MEDIA MAPPING: REFLECTIONS ON AUSTRALIAN AND SWEDISH EXPERIENCES WITH A NEW EDUCATIONAL TECHNOLOGY IN MEDIA AND COMMUNICATION STUDIES

Christina Spurgeon
Queensland University of Technology, Brisbane, Australia
c.spurgeon@qut.edu.au

Marcus Foth
Queensland University of Technology, Brisbane, Australia
m.foth@qut.edu.au

Pernilla Severson
Malmö University, Malmö, Sweden
pernilla.severson@k3.mah.se

Christy Collis
Queensland University of Technology, Brisbane, Australia
c.collis@qut.edu.au

Abstract

This paper reports on Australian and Swedish experiences in the iterative design, development, and ongoing usage of an interactive educational system we call 'Media Maps'. Like maps in general, Media Maps are usefully understood as complex cultural technologies. That is, they are not only physical objects, tools and artefacts, but also information creation and distribution technologies, the use and development of which is embedded in systems of knowledge and social meaning. Drawing upon Australian and Swedish experiences, this paper illustrates this three-layered approach to the development of media mapping. It shows how media mapping is being used to create authentic learning experiences for students preparing for work in the rapidly evolving media and communication industries. We also contextualise media mapping as a response to various challenges for curriculum and learning design in Media and Communication studies that arise from shifts in tertiary education policy in a global knowledge economy.

Keywords: media maps; media and communication studies; new media; authentic learning; creative industries

Introduction

When we think of 'maps', we may instantly think of geographical representations of paths, streets, suburbs, cities, regions or countries. These maps help us find a fast and efficient way from origin A to destination B. In ancient times, maps were drawn on cloth, leather or other kinds of fabric, and today, paper-based maps can be found everywhere. The standard cartographic type of map provides information about physical locations and directions. However, with advances in science, technology and new media, other types of maps have evolved that are not limited to geographical data. These maps represent abstract relationships between perceived reality and temporal or conceptual information in areas such as mathematics, genetics, engineering or architecture. Paper-based maps are produced using information and communication technologies, and dynamic mapping systems have been designed to take advantage of the processing and visualising capabilities of new media applications.

In the context of the knowledge-based economy, many economists and public policy analysts want to capture, visualise and understand the composition, characteristics and dynamics of services sector businesses, conglomerations and markets in both macro and micro economic dimensions [1]. The inter-relationships and blurring boundaries between suppliers, producers, distributors and consumers, as well as cooperating and competing enterprises, have traditionally been illustrated by mapping them onto horizontal and vertical value chains and by notions of economies of scale and economies of scope. Ownership, power and shareholder dependencies have been visualised by mapping certain actors in the market to nodes, boxes, squares and lines in flow charts, network graphs and statistical diagrams.

As this discussion suggests, there is much more to maps than their material and cartographic forms. In their trans-disciplinary analysis of maps and mapping behaviours, Stea, Blaut & Stephens posit mapping as 'a cultural universal'. Like language, the cognitive capacity to map appears to be hard-wired, although maps themselves are culturally specific. Maps can be thought of as complex 'cultural technologies' [2]. That is, they are not only physical objects, tools and artefacts, but also information creation and distribution technologies, the use and development of which is embedded in 'systems of knowledge and social meaning' [3]. This approach to maps is summarised in Figure 1. While it is possible to discern three layers in the manifestation of cultural technologies such as maps it is also the case that none of these layers can exist in isolation from the others. Complex interdependencies between these layers are also conditions of cultural technologies. An example of the application of such a three-layered cultural technology approach to mapping in undergraduate tertiary education is the 'Media Map', which we introduce in this paper.

Figure 1: Multiple layers of Media Maps

Layer	Features
Layer One	physical objects, tools, artefacts
Layer Two	information creation and distribution technologies
Layer Three	wider systems of knowledge and social meaning

The physical layer of a Media Map consists of a student-produced 'map' of local media and communication industries. The examples considered here include The Brisbane Media Map (http://bmm.qut.edu.au/, see Figure 2) and the Malmö Media Map (http://mmm.k3.mah.se/). These maps take the form of online directories of media and communication firms located in Brisbane, Australia, and Malmö, Sweden. By working on Layer One problems of creating entries for the physical entity, students are also compelled to generate their own schematic representations of these industries which the online publcation also puts into wider circulation. In this way students also address Layer Two problems. Layer Three problems are also embedded within the Layer One and Two processes of obtaining and organising the information content of Media Maps. They also require students to find points of meaningful connection with their local industry ecologies. The pedagogy of media mapping is also a Layer Three feature. It is the wider system of teaching and learning knowledge into which experiences of working with Media Maps feed back. This article's account of media mapping is based on the involvements of the authors as participant-observers in various media mapping initiatives from 1997 to the present.
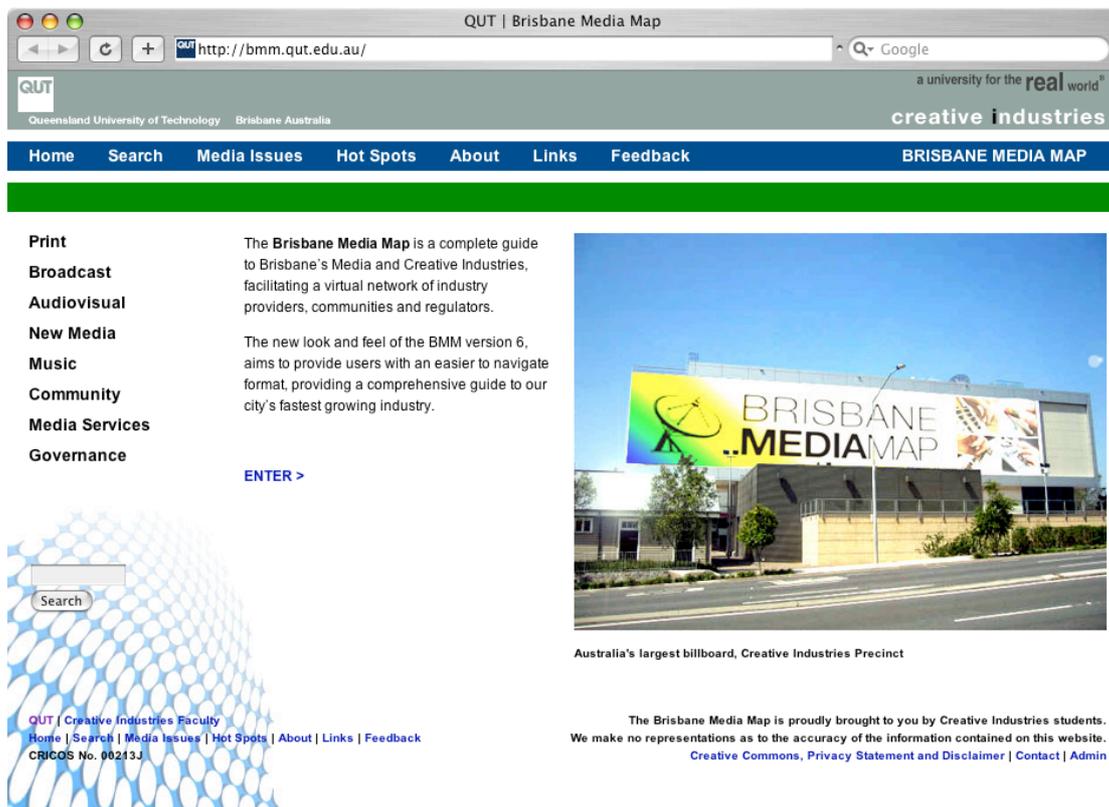
Figure 2: Brisbane Media Map v6 homepage

Media Mapping and 'Authentic' Learning for the Knowledge-based Economy

Betty Collis argues that educating students for knowledge economy employment requires a significant shift in pedagogy. Rather than learning how to *listen*, students need to know how to *do*; rather than learning how to work in isolation, students need to know how to work in multidisciplinary teams; and rather than acquiring information, students need to become co-contributors engaged in the production of knowledge-based resources. Collis is, in effect, arguing for a turn away from models of teaching and learning that rely on the mere transmission of theoretical knowledge from instructors to students. Instead, education needs to develop students' understandings of the ways in which the tacit knowledge base of human action might be structured or re-structured through grounded exposition, authentic practice [4] and networks of social connection. The development of 'authentic learning' has emerged as a key pedagogical modality through which to address these general knowledge economy requirements, as well as the vocational imperatives of national and institutional educational policies [5]. Authentic learning involves student participation in real-world projects and is often referred to as 'generative learning because the completion of the task requires the students to generate other problems to be solved' [6]. Herrington, Oliver & Reeves identify ten characteristics of authentic learning activities, among which are 'real world relevance', 'complex tasks to be investigated by students over a sustained period of time', 'the opportunity to collaborate', and 'the opportunity for students to examine the task from different perspectives using a

variety of resources' [7]. Media mapping comprises these characteristics. It aims to put responsibility for the design and production process of a major public resource almost entirely in the students' collective hands.

The experiences of implementing media mapping into tertiary education also show that learning by mapping involves and integrates important problem-based learning elements. It involves, for example, learning by searching [8] and learning by doing [9]. We would even suggest that media mapping involves learning by doing *by* learning by searching. The students struggle to define what local industries of interest are, which companies to represent, how to collaborate, what they want to work with – and actually – who they are and what their role is in knowledge production. The relationships between students of course is based on interest, but from an instructor's perspective, it is based on learning by searching. When it comes to the learning aspects, the Media Map integrates Dewey's (1963) understanding that is, there is no opposition between traditional and progressive education. The instructor's role can be both that of the teacher and of the facilitator [10]. Fruitfully enough, these dynamics of being both teacher and facilitator exist for students in media mapping development over time. For every new group of students the old students become *both* teachers and facilitators. This open progression over time, both technically and educationally, is an important part of what makes Media Maps exciting.

In addition to authentic learning [11] and action learning [12], other scholarly influences upon the teaching and learning approach that the term 'media mapping' encapsulates include developments in, action research [13], and participatory design [14]. The disciplinary and institutional context of tertiary Media and Communication studies in Australia [15] from which media mapping has emerged is another important influence. So too has been the authors' interest in exploring the networking potential of multiple local Media Maps [16]. Following one of the key propositions of network economics, we are curious to know if the value of Media Maps to all users (faculty, students, industry) is increased as the maps proliferate and numbers of users increase. Although media mapping is now being used in a number of locations, the Media Map network is not yet adequately extensive or integrated to support the generation of significant answers to this question. Instead, this article draws upon Australian and Swedish experiences with media mapping to describe and reflect upon the inter-relationships between the informal iterative innovation cycles embedded within the three tiers of media mapping, as well as between each new generation of Media Maps.

We start by tracing the historical development of media mapping since 1997 in the Australian context. This outline informs our practice of and reflection on implementing media mapping in tertiary education in Australia. It enables us to better understand the critical differences to the Swedish perspective of media mapping which is discussed thereafter.

Implementing Media Mapping in Tertiary Education: An Australian Perspective

The first initiative in media mapping occurred in a regional university setting in 1997. Southern Cross University (SCU) is located in the rural Northern Rivers Region of New South Wales, close to rainforests and the pristine beaches of Byron Bay. The natural beauty of the region has contributed to its reputation as a lifestyle destination for a significant wave of internal migration out of major cities to the region over the last 30 years. Artists, musicians, performers and media practitioners have figured significantly in this movement of people into the region in search of alternative lifestyles [17]. Despite this demographic change, this part of Australia can be characterised as being on the periphery of global flows of information and money, and coming to terms with the challenges of regional economic decline and associated problems of under- and unemployment. In this context, SCU has an important capacity-building and leadership role in a wider development strategy that seeks to soften the impact of structural economic adjustment and encourage renewal by re-focusing resources on value-adding to primary production and stimulating the development of knowledge-based service industries. University-based research is also important to the task of identifying the competitive advantages of the region in a global knowledge economy, and for articulating these into national and international flows [18]. Nevertheless the prevailing common sense of SCU Media students was that there were very few employment opportunities for them in the region. Upon graduation students needed to either leave the region, create their own work, or balance under-employment with on-going professional development in the form of voluntary work in community-based media. In this context, media mapping started out with the humble aim of improving student chances for finding or creating work in the region by building a current awareness capacity and empirical knowledge base of local media and allied industries.

Final year students established an inventory of local media, using their own knowledge of local media, as well as observation and direct enquiry. They interviewed the principals of firms of greatest professional interest to them, and wrote detailed reports on the core activities of these firms, describing their markets, organisation and business models. Summaries were compiled into a consolidated list which was shared as a common resource by all participating students and then used as the starting point for re-developing and updating by the next cohort of students. A number of observations can be made about the intelligence generated from this initiative in these early years. First, it provided a means for grounding students' critical engagement with larger debates of direct relevance to them about trends and directions in regional, national and global economic development. The quality of the learning experience was rated highly by students for a number of reasons. The grounded, project-based mode of learning diversified the range of tertiary undergraduate experiences in ways that were seen to be helpful in dealing with anxieties about the transition to post-university life. Second, the inventory showed that there were many more media and communication-related enterprises in the region than either students or faculty had anticipated when they first embarked on the exercise. This amounted to significant new knowledge that had potential value in a range of contexts beyond the classroom. Finally, a number of students in the first and

second cohorts used the industry contacts they had established while engaged in the media mapping exercise to obtain work experience and employment opportunities.

Media mapping at Southern Cross University has continued to evolve incrementally since the late 1990s and is now principally used to support the integration of a workplace-based learning program into the undergraduate Media curriculum [19]. Since 2002 a dynamic, web-based interface has supported online publication of student-generated profiles of firms in the region. Also in 2000, SCU faculty extended the mapping project through a collaborative research initiative to culture and music industries, and have since expanded it further to encompass the performing arts and writing. The 'Music Map' is now jointly managed by SCU faculty and a local entertainment industry association.

Building from the early experiences at Southern Cross University, media mapping was taken up at Queensland University of Technology (QUT) in 2000 with three aims in mind. Publishing student work in the form of a Media Map was intended to develop new media literacies of Media students in a predominantly theoretical program of study. It also aimed to build the teamwork and leadership experience of this cohort, as well as to develop in them a critical capacity for their 'finding their way' into a rapidly changing media and communication industry environment. In this way, the QUT design and implementation of media mapping strives to address the changing pedagogical needs of the knowledge economy in an integrated system. It comprises all three layers of media mapping, that is, physical artefacts (database and web server), information creation and distribution technologies (the online interface), and on the content or discursive layer, a conceptual system of knowledge and social meaning.

Media mapping classes at QUT consist of between 30-40 final-year students. Two factors distinguish the experiences of the first group QUT students to media mapping from those of subsequent groups. Although the initiative was well-resourced, in the first cohort, most students and faculty were not accustomed to taking classes in computer laboratories. Also unlike subsequent groups, for the first cohort there was no pre-existing physical version of a Media Map. Their map was developed in the absence of a material starting point and a model against which they could benchmark their own efforts. Similarly, there was no feedback from firms that had been represented in earlier maps and wanted details updated or corrected, or from firms that wanted to be included in the next iteration. (This kind of feedback is now commonplace, with these kinds of requests being received at the rate of one or two per week). There was no data on web site traffic, or any anecdotal evidence that could shed light on how such a map might be used or by whom. Despite these difficulties, QUT's first version of the BMM was completed on schedule and went live in October 2000.

The QUT 2000 cohort was the first group of students to work with media mapping to break with both the abstract philosophical approaches to Media Studies and the highly specific professional training of the communication disciplines. Rather than learning how to critique or produce for existing media and communication services these students developed new multi-modal literacies by designing their own [20]. As with subsequent groups of students, they initially resisted the requirement to decide upon the scope and depth of the map content, as well as its taxonomical organisation. In other words, before students could commence substantive work on developing the map, they had to make general decisions about what kinds of firms to include in their map, why, and how this information would be structured and presented. They wanted to be told how to structure their knowledge of the field, rather than arrive at their own informed decisions about what constituted the field and its limits as a result of critically engaging with other tacit and explicit schemes of media and communication industries. There were also wide variations in the team leadership and the project and time management abilities of students.

In subsequent years faculty have paid attention to these issues by improving the ways in which students are encouraged and supported to collaborate with each other, as well as technical specialists, in the re-development process. Unit workload parameters were clarified and re-structured so that each student is now required to lead at least one team and participate as a member in a number of teams. By identifying the component tasks that make up the larger project, and then by assigning these to multiple, distributed teams, students have the opportunity to learn from different perspectives on collaborative team work. Collaboration among students is also supported by an online learning and teaching environment that offers a shared file storage area, discussion board, chat, notices and announcements and polls. These multimedia tools are used by students to coordinate their work efforts and time commitments and to establish collective efficacy [21] and a shared sense of achievement. Each development cycle now starts with a phase of familiarisation and evaluation of the physical map and the larger project prior to the identification of component tasks (around which teams are organised). Students also evaluate the quality of the information contained with in the map. They review the schemes of knowledge and sources of qualitative and quantitative research that inform the scope and schematic organisation of information contained in the map.

Interdisciplinary collaboration has also been important to the ongoing technical development of the Brisbane Media Map (BMM). In 2000 the BMM was comprised of static HTML pages. The 2001 version incorporated an Access database with active server pages (ASP). This improved the ease with which the contents of the Media Map database could be developed, and allowed external users to search and view the site in a more interactive and efficient way. In 2002 a postgraduate communication design student brought to the project the necessary skills to move the BMM to an open source format based on PHP/ MySQL which offers a more sophisticated and stable environment that meets the support and maintenance requirements of the underlying university IT infrastructure. Since this time a communication design and participatory design specialist has been included in the teaching team to work with students on the technical and design aspects of the BMM. This participatory

involvement in the design and development process has led to a cycle of annual system improvements to the physical mapping system, with Version 6 of the BMM launched in November 2005.

The participatory approach taken to designing the Brisbane Media Map integrates the students as end-users in the system development process. By allowing students to see behind the development curtain, and to participate in the re-development process itself, instructors aimed to avoid technocratic determination of the BMM by making all aspects of its redevelopment a genuinely student-controlled learning experience. By aiming to 'walk the talk' of participatory design instructors also aim to maximise the authenticity of media mapping for students.

Visitors to the BMM today find an information-rich resource of dynamically searchable profiles of over 500 firms and organisations in the Brisbane area. The BMM makes visible fine-grained information about the media and communication sector in Brisbane, including its active geographical, historical and institutional dynamics. Its core data is drawn from a variety of sources including student-conducted industry interviews, online research and industry body directories in order to ensure that its listings are reflective of the current state of the sector. The BMM also features numerous 'media issue commentaries' which provide a critical dimension for the otherwise strictly empirical information contained in the resource. It has proven its popularity with students, industry professionals and job-seekers. This popularity is evidenced by the fact that, since 2003, the site has attracted an average of 1250 hits per day. It also makes an important portfolio inclusion for Media and Communication students who previously graduated with very little tangible evidence of their tertiary undergraduate achievements. Students do not only reproduce explicit knowledge but also build a repertoire of tacit knowledge by conducting original research, finding original design solutions, making responsible and informed decisions and expressing their creativity [22]. Thus, media mapping aims to provide innovative practical support for the personal and professional development of Media and Communication students. The collaborative nature of media mapping aims to foster the emergence of a community of learners that is – upon graduation – on the verge of becoming a professional community of practice [23]. Indeed, faculty believe that the BMM now has nascent potential for further development as a part of the 'soft' infrastructure of evolving media and communication industries in Brisbane, and are exploring the ways in which it can be connected to research, development and innovation agendas [24] in the wider 'Creative Industries' [25]

Although the BMM features a cartographic map of Brisbane which spotlights specific industry cluster sites, or 'hot spots', it is, as Spurgeon and O'Donnell note, primarily a conceptual rather than a geographical map: the various categories and subcategories into which individual firms' entries are entered reflect the students' understandings of the organisation of the local sector. It is now possible for students to track back over six different versions of the BMM to see how this industry field, and student perceptions of it, have evolved over time. For example, the representation of new

media services in the BMM has changed more than any other part of the resource. This is not surprising to us, given the rapid growth of new media activity in the Brisbane region and further afield, including associated theoretical knowledge of this area. For example, in 2000, students included two categories of 'Digital Media' and 'Internet Service Providers'. While the scope of the latter group of firms was clear, the range of services included in the former was extremely diverse. In 2001 students introduced finer distinctions. They created a top-level category of 'Online' media and communication services which was made up of three sub-categories: 'Internet Service Providers', 'Publications' and 'Information and Entertainment'. Student thinking about how best to represent the new media part of the field continued to develop. By 2005 it had assumed the form of a top level category called 'New Media', made up of four sub-categories: 'Games and Leisure Software', 'Electronic Publications', 'Web Developers', 'Internet Service Providers', and Industry 'Organisations and Associations' (see Figure 3).
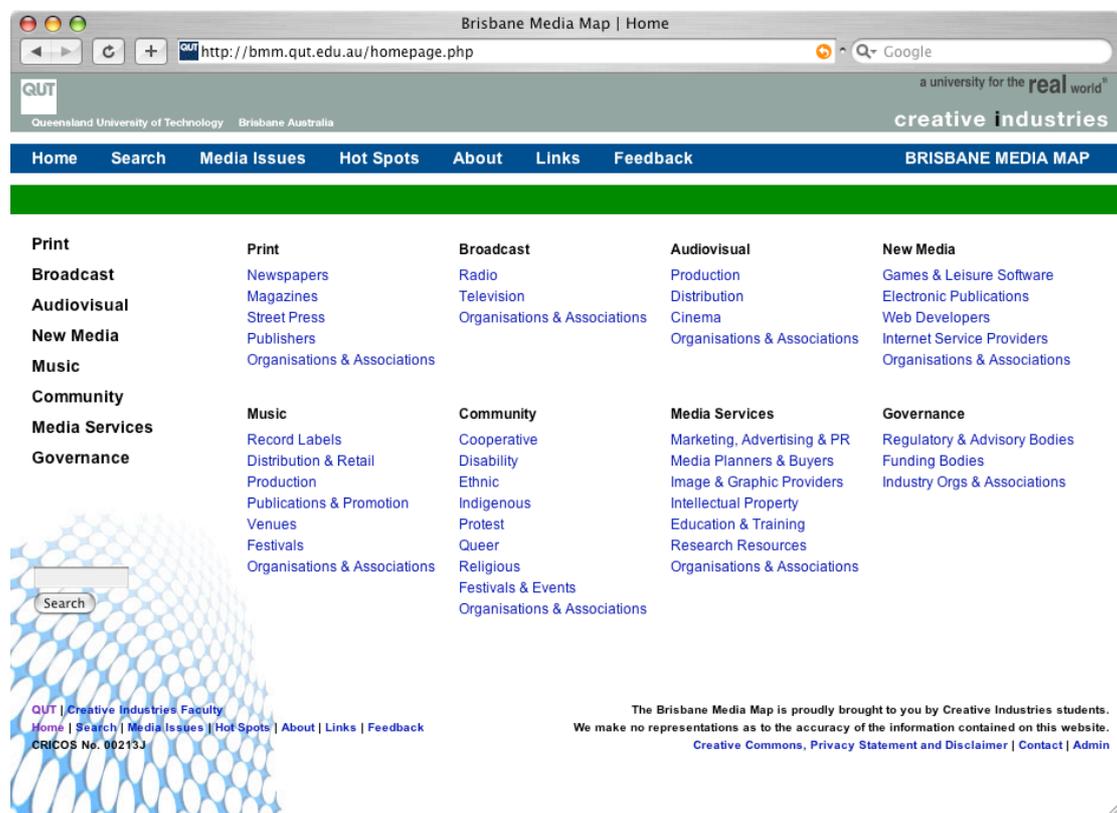

Figure 3: Categories used in the Brisbane Media Map v6

By the end of 2003, the BMM began to attract interest from other universities nationally and internationally. After some preliminary discussions to solve licensing issues and to develop a universally applicable Media Map shell that interested parties could transfer, modify, populate and customise to suit their needs, the physical tier was successfully installed at higher education institutions in Sydney and Melbourne, as well as at one institution in Malmö, Sweden. The Malmö experience with the three tiers of media mapping – the physical map, its meanings in the classroom and beyond,

and the adaptation of mapping as a teaching and learning approach – is discussed below. Expressions of interest have been received from additional institutions. This opens up two other exciting possibilities for media industry mapping. First, a nascent distributed media mapping innovation system now exists, whereby knowledge of experiences as well as improvements in technical operation or learning outcomes can be shared amongst participating institutions. Second, the potential of working with new and existing partners to inter-link different Media Map systems into a federated database for the purpose of generating cross-national data and comparative analyses also exists.

Implementing Media Mapping in Tertiary Education: A Swedish Perspective

In the experience of Malmö University, mapping as a teaching and learning activity is undertaken by students early in the educational program. This has introduced a special focus on original learning rather than giving proof of already accumulated knowledge. In the first media mapping cohort, students were required to start from scratch in the mapping process since there was no local database to work with from previous years. Students were required to learn and conceptualise the empirical nature of how a research process works. They were able to acquire knowledge and developed their ability to read and understand theoretical literature, to be critical of one's sources, to write presentations and essays, to interview companies and to present and finally publish their research findings on the Malmö Media Map website (http://mmm.k3.mah.se/). Due to the lack of a prior local version of the Media Map, students who participated in this first development cycle were required to make more independent decisions under the guidance of the teaching team.

The context for media mapping in Sweden has both differences from, and similarities to the Australian experience. In Sweden, using media mapping of media and creative industries in higher education is also a product of a local climate in which creative industries and IT and learning are high on the political agenda. The Swedish government has declared a special interest in these two areas. An important expression of the political agenda can be found in the work of The Knowledge Foundation [26] which was established in 1994 by the Riksdag (Swedish Parliament) to enhance Sweden's competitiveness by supporting projects related to research, competence development in industry, and IT development in the schools. From 1999 to 2004, the Knowledge Foundation has studied creative industries – under the label 'upplevelseindustri' (experience industry) – as a possible way to enhance Sweden's competitiveness. Since 1995 the Foundation has also worked towards supporting IT development in Sweden by promoting IT in schools and teaching. From 2000 to 2007 a special research project, 'LearnIT', has been founded and is supposed to establish a long-term knowledge building process around learning and information and communication technology.

However, the political agenda did not itself drive Malmo instructors' decision to undertake media mapping, rather, the decision to use media mapping has to do with the educational environment. The Malmö Media Map, so-called because of its geographic focus on Malmö, is mainly a pedagogic decision, that is, a suitable teaching concept which allows the use and production of IT to be explored through mapping of creative industries, and the promotion and publicisation of this knowledge. Moreover, the teaching approach in this class enables students to develop a better understanding of interactive mapping of media and creative industries in a Swedish educational setting.

Collaborative mapping systems are taken up in different ways, in various places, for different reasons and in different contexts. The ongoing design and development of the Malmö Media Map website is guided by the same teaching concept as found in the Australian context. The Media Map is a visual representation of the local industry ecology made possible with the help of a digital media application. As in Australia, the website includes two major components: company profiles and topical short essay reports on current media issues. Yet, just as there are differences between local Australian universities, it is also possible to find aspects that are particular to the Swedish context insofar as the dynamics of Media Maps is not only influenced by the political climate but also by the geographical and educational environment. Geographically, Brisbane is bigger than Malmö. Brisbane has approximately 1.7 million inhabitants, while Malmö Municipality has approximately 267,000 inhabitants. Malmö's size implicates a smaller market with fewer companies involved in creative industries. Although this signals the possibility of the students running out of companies to map, this is in fact not a serious issue due to the dynamic nature of the market.

Educationally, Malmö itself also shows certain distinctions. Malmö University chose to create a dynamic media mapping system to be able to structure an ongoing learning process and to motivate students to make material public. This was a reaction to comments received by students and instructors in previous years. Creating a Media Map therefore meant focusing on more than just training students for tertiary graduate employability. Malmö Media Map was initiated for the first time in September 2004; because 2004 was the 'maiden voyage' no attempt has yet been made to map local 'Hot Spots'.

In media mapping with students early in the educational program, the key learning objective was to establish an appropriate research process. First year students in Malmö are required to acquire a universally applicable skill set first instead of specialising in just one area straight away. Thus, there was no opportunity yet for team specialisations with some students only taking pictures or some only working on writing content. In future courses, students are expected to have different competences. Therefore, they have to be individually visible in order for instructors to be able to assess their progress. Rather than practicing team work, students in Malmö were mostly assigned individual work tasks. Yet students still had to take

responsibility as editors and worked in groups to sketch out the mapping concept, that is, to understand what cultural and creative industries are in the Malmö context and to decide what to map and how.

Dynamically mapping media and creative industries for the first time brought about the importance of classification as a significant starting point. Mapping in this sense means visualising a local industry landscape. The students therefore had to analyse what to map, which industries to include, and where the geographical borders of Malmö should be drawn. To structure the discussions, students used ideas by Hesmondhalgh and were guided by reports from The Knowledge Foundation (see above).

Contact with creative and cultural industries meant reflecting on what is local and finding out which companies exist in and service Malmö. Due to the early phase in education this was for many students a first contact with possible employers. There were several problems in contacting companies. Some companies were almost impossible to contact, and some companies did not want to participate. This had to do with confidentiality issues relating to making material public.

Publishing material is a special experience in the mapping process which involves not only the collaborative environment that is explored and exposed. Ideally, students who realise that what they produce as students matters in the professional world in which they will work and reflects on their own ability, will critique their own sources, and consider what they can say. However, to ensure the accuracy and quality of the content of the Media Map, only approved material was included. Approval was introduced because some of the profiles were more promotions than critical evaluations of the companies presented.

Publishing student work online also brought anxiety about the work being 'good enough'. This occured particularly as students worked more as individuals and realised that they were leaving the comfortable safety zone of trial and error that a teaching and learning environment in higher education usually provides.

Students worked together to understand what cultural and creative industries are, and they worked individually to create profiles and essays. For the profiles, all students were editors and were responsible for allocating companies to research. The students consequently had many different roles in the project. This was confusing for many students and, combined with being students early in their educational history,y this meant that clear instructions were crucial.

Students received instructions as the project progressed. The need for instructions – and balancing this with the educational need for self-exploration and frustration – meant that the students wanted the 'recipe' in some situations, and in other situations, the freedom to explore. Students wanted freedom in writing profiles, but instructions in the information-gathering process. This model turned the other way around in the process of writing the essays, that is, students wanted freedom in what material to use, and strict instructions on how to write an essay. The problem was first seen in how and where to find information, while the problem later was the actual presentation. What seemed simple for the students from an instructor's point of view was experienced as difficult by students. The reason for requesting instructions was mostly that the project was a learning process both for students and instructors, but also that mapping reality in a collaborative way is a dynamic process [27].

Pedagogically, collaborative industry mapping means going public, which generates questions and implications which need addressing. For whom are we making the Media Map? Should students, instructors or companies decide what the Map contains? Mapping has been a way for students to reflect on geographical representations and to visualise their material. The Malmö Media Map solved the problem of students not grasping the depth of how different aspects are interrelated and gave them a stronger motivation in their efforts by publishing their work. Interestingly students argued that they wanted to do the project later in the degree program when they felt they had more skills. This can be a reflection of the possibility of instructors demanding more because of the publication of the students' work.

It seems that the authentic learning project can include some challenging issues both for students and for instructors. Students not looking for a job are confronted with non accommodating companies, demanding instructors and a pressure for not only learning but also performing. Instructors have trouble balancing students' need to learn as students but also to do the job as future media professionals. The balancing act led to a strategy of students having freedom within a set framework. The Malmö Media Map is a problem-based learning exercise but situated within a structured framework. The starting point within the framework is to decide upon the structure of the Media Map. The problem-based dimension stems from the imperative that students take responsibility for their own learning. What was discovered was that this responsibility was felt strenuous for some first year students. However, the opportunities for open progression of both the Malmö Media Map and the pedagogy of media mapping will see the difficulties of the first encounter diminish in time. This will lead to new, collaborative, problem-based learning opportunities in which both students and instructors will learn by searching and doing.

Conclusions

Media mapping has developed in Australia to address generic objectives of tertiary undergraduate education, as well as those that are specific to the disciplinary concerns

of Media and Communication studies. It has evolved as both an approach to learning and teaching, and a learning object, and has been successfully transferred and adapted to a variety of institutional and learning contexts for various reasons, with a various results. This article has demonstrated the ways in which media mapping can be taken up in order to offer students a new type of authentic and meaningful learning experience that is aligned to the requirements of tertiary education for the knowledge economy. It has also shown that reflexive engagement with the pedagogy of media mapping is structured into media mapping and demanded of faculty involved in its year-on-year delivery. In other words, the sum of media mapping amounts to significantly more than its visible web-based outcomes. Furthermore, it also opens up valuable opportunities to collaborate in comparative processes of innovation and ongoing action research in teaching and learning with recurring cycles of action, review and change [28].

Similarities in the Australian and Swedish experiences with media mapping are worth noting. There were Layer One difficulties associated with the initial development of mapping in both locations. Although the Malmö Media Map was established using the shell of the Brisbane Media Map this did not significantly diminish the confrontation with the absence of a pre-existing local version. Similar Layer Two problems were also experienced in both sites. Student resistance to the learning approach of media mapping was reported. This most commonly took the form of demands for more detailed direction in the tasks of obtaining and representing information than instructors thought appropriate. Instructors often met these expectations indirectly, by concentrating instead upon development in key skills areas including research, teamwork and communication. The most striking Layer Three similarity was the shared interest in developing a new pedagogical approach that took account of the dynamics of the knowledge-based economy. Even though there were variations in the precise learning objectives of working with media maps in each location, there was also a shared interest in developing and applying the open-ended learning and teaching approaches that a cultural technological approach to mapping supports.

Media mapping fosters an authentic, active learning approach to understanding media, cultural and communication industries in a rapidly changing environment. The analysis presented here of the ways in which media mapping has been developed and practised in two Australian locations draws attention to the ways in which an ambitious, authentic, service-oriented project such as a Media Map contributes to active, collaborative learning by demanding student collaboration and content generation. The account of media mapping in Malmö, Sweden, shows that the student experience of mapping is far more complex than the final product might indicate. The similarities and differences between the Malmö and Brisbane experiences provide important findings for the ongoing autonomous development of mapping in both locations. Both examples illustrate the dynamism of three Layers of media mapping as well as their interdependencies. The physical system itself is dynamic to the extent that it allows content within the mapping system to be changed asynchronously and in real time and is updated and evolved by different cohorts of students over time. In the Layer Two process of generating the information that populates media maps, students are encouraged to become aware that definitions within these fields of knowledge are

not fixed, but require constant interrogation. They also participate in the social shaping of larger systems of knowledge. Their map provides a valuable directory service to the industry and local community; it can build students' portfolios and connect them directly to potential employers. It also situates students, and their work, in larger debates about the role of media, communication, culture, IT and education in social and economic development. Students' legacy is also apparent in the pedagogy of media mapping which is also continuously refined in response to their demands and experiences.

The fact that Media Maps are now developing at a number of institutions opens up other exciting possibilities for cross-institutional exchange and collaboration. There now exists a nascent distributed media mapping innovation system, whereby delivery experiences as well as improvements in technical operation and learning outcomes can be shared amongst participating institutions. Ideas for system improvements that may be integrated in future versions of the Media Map system include a time dimension to make archives of previous versions of company profiles available through the user interface. Common ownership patterns, conglomerations and concentrations could also be visualised (cf. http://www.kek-online.de/) through flow charts and interactive diagrams. Aspects of Geographical Information Systems (GIS) could also be integrated into the existing system's architecture. As well, there is the possibility of inter-linking different Media Maps into a federated database for a variety of purposes including generating cross-national data and comparative analyses.

The Brisbane Media Map is available at http://bmm.qut.edu.au. The Malmö Media Map is available at http://mmm.k3.mah.se/

Notes

[1] (Cunningham *et al.*, 2003)

[2] (Flew, 2005, p. 20ff.)

[3] (Flew, 2005, p. 21)

[4] (Inglis, Ling, & Joosten, 1999, pp. 39-40)

[5] (C. Collis, Foth & Spurgeon, 2005)

[6] (Herrington, Oliver & Reeves, 2003, p. 61)

[7] (Herrington, Oliver & Reeves, 2003, pp. 61-62)

[8] (Jönsson, 2000)

[9] (Dewey, 1980)

[10] (see Margetson, 1999)

[11] (B. Collis, 2005)

[12] (Herrington, Oliver & Reeves, 2003; Jönsson, 2000)

[13] (Hearn & Foth, 2005; Reason & Bradbury, 2001)

[14] (Greenbaum & Kyng, 1991; Schuler & Namioka, 1993)

[15] (Flew, 2004; Putnis, Axford, Watson, & Blood, 2002)

[16] (Barabási, 2003; Fulk *et al.*, 1996)

[17] (Wilson, 2003)

[18] (Garlick, 1998)

[19] (Coyle, 2004)

[20] (C. Collis, Foth & Spurgeon, 2005, p. 9; Kress, 1997)

[21] (Carroll & Reese, 2003)

[22] (Hearn & Foth, 2005; Polanyi, 1966; Rust, 2004)

[23] (Hiltz & Turoff, 2002; Preece, Rogers, & Sharp, 2002; Wenger, McDermott, & Snyder, 2002)

[24] (C. Collis, Foth & Spurgeon, 2005; Kress, 1997).

[25] The term 'creative industries', refers to those knowledge-based industries and value chains which are particularly reliant upon the inputs of symbol creators. It encompasses the 'copyright industries' but is not limited to entertainment, publishing or media. The creative industries concept has been taken up by a range of national, state and regional governments around the world to frame economic renewal and industry development strategies which emphasise the development of creative human capital as a source of competitive advantage in wealth creation strategies. In Australia the term is used to differentiate copyright and design-based services sectors (such as architecture) from others. In the UK it is used more broadly to incorporate heritage-based trade and services in, for example, art and antiques (Creative Industries Task Force, 2001). QUT is a lead site for national and international creative industries research, and industry mapping is a key methodology for ascertaining information about the significance of the creative industries to the wider national economy and interest (DCITA, 2004).

[26]](http://www.kks.se/)

[27] (see also Kuhlthau, 2004).

[28] (Hearn & Foth, 2005)

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