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21ST CENTURY COMPETENCIES AND COMMUNITIES IN HIGHER EDUCATION

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Higher education staff face a paradigm shift in the transformation of learning and teaching fit for purpose in the 21st century. The experiences of developing the eMatrix – a multi-purpose web platform for learning and teaching through informal and formal learning offers one solution as a possible way forward.

Abstract

Early research carried out by the author (Lister, 2013) indicated that current support and training mechanisms for uptake of technology enhanced learning and teaching amongst academic staff were not working. Some key hindering factors shown by the study were lack of adequate training support as well as lack of pedagogical support for faculty to develop courses suitable for 21st century learners. Whilst there may be a variety of approaches to solving these problems, the London Met E-learning Matrix (the eMatrix) might be one possible solution to some issues. The eMatrix website has become a focal point for developing further mechanisms to help train and support academics at London Metropolitan University in their individual technical skills development as well as their knowledge of the possibilities and pedagogical approaches to technology enhanced learning.

The eMatrix is a complex category driven online content management system that offers multiple authors the opportunity to create related articles in the field of e-learning, which can then be cross categorised into appropriate themes and topics. It is a practical piece of work that attempts to build an online community, both for the authors themselves as well as others who would use the material in their learning, teaching and elsewhere. Centred around one institution (London Metropolitan University), it seeks to provide content for pathways of accredited learning for the continuing professional development of its own and other academic staff, as well as offer more informal connected learning content for a variety of areas related to technology enhanced learning, teaching and research.

It is a pioneering web application, seeking to blend articles from e-learning technologists, academics, admin and library staff, and even students if practicable. The process of creating articles has been made especially user friendly and straightforward, with as little technical 'know-how' required as possible, yet allowing for multimedia webpage content to be authored and navigated with ease.

The aim is to provide a technology that 'meets its users on equal terms' in order to encourage use by all, not only by a few technical specialists. A strong emphasis has been placed on the social functions of the articles, to encourage as much sharing into social and professional online networks as possible, therefore promoting further discussion in the wider community.

Introduction

The concept of 'academic community' is complex, with diverse areas of discussion amongst academics everywhere (Maxwell, 2004, Kogan, 2000). Communities of practice, perhaps the most prevalent type of 'academic community', have a far-reaching scope of reference, extending from research partners and practitioners, professional academic bodies to online open resource development and shared repositories.

This paper discusses ways in which those who may seek to develop a comprehensive set of learning and teaching resources, practitioner expertise, case study discussion and ongoing (often peer) support, together with opportunities for accredited continuing professional development may best utilise web technologies to develop their community of practice. By making use of *open* online technologies to develop a community such as this, access and sharing can be most effectively achieved (Oblinger, 2013, Kukulska-Hulme, 2012, Whitworth et al, 2012), with more individuals

potentially able to become part of an *authentic* community of practice over time and thereby increasing useful content and connections for all users (Talja, 2002).

The eMatrix concerns the development of an online community of blended learning academic practitioners at London Metropolitan University. The focal point of this paper centres round discussion of the iterative development of the community and the resource, from initial concepts and requirement specifications in 2010, following through to the first 'beta' online deployment iteration in 2012 and on to the current iteration (2014). Under scrutiny will be application effectiveness, perceived usefulness and ease of use (Davis, F, 1989) both for author-publishers and user-consumer/practitioners, and ways that these factors can be best researched and evaluated over time to enhance the successful engagement of academics within an online community such as this. Technical issues, interface design, information design and online community aspects are all considered, as well as areas for future development and research.

Background

The eMatrix web application development work has largely been undertaken by two academics from the Centre for the Enhancement of Learning and Teaching at London Metropolitan University, Charl Fregona (Principal Lecturer and Head of CELT E-learning), and Pen Lister (CELT Senior Blended Learning Facilitator and Lecturer in Web Applications and Multimedia) with central support from senior management and academics at the institution. Ms Fregona's background is in extensive academic lecturing and research within the e-learning and blended learning fields, with a strong emphasis on CPD and CAP (CPD in Academic Practice). Pen Lister is a web and multimedia professional and lecturer working in a variety of fields associated with new media, web development, e-learning and social media in the context of academic scenarios. Both are higher education lecturers of considerable experience in their chosen disciplines, and both have a keen interest in new technologies and discovering new opportunities for utilising technology for the benefit of learning and teaching.

Aims and purpose of the eMatrix

An information and learning resource was requested by senior university management at London Metropolitan University which would aid the dissemination of skills, knowledge and experience in e-learning and blended learning, to help support the newly instigated blended learning institutional policy and encourage best practice in the institution. By utilising experts to help novices (Whitworth et al, 2012) and make use of online technology, the hope was that "positive impact on changing practice" would be achieved. Whilst this type of platform is straightforward to build technically, it can be fraught with problems in terms of actual success of purpose (Conole & Culver, 2009).

The initial vision of the eMatrix came about as a result of this need, for academics to be able to access materials and support associated with faculty policy and practice in relation to blended learning, and to be able to share their practice with one another. Areas were needed for each faculty that would hold a selection of current policy documentation as well as faculty specific case studies and relevant tutorial and help sections. Though the eMatrix has grown somewhat since the original requirements and expectations, its core aim and purpose remains, that of providing ways to share best practice and support professional development of academics at the institution, providing up to date approaches to teaching and learning, blended learning resources and an online community presence.

The eMatrix website development Iterations from 2010 – 2014

A prior study carried out by the author (Lister, 2013) developed a hierarchy of problems and benefits factors influencing the uptake of Technology Enhanced Learning (TEL), which highlighted some key hindering factors of relevance to the eMatrix, and which may form part of future research of the eMatrix project. These were:

- Time Poor Academics in relation to professional development time allocation
- Pedagogical innovation and support problems in relation to TEL
- Learning quality support and evaluation mechanisms in relation to TEL
- Central ICT and e-learning pedagogy support provision in relation to TEL
- Staff expectation for '*Always On'* help, support and learning
- Student expectations in relation to TEL and:
- Flexible learning provision
- Student centred learning approaches
- *Device friendly* TEL provision

It was clear both from literature and from primary data in this study that academic staff saw the provision of easily accessible, relevant, preferably discipline specific case studies and pedagogical advice and support as of great importance and influence in facilitating and encouraging their use of technology in their learning and teaching practice. The eMatrix project offers some practical solutions for 'always on' provision of tutorials and TEL pedagogical support, and by attempting to develop a clearly focused online peer 'self-help' community, conceptually *smaller* in nature, it perhaps creates a more effectively engaged, facilitated and shared community of practice (Butler, 2001, Whitworth et al, 2012).

Development Iterations of the eMatrix

The eMatrix website development in the context of multiple factors of relevance are considered here. Discussion is summarised into several main topics indicated below, with reference to three distinct phases: Phase A (2010-2011), Phase B (2011-2012) and Phase C (2013-2014). *The website is available at www.celtelearning.org.*

- Community
- Design
- Information Architecture
- Media and Social
- Features
- Continuing Professional Development
- The Metrics
- Issues and considerations
- The future

Stakeholder requirements for the online system needed to provide the following:

1. Resources to support a recently instigated (2009) central university policy of blended learning at London Metropolitan University learning and teaching practice.
2. Designated faculty spaces to hold faculty specific documentation, case studies and research relevant to blended learning.
3. Shared spaces for e-learning (blended learning and distance learning) pedagogical and technical support.
4. Provision for staff (designated representatives) from each faculty to contribute as and when they required, to their own faculty space, independent of any other support staff being involved. That is, to publish directly into their own faculty space whenever they wished.
5. Communal faculty forums to aid collaborative development of faculty blended learning policy, best practice and problem solving.
6. Communal (all faculties) forum to provide the facility to help each other in problem solving, and to share news, events and other relevant information concerning blended learning at the university.

Community

Building an online e-learning community means defining who the community is, as individuals and together as a whole. We needed to discover the best means of communicating our raison d'être, our identity and our roles as equal participants in this community, to build the trust and value of the community and so increase the likelihood of engagement in that community. Work by a variety of academics in this thinking (for example Dunbar, 1993 and 1998, Butler, 2001 and Gladwell, 2001), and later the work of Conole and Culver (2009) with their development of Cloudworks all have bearing and relevance to what we are trying to achieve. At first this was not apparent, and did not directly inform our thinking, but over the iterations, it has become a leading factor of importance to the entire development process.

Design

Phase A of the web platform was built 'inside' Blackboard[1], as a stand-alone website, complete with meta-navigation, logos, icons and banners. Making use of *learning modules* (a Blackboard feature) and extensive JavaScript and CSS created an identifiable space for faculty best practice and strategic policy, but drawbacks were many. The site was limited by the well-documented idiosyncrasies of Blackboard (too numerous to mention here), staff needed to log in and navigate to the site module to access it (too laborious a process), and nothing could be shared. Staff also found it too technically challenging to publish in, so it failed on several of the stakeholder requirements.

Phase B learned from many of these initial problems and moved out of Blackboard. Utilising a professional Content Management System, ExpressionEngine, as the platform for further development, improvement was significant. But interfaces were still over complex, with use of too much 'playful' interactive behaviour, too much branding and too many icons. Typography also became a design element of more significance as time went on, and menus, which were cluttered and illogical (design and functionality), became much simpler by the end of this phase.

Phase C has shown that the simpler everything is, the better it seems to be for everyone. Flat clean design, well spaced and padded sans serif fonts, content block approach to all layouts, and opportunity for authors to easily select layout choices for articles depending on type and amount of content all contribute to a more successful application. The predominant purpose of *reading* the article is now paramount in the layout approach, but there may still be room for improvement.

Overall approach to the author side of site design from phase B onwards has been to create a 'one page view' clearly laid out publishing form, which requires little or no technical skills in order to publish sophisticated multimedia articles with a choice of layouts for sections of the article webpage. Semantic mark-up for text has now also become more achievable for authors, with styles available in the publishing WYSIWYG to help with visual chunking as well as machine-readable hierarchy of textual content.

Information Architecture

While the fundamental challenge of all information architecture is to avoid confusion, the overarching requirement of the eMatrix is to create multiple routes to sometimes the same content, in order to suit many users who come with different reasons and needs. Site users are from a wide variety of cultures and languages, so it's very important to cater for various approaches, but not lose sight of defined clarity and logic. This aspect of the site is in persistent subtle iteration, and much like any modern web application, change is the most constant thing about taxonomies and menus. Taxonomies have changed somewhat over phases of work, and been added to considerably as areas of the site have expanded, but the main noticeable change has been in a lot more use of folksonomy tagging of articles. This feature of the site has been developed to allow for filtered tags as well as a dedicated area to view all site tags.

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[1] *Blackboard Vista, an earlier version of the proprietary Learning Management System*

Menus continue to improve, but each implementation will show new problems. This perhaps is one of the major challenges of a site such as this. As we move towards a fully responsive design iteration (Phase D) we plan to look again at simplifying and focusing user journeys to single purpose tasks, which will have great bearing on menu approaches. The overall aims of avoiding 'dilemma of choice' and obscure academic terminology are still key considerations.

Media and Social

The use of rich media in site articles is perhaps one of the strongest unique selling points of the eMatrix and has been very important to the site from Phase B onwards. The affordance of embedding multiple media sources (up to 6) into a single article allows for a much richer and dynamic user experience. The site does not allow for upload of video or audio, this can only be used if hosted elsewhere on a third party, usually social, platform. By encouraging the use of these platforms, a larger site web footprint is established, as well as avoiding potential problems surrounding video streaming and file size and formats. Moves to use a media streaming service such as Zencoder may become more important as time goes on but as yet this remains to be seen.

The integration of social channels into the site has always been a high priority. By using customised scripting and accurate implementation of Open Graph we are able to offer a much more *controlled* and detailed sharing experience, without the user having to do much. Having accurate social metadata helps to establish the site in machine-readable contexts (search, metrics), and in due course social login functionality and goal conversion analytics monitoring will be implemented, as well as a wider selection of social metadata.

Features

Key features that we have established as of real importance and significance to the work of the eMatrix would be the emphasis of its identity as an Open Educational Resource (OER), to pioneer a versatile set of choices and accurate approach to intellectual property, the attempt to have author teams as well more flexible contributor members, and to integrate open academic resources with formal assessment mechanisms. Over time and with more careful promotion to faculty and partner institutions, we might be able to improve and develop on this set of key deliverables. All of these features are *community* in orientation, as they impact public (open), private (closed) and individual reputation and engagement.

A recently implemented (phase C) feature to help build 'contributor' roles is the concept of the ShortRead. This is a *one click to publish* functionality using an email to blog process. Any user who knows the ShortRead email address plus any designated subject line prefix (in principle similar to using a hashtag) and whose own email address is listed as a contributor can then email articles to the site, including an image attachment if they wish, which are published automatically to the site, or held in a moderation queue. The ShortRead idea seeks to overcome problems surrounding technically novice and time poor academic users that may otherwise be disinclined to contribute articles. ShortReads could be used in any number of settings such as collaborative projects with a larger group of contributors, or for feedback purposes on a given set of topics.

Continuing Professional Development

The eMatrix works in conjunction with a 'Tessello'[2] closed system (access via login only) third party platform, from the Brightwave online learning company. The application, which has been created by us to compliment the eMatrix, is known as the eMosaic, and embeds eMatrix content into formal curricula, allowing learners to compile personal learning environments (Davis and White, 2004) of this and other content. Learners submit reflective projects based on this content for formal assessment using a variety of approaches, and can support each other, either in the social area of the eMosaic platform, or openly using comments or ShortReads in the eMatrix.

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[2] *Tessello & Brightwave, International House, Queens Road, Brighton, BN1 3XE*

The Metrics

Quantitative data is always useful to web developers, as well as to those who might fund projects such as the eMatrix web resource. The most striking fact that is apparent on even a cursory examination of the metrics currently available for the eMatrix from Google Analytics is the breadth and depth of reach for the content on the site. While our statistics are still modest as we have only been a live site for approximately one year, we already have a sound foundation of statistical characteristics: lower than average bounce rate, good user retention, multiple user interactions, and impressive global reach. With no official publicity at all we have gained users from many nations around the world. With currently less than 200 articles available we have managed 20,000 page views, 3500 unique users, at least 30 countries of user location, and very respectable accesses made from mobile as well as desktop devices. If this were to be compared with analytics from the Blackboard closed platform application of phase A, the difference would be astounding.

Issues and considerations

With any public facing web application associated with a formal organisation, a variety of issues can very quickly surface which must be considered seriously. The most significant legal issues for the eMatrix are concerning data and content, but user engagement is also an important challenge.

1. *The intellectual property of academic articles published in an open educational resource, which are authored by staff currently employed by an institution.* The relationship of academic intellectual property and individual academics in the employ of a higher education institution is in itself a thorny issue, with academics constantly aware of issues surrounding ownership and rights to their work (Campbell et al, 2001). In the setting of the potentially institutionally shared OER landscape, both institutions and individual academics are increasingly concerned about IPR rights, when authorship takes place wholly or partly outside of professional duties, thereby creating an unclear territory of ownership. This situation is only set to magnify as time goes on, yet Campbell's work is nearly fifteen years old.
2. *Protection and archiving of personal or academic materials data used or incorporated in some way by third party hosted (bespoke) web applications, in relation to the legal responsibilities of the institution who may employ those people that are either members or creators of those applications.* It is not clear what the position is when referring to the average terms and conditions of universities where these responsibilities may lie. If they lie with the individual developers or users, legal ramifications might be serious were there to be a breach and loss of data.
3. *Accessibility for all users is a major challenge of all web applications. From a legal perspective the issue is clear: responsibility to build sites fully accessible by all users is of paramount importance.* However, university general web provision may only meet single A accessibility standards, and no clear terms of requirements for application development are available from institutions in this regard.
4. *Engagement of faculty academics and institutional partners in connection with use and authorship of shared open resources remains a challenge.* As Rogers (2003) and others (Butler, Whitworth, Campbell et al) know, any innovative practice takes time and the informal leadership of innovators and early adopters for it to take hold further down 'the chain of command'. If we could find a way of targeting individuals by knowing more about what they need (perhaps than even they themselves might know) we might be more successful at aiming this type of platform at their requirements and so find a more receptive audience amongst those that are not perhaps Rogers' laggards, but certainly are 'late majority' users. Other research carried out by the author has piloted one way of measuring some of these needs that may prove worthy of more research in connection with the eMatrix as a staff development tool (the Personal Technology Profile). It might be useful to note here that further afield amongst the wider web community at large, the eMatrix is apparently being received fairly positively (see the Metrics section).

The future

As the eMatrix grows into a larger project, it offers more opportunities for investigating how our immediate academic online community interacts with it, and what that community needs becomes clearer. From a technical and user standpoint, to develop a device responsive design site is of highest priority. Web analytics for June 2013 – June 2014 show that of users who visit the site, combined Android and iOS users (25%) already outnumber Macintosh users (18.7%). Though Windows users still outnumber all of them (55%), this indicates how quickly we need to develop a fully responsive site.

Developing the community itself is also of real importance. Partner Institutions (other universities, colleges or groups of teaching practitioners) could all contribute and benefit from being part of this platform, so new ways need to be conceived to make this a reality, with ShortReads being a good start. Social collaborative spaces or other collaboration initiatives between groups of authors may provide added incentive for others to become involved.

Technical functionality still only touches the surface of what is possible with a socially connected learning space such as the eMatrix. Opportunities for innovation are plenty, with full Facebook API integration, Tin Can API functionality, use of Open Auth and *web trail activity* tracking and sharing all in the frame for possible small pilot research add-ons to be developed which would connect the user to a seamless world of learn-on-demand.

Conclusions

Though the development of the eMatrix web resource platform is ongoing, it is now beginning to yield some measurable benefit on a number of fronts. It has become clear that the work has gone beyond 'making a website' and has blossomed into a fully-fledged academic research project of some depth, offering the opportunity to measure a variety of aspects of modern academic resource development for learning and teaching. Staff requirements for their practical uses of materials, continuing professional accredited learning and support provision for training and resources, and their engagement in an online academic community all being part of the picture.

Though problems and setbacks have occurred, these have all mostly been solved and often contributed to the improvement of the application as a whole. We look forward to the next phase, and new extensions of the system into further areas of development and use.

The eMatrix, however good the technology may be, will only be as good as the community who contribute to it. By authoring and collaborating on high quality academic content which is useful to many in the immediate community as well as those who access it from further afield, a context of understanding is established, and this may in turn help to create the right conditions for a relevant and empowered authentic academic community (Cox, 2000).

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