

The Brisbane Media Map: Connecting Students, Industry, and University through Authentic Learning

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Abstract— How can an undergraduate course and its technology-integrated learning design strengthen the student-university-industry triad? This paper describes the Brisbane Media Map, (<http://bmm.qut.edu.au>), an authentic learning project in which undergraduate media students work as a team to design and populate an online directory of Brisbane's media sector. The paper focuses on the pedagogical design, assessment and management, and technological architectural of the Map Project and its implications for strengthening university-industrial relations in an urban area.

Index Terms—Education, Educational technology, Information technology

I. INTRODUCTION

This paper focuses on a potentially important component of the university-student-industry triad: undergraduate students. When it comes to the university-student-industry triad, undergraduate students are a neglected group, as well as an untapped resource. Many linkages between universities and industry are undertaken through research connections which focus on academics, postgraduates, and specific industry partners. The Australian Research Council's Linkage grants, in which academic teams--teams which often include a postdoctoral fellow--undertake collaborative research projects with industry partners, are a clear example of the development of this kind of university-industry relationship (http://www.arc.gov.au/grant_programs/linkage.htm). Yet there is no place in the Linkage scheme for undergraduate students, who do not have the skills, publication track records, or seniority to be involved in this type of university-industry partnership.

Currently, one of the major ways in which undergraduate students are brought into the university-industry-student triad is through workplace learning schemes or internships—collectively known as work-integrated learning--in which undergraduates spend limited periods of time in industry

workplaces. However, while work-integrated learning schemes have clear benefits for participating students [1], they can be difficult to organize in a way that strengthens not only student skills, but also the triad. Organizations have limited resources available for dealing with individual work-integrated learning students, and full-time undergraduate students have limited time in which to undertake work which benefits the industry partner in meaningful ways. Further, work-integrated learning schemes can be difficult to administer: with students in various workplaces undertaking varied tasks, both assessment and management can be complex and time-consuming for teaching staff involved. Yet undergraduate students can potentially be an important part of the university-student-industry triad; the question is, how can their skills, work, and knowledge best be mobilized? This paper addresses the question:

What are design constraints, opportunities, and options for an undergraduate course which strengthens and actively contributes to the university-student-industry triad and what is the result when these are realized in practice in a particular urban setting?

In particular, the paper addresses key opportunities as well as constraints in the university-student-industry triad when large cohorts of undergraduate students are involved; identifies a series of dimensions along which design options can be identified for courses embedding authentic activities to link academic standards and industrial interests; describes a case in which a combination of the options has led to a successful linkage activity involving undergraduate students, a technology-oriented university, and its local industrial environment; and concludes with recommendations relating to the transfer of the strategies to other university-industrial settings.

II. GENERIC DESIGN

A. General constraints

University-industrial linkages typically involve students as researchers or for individually oriented field work experiences. Undergraduate cohorts, in contrast, involve larger number of students whose time and skill set for contribution to the university-industry partnership are limited.

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A first generic constraint relates to these parameters and also to the need for a systematic form of assessment and grading to apply to student work. Also, typically there is little budget available for scaffolding of students or of industry partners providing an access opportunity for the students. Budget must be available for any technical infrastructure involved in supporting the students and in presenting their products to both their university supervisors and industrial contacts. Undergraduate students can have mixed backgrounds and skill sets, which complicate general approaches to short-term immersion activities. Finally, the experience of the students must be both academically sound as well as practically useful to the industrial partners.

B. *Generic opportunities*

In contrast to these constraints, there are many positive opportunities for strengthening the university-industry relationship with cohorts of undergraduate students. First, from a developmental perspective, students oriented toward future careers within a specific industrial environment can obtain authentic experiences within this environment, helping them in their professional development. Second, from a learning perspective, learning is strengthened to the extent that it is authentic and grounded in real-world issues and experiences [2] where students are engaged in worthwhile tasks involving interaction with others. A framework for this type of learning is Engagement Theory [3], which “is based upon the idea of creating successful collaborative teams that work on ambitious projects that are meaningful to someone outside the classroom. These three components, summarized by Relate-Create-Donate, imply that learning activities:

1. occur in a group context (i.e., collaborative teams)
2. are project-based
3. have an outside (authentic) focus”

The notion of an authentic focus requires developing a product that is valuable to an outside customer [3, 4]. When the outside customers are industries, it is consistent with school-to-work orientations (workplace-oriented learning) and with a “service” philosophy linking the university and its industrial partners [5]. If such a service- and workplace-oriented project can be devised and managed in the academic setting, it offers strong opportunities for strengthening the university-industrial partnership as well as strengthening the learning experience for the students. Course concepts related to workplace learning involve new ways of learning in the workplace including action, situated, and incidental learning [6]; such concepts should also be central to academic courses relating to the workplace. Finally, such an approach to course design represents an opportunity for innovation in higher education, where renewal processes are “necessary for survival” [7]. “Unless [higher education] organizations are prepared to renew their products and processes on a continuing basis, their survival chances are seriously threatened” [8, p.12]. Thus, if the constraints noted earlier can be managed, the payoff for an approach to course design that is based on authentic activities and Engagement Theory can

strengthen the student-university-industrial triad. To overcome the constraints and realize the opportunities task-oriented design decisions must be taken and appropriate technology must be available.

C. *Design options*

Key design decisions for an undergraduate course reflecting the above constraints and opportunities fall along the dimensions:

1. Authentic vs simulated projects? Authentic projects are directly based on the situations in the workplace whereas simulated projects make use of case materials prepared by the instructor. For results meaningful to others outside of the academic setting and when a wide range of entities are represented in the “others”, then a project making use of experiences from the actual industrial settings is superior.
2. Pre-structured vs open-ended tasks? Since logistic constraints require that the project engaged upon can be managed by the students within the set period of time of the course, some pre-structuredness is necessary. However, as much as possible, students should make decisions within the structure as to how to realize their projects.
3. Group vs individual projects? Private vs public products? The nature of Engagement Theory identifies the preferences here.
4. Kind of product? A database driven Web-accessible environment in which information and resources of industry-wide value are made available is an appropriate product. A large group of students can be subdivided into different subgroups, each responsible for different aspects of the environment, including its locally relevant content, and its design decisions relating to structure, navigation, and user interface. The product needs to be accessible to its intended audience and at the same time needs to be secure, but with students having write- and even administrator-level privileges in order to take ownership of the design and creation process of the product.
5. Assessment criteria? For the product to satisfy academic requirements, aspects of it must require integration of course concepts with practical relevance for the industrial audience. Reflecting Engagement Theory, assessment criteria should relate to both the product produced as well as the processes involved in the various group contexts. Criterion-referenced assessment based on the determination of clear criteria is appropriate for this [9].

A description of a course designed around these constraints, optimizing these opportunities, and illustrating these design options follows.

III. THE BRISBANE MEDIA MAP

A. Setting

The course and project described in this case, involving undergraduate students in the context of their university's partnerships with the local industrial sector relating to media, is called the Brisbane Media Map (BMM). The Brisbane Media Map as a product is an online directory of the Australian city of Brisbane's media-industry sector. The media sector is comprised of eight general categories: print (including newspapers, magazines, print publishers, and street-press publications); broadcast (including radio and television); audiovisual (including cinemas and audiovisual production); new media (including games and leisure software, electronic publications, web developers, and Internet service providers); music (including record labels, music promotion, production, venues, and festivals); media services (including marketing, advertising, public relations, media buying and planning, image and graphic providers, and intellectual property legal services); community media; and organizations responsible for media governance and support. It includes dynamically searchable profiles of media organizations and companies in the Brisbane area as well as reviews of issues facing the industry, and has proved to be a popular resource for students, job-seekers, and media industry professionals. Since 2003, the site has attracted an average of over 1250 hits per day. The Brisbane Media Map is the only publicly-available resource which provides fine-grained information about the whole of Brisbane's media sector: it provides descriptions, histories, and contact information for over 500 organizations. It also includes commentaries which reflect on various key aspects of the Brisbane media sector, and a 'hot spots' map which spotlights specific geographical sites of industrial concentration. For the media industry in Brisbane, the BMM provides sectoral visibility and a single-site portal to the entire complex industry sector. For an industry as dynamic as media, the annually updated nature of the BMM is also crucial.

The Brisbane Media Map is an initiative of the Media and Communication discipline housed in Queensland University of Technology's Creative Industries Faculty (<http://www.creativeindustries.qut.com/>). Queensland University of Technology's ethos and institutional identity revolve around the idea of a 'real world university': a university which has strong partnerships with industrial sectors and concerns, and a university whose students tend to be vocationally oriented towards professional contexts. The Creative Industries faculty embodies the university's 'real world' focus by concentrating on industries in which individuals' creative talents and skills generate wealth and employment. Media is a major sector within the creative industries broadly, and within the Creative Industries faculty specifically [10]. Media is also an important industrial sector in Brisbane itself. Although Australian Bureau of Statistics figures are not calibrated to account thoroughly for the media sector in Brisbane [10], there are an estimated 600 media

companies and organizations currently operating in the Brisbane region. The context and motivation for the Brisbane Media Map is more fully described in [11].

B. Purpose

The Brisbane Media Map is revised, updated, and re-launched annually by Media and Communication undergraduate students enrolled in the final-year course Applied Media Communication. The course runs for 13 weeks over one semester and involves approximately 30 students. Applied Media Communication is situated at the end of the Bachelor of Creative Industries (Media and Communication) degree; it marks the culmination of the degree, and involves the synthesis and application of many of the skills and competencies acquired over the course of the degree. Students in the course are well-equipped with technical skills and conceptual understandings of the media industry, but they lack both project-management skills and experience and a familiarity with the local media-industry sector. The key aims of the course are thus to assist upper-level Media and Communication students in the transition from undergraduate study to professional employment; to build awareness of the Brisbane media sector; and to build students' project-management skills as well as to strengthen their skills in professional communication and teamwork and their industrial awareness.

The Brisbane Media Map was initiated in 2000 by Dr Christina Spurgeon and is now managed by the author with technical design and development assistance from another member of the Faculty. Reflecting Engagement Theory, the product produced by the students is meaningful for its real-world audience outside of the university, providing the only publicly-available directory of Brisbane's media sector. The Brisbane Media Map was designed from the outset to benefit both the students involved in its creation and the industrial sector in which these students are likely to seek employment. In order to achieve these ends, several decisions have had to be made regarding the course's organization, staffing, and assessment, and the Brisbane Media Map's technical architecture. Because the Brisbane Media Map is now in its sixth iteration, these decisions have been refined through an annual iterative process.

C. – Layers of scaffolding

There are five key layers of scaffolding which support the course: course organization, technical architectures, the database driven course-management system, assessment, and staffing.

1) *Course organization*: The course is run over thirteen weeks, during which time students must be introduced to both conceptual and technical aspects of the BMM, work within a hierarchical network of teams to address specific aspects of the project; undertake research; design, build, and upload the revised version of the BMM; and complete individual academic assessment tasks. Ensuring that all of these tasks fit

into a standard semester, a semester in which students are also enrolled in other courses, requires careful organization. In the first three weeks of the course, all students meet in a conventional classroom setting and are given three lectures: these lectures familiarize them with the BMM as a media resource, with the basic technical architecture of the BMM, and with the general problems associated with mapping an industry sector as diverse and as swiftly-evolving as media. After these three introductory sessions, students complete an assessment task in which they indicate the specific areas of the BMM project in which they are interested: these areas include researching and updating records for individual subsectors such as print media or community radio, improving site look and feel, and organizing communication within the project team. Based on these indications, each student is then assigned to four or five teams of approximately five students each. The instructor ensures that each student is assigned to a variety of teams so that each student uses technical, research, organizational, and planning skills. Each student is the team leader of at least one team. A list of teams is posted to the course's website in the fourth week. This list also contains a list of basic duties and responsibilities for each team and a map of the hierarchical structure of the project team as a whole. In line with Engagement Theory, the students assume responsibility for the expectations: the duties and responsibilities list has been partially authored by students in the previous year's iteration of the course after reflecting on their experiences during the BMM process.

The delivery of the course then begins to change, as the focus moves away from the dissemination of information by the instructors towards the students' own team projects and processes. Physically, the course moves out of the classroom and into the computer labs and smaller meeting rooms. The University's campus-wide WIFI network proves to be highly useful, as students move from room to room with their laptops. In order to assist students with project management and teamwork skills, three workshops are delivered, focusing on team management, time management, and leadership. Workshops, however, comprise only an hour of each three-hour session: the remaining two hours are devoted to team meetings organized by the students. Students make use of email, mobile phones, and the groupware tools in the course's web environment to organize team meetings. Halfway through the semester, each team leader gives an oral presentation to the group which details her/his team's progress, problems, problem solutions, and work still to do. As an aspect of collaborative learning [3, 4], this process allows students to learn from each others' experiences and strategies, as well as familiarizes them with the professional practice of project reporting. The final three weeks of the course do not involve any formal lectures or workshops: teams work in labs or in meeting rooms towards the final deadline by which the new version of the BMM site must be ready for upload. The course thus adopts a flexible delivery approach: it includes formal lectures, instructor-led workshops, student presentations, student meetings, student

computer lab work, and substantial use of the functionalities of the institution's course management system for group and team communication.

3) *Course management system*: The institution's course management system (the locally developed CMS) plays a crucial role in the course. At the beginning of the course it serves as a standard 'push' technology through which the instructor delivers information and material to students. Regular notices are posted on the site, and a FAQ section allows the instructor to manage emerging problems efficiently. As the unit evolves, however, the CMS becomes a busy collaborative space: the instructor creates individual folders in which each team can store ongoing work, and grants admin authorization to specific team leaders so that relevant leaders can upload material such as the project newsletter. For example, admin authorization is given to the student who is the team leader in charge of collecting the media issues commentaries through the CMS's online assignment submission function: all students submit their commentaries through the site, and the commentaries team leader accesses them for editing. Each team is responsible for creating a 'version document' which details the logic behind its decisions, problems they encountered, and strategies with which they dealt with problems; these documents are held on the CMS for future cohorts. Similarly, the FAQ section remains available via the course's web environment each year so that each new cohort can learn from the questions of previous groups. Two types of institutional support related to the CMS are required for the course to succeed: the CMS must be flexible and easily adaptable to the evolving needs of the students, and the ability to allow certain students to have admin authorization to specific areas of the site must be in place.

3) *Technical architecture of the BMM*: The BMM itself is a web-based application written in HTML, PHP, and MySQL. For 13 weeks a year, two versions of the BMM are active: the live site which is visible to end users, and the development site which is accessible only to students and instructors. The BMM's underlying architecture is comprised of three connected components:

- The front end website through which users view static as well as dynamically generated content
- The Database Management System (DBMS) which allows registered users—students and instructors—to work with data sets such as company records and record classification categories
- The database which houses the textual and photographic information and responds to search queries [11].

The primary function of the BMM is to provide users with a searchable dynamic directory of profiles of Brisbane media organizations and of information relevant to them. Users access individual organizations either through either a menu of industry categories situated on the BMM's front page, or through drop-down menus which appear in the frame of each

page. Nested within each of the BMM's eight media categories are several subcategories; students annually decide which subcategories 'belong' to which media sector. For example, students working on the 2005 version decided to split the Festivals and Events subcategory entries, listing some under the Music category, and other under the Community category. Individual organizations can belong to several categories. Each organization is represented by a single profile authored by the students. Students research the media organizations' websites and industry-association websites in order to complete the fields in each profile. These fields include: organization name, contact information, geographical location, core business, primary revenue sources, and history. Each student is required to complete one interview with an industry member as an additional research method. Company profiles also actively highlight the individual students' contributions to the BMM: the most-recent student author of each profile, as well as the date of the profile's creation or updating, is entered and made visible to users. Students comment that this aspect of the BMM enhances their professional profiles by visibly attributing authorship of a public resource to them as individuals. Hidden administrative fields also give information about previous authors of each profile, as well as the names of the peer validators, one of whom is required to check the team members' profiles before they can be uploaded. For quality assurance purposes, each record must be peer-reviewed before it is accepted by the database.

A new aspect of the BMM is the 'Hot Spots' component. This component, accessed through a link on the frame of each page, visually represents geographical sites in which specific media-industry segments co-locate. 'Hot Spots' are comprised of a map with a rollover Flash aspect: as the user rolls the mouse over the map, specific hot spots are highlighted on the map, and a description of the spot's media-industry concentration appears. Clicking hot spots on the map brings up a detailed description of each geographical area of Brisbane and its media-industry environment. Users may click on a menu of hot spots for further visual and textual information about each geographical location. Hot spots information is entered and manipulated through the DBMS, allowing for standardization and ease of data input.

The BMM's architecture is specifically designed for use in an educational, group-work environment: students are granted authorized access to the DBMS, but access to specific areas of the DBMS can be controlled by the instructor in order to minimize the potential for mistakes. Further, only instructors may delete records, assign specific levels of DBMS access, and limit student access. Thus, although students have significant access to the back end of the BMM, this access is subject to some level of control by the instructors.

4) *Assessment*. Although the BMM is a group product and a group project, students in Applied Media Communication are assessed individually. Students complete three assessment tasks over the course of the semester. The first of these, which is submitted in the third week of the course, is an

evaluation of the existing BMM, in which each each student identifies areas of the BMM which s/he would like to improve. Students identify their own strengths and identify ways in which these might be applied to the BMM project. This assessment task familiarizes students with the BMM, and also assists the course coordinator with the task of assigning students to teams. The second assessment task is an oral report presented by each team leader halfway through the course. Each report, accompanied by a Powerpoint presentation, details the team's progress, problems encountered by the team, and strategies with which the team has addressed problems. This assessment task equips students with the experience of presenting a professional progress report in an oral form. The task also benefits other students: students actively learn from other team leaders' presentations, and borrow their strategies for their own team processes. Group problem solving also occurs during the question period following each oral report as students discuss and assess various approaches to similar tasks and problems. The final assessment item for the unit is a combined report and portfolio. The portfolio contains copies of all BMM work produced by the student, this includes: records updated or created, team and individual time-management charts, contributions to project newsletters, and to team guidelines. This material can be incorporated into students' e-portfolios for future professional use. It also ensures that each student has fulfilled the requirement of updating at least five existing records and creating at least three new records.

The report component comprises both an analysis and an evaluation of each student's work within the project. It also contains a weekly reflective journal which each student is required to keep over the course of the project. In the report, students are required to account for what they did within the project (this involves including copies of team-meeting attendance lists), and more importantly, to discuss the logic behind their actions. Students are not required to undertake new research for the report, rather, they are required to apply skills, theories, and concepts that they have learned in their degree to date to their discussions of their work within the BMM project. Students must discuss and evaluate their: research processes, quality-assurance processes, communication skills and practices, leadership experiences, team-membership experiences, time-management processes, technical practices, and project-management experiences. The report and portfolio are due two weeks after the official re-launch of the BMM so that students have time to reflect on the process after the busy practical phase leading up to the site's completion. Assessment tasks are carefully designed so that they meet institutional requirements, relate directly to the BMM project, provide students with an opportunity to reflect on and evaluate their own project-based and team skills, and provide students with material which they can use as they enter the workforce as job-seekers.

5) *Staffing*. Instructional staffing requirements for a project-based authentic learning course such as Applied Media Communication differ from those of conventional courses. Applied Media Communication involves three staff members: the course coordinator, the tutor, and the technical manager. The course coordinator is responsible for: the administration

of the course, designing assessment tasks, managing the CMS, organizing and delivering lectures and workshops, and ensuring that the course meets institutional graduate capabilities' frameworks. Applied Media Communication demands additional types of work from the course coordinator. In the project-based authentic-learning environment, the course coordinator acts as a resource and as a mentor for individual students and student teams, addressing problems and assisting in decision-making processes as they emerge. During the team-meeting stages of the project, the course coordinator circulates among team meetings, offering guidance and maintaining a project-wide perspective. The course coordinator also assists students with negotiation skills: student team leaders must regularly negotiate the scope of their teams' work with other team leaders, team members must negotiate the scope of the work within their teams, and students responsible for individual organizations' records must sometimes negotiate with industry representatives who request that information be added to or removed from their organization's record. The course coordinator also acts as the permanent liaison point between industries and the BMM: year round, the course coordinator monitors the feedback area and the email inbox for the BMM, and responds to industrial and other user feedback regarding specific entries and overall site design. The course coordinator must therefore be able to manage the course at both micro and macro levels, and to balance the requirements of the university, industry partners, and individual students in order to ensure that the new version of the BMM is ready to be launched at the end of the semester.

Rather than delivering standard tutorials, the course's tutor functions as a mentor, circulating through team meetings and reporting emerging problems and ideas to the course coordinator. The tutor is also responsible for marking assessment material.

The technical manager plays a similar hands-on role. The technical manager does more than perform the conventional tasks of designing the BMM's technical architecture and features, ensuring the technical functioning of the site, and maintaining the site's security and currency. In the context of this course, the technical manager also attends student team meetings and responds to student queries and requests as they emerge, pointing out technical practicalities of student suggestions, assisting with technical implementation of student ideas (such as the Hot Spots map), and providing students with technical instruction where required.

The course coordinator, tutor, and technical manager thus work as a mentoring project team, as well as fulfilling the standard responsibilities associated with their roles. This can be challenging, particularly when tutors and technical managers are hired annually on casual contracts and are not provided with formal training in mentoring or project-based leadership. However, the BMM experience demonstrates that the team-style mentoring role can also be a stimulating and rewarding experience for staff accustomed to less-involved, more-conventional professional roles.

IV. IMPLICATIONS FOR TRANSFER

For such an innovation to work in practice in other organizations, support and guidance must be available around a number of different perspectives.

A. For the faculty

Typically a course embedding an authentic activity such as the Brisbane Media Map will have an academic staff member as key person responsible for the academic integrity and management of the course, particularly overseeing the engagement of the industrial partners, mentoring the persons who will serve as tutors or support persons for the students, and determining the standards and criteria for student assessment. Such an academic takes on new roles compared to traditional lecture-oriented teaching [4], including quality control of material for public access and liaison work with local industry partners. The scholarship of teaching (SOT; see, for example, http://www.clt.uts.edu.au/Scholarship/Home_Page.html) takes on new dimensions when the teaching process focuses on the scaffolding of group work within which students make their own decisions about key design aspects of their work.

B. For the students

Students need a well organized resource environment, in which the expectations of the course and appropriate support materials are available. They also need groupware tools, such as shared workspaces; tools for document version control and distributed annotation, feedback, and editing; tools that allow them to manage their own work-in-progress and at the same time make work ready for assessment accessible to peer reviewers and faculty before going public. They need tools to manage their shared agendas and for different forms of communication. They also need skills in communication via a web environment in terms of presentation design and user-interface considerations.

C. For the university

Students must be allowed admin or at least instructor-level access to certain areas of the institutional course-management system so that it is used more as a groupware environment than a course-presentation environment. A WiFi network environment and student use of laptops is important to the flexibility needed for participation in multiple teams while accessing common resources. To increase the potential of the contribution to the student-university-industry triad, the university should build upon the work of the students, perhaps by hosting a launch event in which local industry contacts are thanked for their cooperation. Assessment criteria must allow for performance indicators such as portfolios of student contributions and self-reflections. The continuity and security of the Map environment as well as free public access to the environment must be maintained by the University. Any changes of Map location indicator (URL) must be indicated by redirects when previous URLs are called up by site users.

D. For the industrial partners

The industrial partners need assurance that information made public does not include company-sensitive information and is up-to-date at the time of launch of the site. The intake of information has to occur in an efficient manner, given the time constraints of the industrial partners. The launch event, to which all contributing industrial partners are invited, provides an opportunity to network with others in related industries in the local urban area, as well as identify promising students as new employees. The industry-issues essays in the Media Map must be useful to the industrial partners, particularly in terms of up-to-date references and linkages. Usability research among industry contacts is advisable.

V. CONCLUSION

The Brisbane Media Map is an example of a course and learning activity that strengthens the engagement that university undergraduates can have with industry in their local area. Reflecting authentic learning and Engagement Theory, the Brisbane Media Map not only has provided a valuable local resource and has opened new channels of networking for the students and their prospective employers, but also has renewed the teaching and learning process for this final course in the Media and Communications program. Data-based driven web technology along with groupware tools are critical enablers for both the process and the product.

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