara and how we might bridge between it and ICE and media repositories and Eprints and our eReserve system and library catalogue and so on.

Working parties

And we have 4 mini 'sprint' developments/investigation happening in the tech team this week. These are designed to explore some of the many things that were brought up by our colleagues where we think we can get something to show quickly that will advance ICE significantly:

1. **Annotations:** Ron Ward & Duncan Dickinson. The point here is to look for generic annotation services for academia covering comment, discussion, notes for personal use, peer review, marking and so on, using a common web based system across multiple web applications. The basis for this is Dannotate, to which we are adding some user-interface tweaks
2. **ePub-format books**: Linda Octalina and Cynthia Wong have this mostly working – we'll post some examples soon.
3. **Packaging of arbitrary collections of resources** (ICE, flickr, images, data) using The Fascinator: Oliver Lucido is looking at a proof of concept here; to show a possible ICE-future.
4. **Moodle 2 integration possibilities**: Bron Chandler. This is fact-finding at this stage, but if we can hook in any of the above into a demo then we will.

References

Phythian, M.W. & Das Gupta, J., 2008. Hyperlinked concept map enhancements for electronic study materials. Available at: http://eprints.usq.edu.au/4776/ [Accessed November 24, 2009].

Sefton, P., 2007. An integrated approach to preparing, publishing, presenting and preserving theses. In *ETD 2007*. Uppsala. Available at: http://eprints.usq.edu.au/archive/00002653/ [Accessed July 2, 2007].

Sefton, P., 2006. The Integrated Content Environment for Research and Scholarship. *ICE Website*. Available at: http://ice.usq.edu.au/introduction/ice_rs.htm [Accessed April 30, 2007].

Sefton, P., Downing, J. & Day, N., 2009. ICE-theorem - end to end semantically aware eResearch infrastructure for theses. *University of Southern Queensland*. Available at: http://eprints.usq.edu.au/5248/1/ice-theorem-paper-OR09.htm [Accessed August 24, 2009].