BREAKING DOWN BOUNDARIES – A REGIONAL APPROACH TO COMMUNITY AND ORGANISATIONAL COLLABORATION USING GIS: AN EDUCATION PERSPECTIVE

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ABSTRACT: The requirement for Australian universities to engage with their communities is emphasised in policy at Federal, State levels and is embedded in planning in individual universities. However, little is known about the mechanisms that foster this engagement. This paper explores the application of an information tool that assists in developing and maintaining these relationships. Our use of Geographic Information Systems (GIS) has facilitated the development of a database and on going collection of socio-economic data to act as a knowledge resource for local community and regional education initiatives. The mechanisms of engagement turn on the capacities of GIS technology to provide visual thematic representation that enables collective understanding of socio-demographic patterns salient to local community development issues. We argue that this collective access provides for the weakening of traditionally strong classifications (Bernstein, 2000) between the university and its constituents, spanning boundaries that exist at both knowledge and organisational levels. We further contend that this weakening of boundaries assists in stimulating dialogue and significantly aids effective evaluation and informed decision-making.

1. INTRODUCTION: THE AUSTRALIAN POLICY CONTEXT OF UNIVERSITY-REGIONAL ENGAGEMENT

In July 2002, ministers from around Australia signed a declaration through the Ministerial Council on Education, Employment, Training, Youth Affairs and Community Service (MCEETYA) committing to the development of pathways

for effective transition for all young people; access to career and transition support; responding to the diverse needs of young people; promulgating effective ways to support young people; and focused Local Partnerships and Strategic Alliances. The MCEETYA action plan identified the following strategies as central to strengthening community support: education and training as the foundation leading to pathways for effective transition for all young people; access to career and transition support; responding to the diverse needs of young people; promulgating effective ways to support young people; and focused Local Partnerships and Strategic Alliances.

The articulated key areas from the action plan were further supported by a series of principles that were to guide the nature of the strategies to be adopted as focused on partnerships that "share the load and increase possibilities and opportunities." These key areas were identified as: a focus on the interests of young people; collaboration and co-operation across sectors; communication, consultation and collaboration; promoting partnerships and networks; connecting and ensuring coherence; participating meaningfully and evaluating and reviewing. As such the action plan proposed a key role for the educational sector. Educational institutions were to participate actively and meaningfully in their communities; collaborate and communicate within and between each other, broader agencies and community; optimise the delivery of learning and learning pathways particularly for young Australians through integration, and facilitate informed decision making.

Since the MCEETYA declaration in 2002, significant reforms have begun at both national and state levels, which identify processes of engagement as required in this context. At the national level, the initiatives occurring under the auspices of Minister Dr Brendan Nelson identified national priority areas focusing on course provision between two or more institutions, such as between vocational education and training provider/s and an institution; engagements between universities and their communities, particularly, but not exclusively, regional communities; and engagements between universities and business, industry, employers and or professional associations. In this context, the policy called for "more collaboration between universities and other education providers, industry, business, regions and communities."

The espoused goals of increasing possibilities and opportunities through collaboration were also clearly reflected in Queensland reforms. The *"Education and Training Reforms for the Future A White Paper"* was released in November 2002, leveraged from the *"Pitman and Gardiner reports"* released in August 2002. The white paper referred a number of times to the MCEETYA declaration and built on these principles through a greater emphasis on the concepts of life long and work integrated learning and the importance of local networks. The key objectives of this framework were to: prepare the students' learning throughout their lives including the skills and passion to achieve this objective; build partnership linkages across the sector; build partnerships at the local level; build new relationships that draw on the best from across our communities; coordinate program and services at the local level and use resources more efficiently across sectors; improve collaboration between

schools, Technical and Further Education (TAFE) institutes and universities; and foster the special roles of industry and business because they can provide work experience and ultimately jobs.

Thus, the rationales and processes outlined in the MCEETYA declaration principles are reflected in the Nelson Reforms, and Queensland Government initiatives in seeking to create a systemic environment that supports education engagement both within the sector and with the community. However, this pathway for higher education, while clearly outlined at the level of policy principles, has not been articulated as a set of program strategies suited to implementation in specific universities and regions. This is the challenge that confronted the Northern Corridor Education Precinct strategy at QUT. QUT, throughout 2003 and 2004, had developed a series of interrelated strategic and operational plans designed to guide the university for the next five years. Embedded in them was the vision articulated in the university's strategic plan *"The Blueprint 2004"* for QUT to be a university *"engaged with our communities"*. Engagement with our Northern Corridor community emerged in the broadest sense with the top-level university plans embedded under the strategic plan. In particular the *"Learning and Teaching and Research and Innovation Plans"* adopted and articulated the ideas of active partnership and collaboration, internal and external engagement, capacity building, shared facilities and research benefit to the community and more. To support these principles the university states, *"QUT will develop a culture of partnership and engagement"* part of which will be the review of best practice models for community engagement.

The challenge for the Northern Corridor Education Precinct initiative was that while there was a clear alignment in the way goals and strategies were articulated at a national, state and university level, they were not articulated at the level of policy principles. They did not provide for implementation strategies at the level of specific universities and regions. This paper focuses on issues surrounding identifying and implementing principles of engagement at the level of a specific university campus and its region. First, it reviews what is known about these principles in regional development contexts, and then locates these findings in a framework suited to the development of knowledge regarding university community engagement at a program level. The paper then reports on specific strategies of engagement between the QUT Northern Corridor initiative and key education providers as well as other stakeholders in the region through shared access to GIS visual mapping of important socio-demographic characteristics of the region. The paper argues that the experience of the relationships formed around this initiative provides for proposals about the knowledge and relationship requirements underpinning engagement with regional campuses.

2. CONTEXT: IMPLEMENTATION OF UNIVERSITY-COMMUNITY ENGAGEMENT IN REGIONAL CAMPUSES

There is a growing body of literature in regional development studies that examines the relationship between higher education institution initiatives and

regional development. This literature can be argued to intersect with the policy concerns outlined above because it identifies the mechanisms of collaboration and engagement that are required to produce both social and economic outcomes for regions. Studies investigating both the European (for example Boucher, Conway and Van Der Meer 2003) and Australian context (Keane and Alison, 1999; Gunasekara, 2004) have proposed that "regional success" depends at least in part on "institutional thickness" where institutions engage in the sharing of knowledge and expertise to promote cooperative activity (Boucher et al., 2003).

In the Australian context, Keane and Alison note that universities are responding to the new demands on them to play a leading role in regional economic and social development, reflecting Thanki's, (1999 p. 899) emphasis on "how institutions of higher education are increasingly being recognised as a key vehicle in regional economic development" Gunasekara (2004) has identified some factors that may play an important role in enhancing or constraining university community engagement in the Australian regional development context. These factors pertain to structural initiatives on the part of universities as attempts to "institutionalise" or normalise University Community Engagement (UCE) in the practices of academics. Cooperative education schemes, internal grant schemes encouraging regional engagement and changes to performance management are some of these factors. In relation to these initiatives Gunasekara (2004) identifies a number of challenges facing universities including financial contribution from regional stakeholders and patchy demand for university expertise.

The findings outlined above represent some important insights into factors influencing levels of cooperative activity. However, Keane and Alison site Goddard (1997, 3) in suggesting that institutional thickness involves "more than a strong presence of institutional bodies and practices supporting enterprises…. rather there is a high level of interaction and a mutual awareness of common purpose". In this respect the quality of the interaction is paramount in universities' considerations concerning the appropriate application of human infrastructure and institutional mechanisms. Further, it is critical that these mechanisms should foster interactive learning (Keane and Alison, 1999: 899).

In light of the challenges facing QUT's NCEP initiative there is a key research area that requires further investigation in relation to UCE. This pertains to the mechanisms and processes involved in securing collaboration and support from regional stakeholders and constituents. Given that these need to be based on understanding of the cultures and practices of stakeholders, we turn to a methodological approach suited to this purpose: constructivist programme theory.

3. THEORETICAL FRAMEWORK

3.1 Programme Theory, Mechanisms and Social Constructivism

Programme Theory emerged about thirty years ago from the evaluation discipline and has gained wide acceptance as an important framework for understanding programme workings and assessing their effectiveness (Friedman,

2001). Rogers (2000) (in Baldwin et al. (2004)) describes Programme Theory as "an explicit representation of the 'mechanism' by which programme activities are understood to contribute to the intended outcomes." Chen and Rossi (1992) (also in Baldwin et al. 2004) see this kind of framework as a systematic guide to practice, providing "a specification of what must be done to achieve the desired goal, what other important impacts may be anticipated and how these goals and impacts could be generated."

An important component of the analysis involved in the application of programme theory is the establishment of links between what programmes assume their activities are accomplishing and what is actually happening. Baldwin et al. (2004) suggest that these frameworks are more than just flowcharts because they explain, "…how programme activities are understood to lead to intended outcomes" and "…convey what it is about the programmes that help to bring about the goals". These links can then provide a guiding framework for systematic programme evaluation and management. Thus this approach allows for systematic identification of important programme mechanisms for the achievement of goals and also the contingent conditions that may enable or block the achievement of desired outcomes.

Dahler-Larsen (2001) has recently advocated a specifically constructivist approach to this analysis. He describes the logic of this approach as follows:

A constructivist analysis begins with the typifications applied by different actors to a given object of analysis, say, a programme, in a given context. These are first-order constructions. A good constructivist analysis shows how these fit into larger patterns of interaction (structures, institutions etc.) in which the programme is embedded. To do so, the analyst needs second-order typifications, i.e. concepts describing the larger social reality of which actors are unaware due to their limited perspective on the larger social configuration.

In this way, he identifies actors' sense of the context in which the program is applied as a key factor in the causal relationships proposed to produce program outcomes:

the very constitution of actors, including target groups of particular programmes, are crucial. Not only do institutions provide fundamental roles for customers, clients, users, patients, etc., as well as labels for normality and deviation, but institutions also fundamentally equip human subjects with the cultural tools to determine what counts as 'good taste', 'appropriate preferences' and 'legitimate interests' (Strang and Meyer, 1994). Different roles and identities sensitise subjects in different ways to the 'A' that is expected to lead to 'B' in a given programme context.

In addition to the argument that actors' sense of program contexts are themselves key factors in outcomes, the evolution of a constructivist approach from the field of education, also identifies the approach as critical in attempts to engage program participants according to democratic principles.

The requirement for engagement strategies at university level that are framed in terms of the logic of a specific program results from a current policy framework that articulates principles pertaining to collaboration etc but also

reflects an extremely 'light touch' approach at the level of individual universities and regions. In this context, Australian universities fund community engagement activities at the point where they have already been framed, usually at the level of individual schools, faculties and campuses. This often means that the engagement strategies are not explicitly articulated as following program logic and as such miss opportunities for these strategies to systematically inform program level knowledge about the processes and outcomes involved in 'successful' engagement.

This, in turn, means that organisational entities within universities continue to try to develop the knowledge and practices required for engagement in isolation with no specific points for comparison and benchmarking. This issue is currently being addressed in Community Engagement strategies at QUT, the NCEP and wider regional education sector in Queensland.

Emerging from reflections on the NCEP and QUT process has been a realisation of the need to develop an understanding of the collaborative, regional and thematic relationship of this initiative based on grounded knowledge, shared understanding, common context, and vision based on regional issues as articulated above. This reflection has enabled the evolution of a constructivist approach to programme development which is consistent with the constructivist tradition in education studies. Hirtle (1996) discusses Social Constructivism as having its origin in John Dewey's Pedagogic Creed (1963, p.20) in which he states:

> *psychological and social sides of education cannot be regarded as a compromise between the two, or a superimposition one on top of the other" and positions education as coming as a result of the empowerment of the learner in a social situation resulting in the learner becoming a member of a community. Dewey believes that school is one form of community, which can help learners construct knowledge socially so that they may fully participate in the "social consciousness of the race. (Dewey, 1963, p.26).*

He maintains that the only way to make learners conscious of their social heritage is for them to construct learning experiences which are fundamental to making civilisation what it is, and that, through language as a mediating tool for learning, learners come to collaborate with their own and other's thoughts and feelings.

Further, Hirtle (1996) citing Schor (1992) suggests that that social constructivism is a way of building knowledge about self, school, everyday experience, and society through reflection and meaning making. As a result, one of the primary roles of constructivism is to provide democratic and critical learning which serve to open boundaries through inquiry, not through unquestioned acceptance of prevailing knowledge. In the case of the NCEP initiative, the key lesson here is the realisation that knowledge is never neutral, and that the ways in which knowledge is mediated and created are as dynamic and important as the knowledge itself. This is not only reflected by the social construction of the partners and relationships, but also in the application of technology in portraying and enabling the generation of new knowledge and perceptions.

3.2 Geographic Information Systems and Visualisation

Regionally, the education sector and partners have begun an initiative that provides common access to shared information and knowledge based on GIS technology and the concept of visualisations of layered data sets that it offers. We argue that this has formed an accessible means by which stakeholders and their communities could share in - and collaboratively develop knowledge about - their regions and areas of responsibility.

GIS have been used since the 1960's led by Sweden's application of it to town planning, environmental, event, resource, and epidemiological mapping and in military applications. In all applications it has concentrated on depicting the physical environment. Now, with advances in technology, data availability and management, and the emergence of the Information Era, GIS can now be applied to social, service delivery, evaluation and change management applications outlined in Ghose (2001) and Blough (2003).

The Centre for Social Change Research and QUT Carseldine has been developing expertise, in collaboration with NCEP, in creating and applying Social Information Systems (SIS). The initial areas of application have concentrated on service provision, demographics and associated changes that are occurring and impacting on local and regional communities.

A key finding from this initiative was the nature of the knowledge that GIS afforded and its potential to allow stakeholders to develop and share a broader view of the socio-economic patterns in the region. This enabled the development of common analytical insights and the creation of new knowledge, information and thematic perceptions.

When this initiative is fully implemented, a capability will exist as a third party process to map - and then provide commentary on - policy and program initiatives and projections for future impacts and development alternatives from within the education sector. It also has potential for government agencies, NGO's and community to utilise the technology and model to capture evidence based data for investigative and evaluative process in the justification of specific community initiatives. This is consistent with recent recommendations from leaders such as Professor Michael Gibbons (past member of the UK Economic and Social Research Council and Chair of its Research Priorities Board) for universities to "shift from the production of merely reliable to the production of socially robust knowledge" as detailed in Campus Review Australia, March 23, 2005.

4. REGIONAL CONTEXT AND BOUNDARY SPANNING

In relation to the NCEP initiative, the social constructivist approach has been extended to an organisational and cross-sectoral level in which knowledge of the actors, mechanisms, boundaries and language are used to bring understanding to the social setting. This is being applied at the levels of both organisational and individual relationships and is grounded within the broader region in which the initiative is located: the transport corridor to the north of Brisbane, Australia.

This use of technologies such as GIS and visualisations in a constructivist programme framework resonates with approaches advocating the 'social shaping' of technology. (see for example,Brey (1997). However, further to this, the experience attests to relatively unexplored opportunities afforded by the combination of GIS, internet and visualisation technologies to foster cross-sectoral engagement and collaboration.

This section examines the identification and development of these opportunities in the regional education sector context of the NCEP, pointing to specific issues of implementation that have arisen. Specifically, it points to the importance of common access to information/knowledge about socio-economic, demographic and behavioural patterns at the spatial and organisational levels relevant to education delivery and management as a key issue in successfully engaging the different regional education stakeholders for mutual benefit.

Brey (1997 p.12) examines an "interesting analyses of technologies, being "socially shaped" or having a "script", that provide a potentially fruitful basis for normative and evaluative philosophical analysis of technology and its impacts" "Social constructivism studies pose interesting challenges to the philosophy of technology" but surely just as social construct plays a part on the determination and impact of technology so the reverse also holds.

The Northern Corridor is a rapidly growing region north of Brisbane, Australia with a projected population increase of over 50 percent by 2026. This statistic raises issues about future infrastructure and resource needs for education and service provision in the corridor. The identification of the Northern Corridor as a region of South-East Queensland, evolved from research by Dr Marguerite Nolan, initiated by the then North Point Institute of TAFE (NPIT) and QUT in 1999. The research found that the corridor included areas that exhibit high youth unemployment, low education retention rates, a large number of families from low socio-economic backgrounds, a significant numbers of 'at risk' students and families where no member has accessed tertiary education.

This research resulted in the formation of the Northern Corridor Education Precinct (NCEP), which is an association between QUT, Brisbane North Institute of TAFE (BNIT) and Education Queensland (Nolan, 2000). This association represented a coordinated and systematic attempt to address these issues in the Northern Corridor through strategies aimed at: decreasing attrition/drop out rates; enhancing regional retention; maximising cross-sectoral programs and processes; better utilising human, physical and virtual infrastructure; increasing youth employment; and decreasing overall unemployment. In this context, QUT, and specifically the NCEP, was confronted with reconciling the principles articulated at National and State levels with the need to develop specific strategies for regional and organisational implementation that could be incorporated in an evaluation framework and thus processes of program refinement.

This situation formed the context in which QUT attempted to develop a specific engagement strategy in the Northern Corridor through a program theory approach that embedded QUT within the NCEP objectives and the emerging articulated systemic policy framework and utilised GIS technologies and

visualisations as a programme mechanism.

While Keane and Allison (1999) had identified the existence of an emerging body of published work relating to community and regional engagement and the idea of an *interface* between the University and Community, the nature of the interface was relatively unexplored. The concept of interface in the context of University Community Engagement is described by Burkhardt in terms of leadership oriented to boundary spanning:

The adaptive capacity of higher education is not only rooted in the ability for institutions to change one by one, but in a system level capacity which depends upon a specific form of leadership. This leadership process is constructed at the boundary between the higher education at large and its interface with society (Burkhardt 2002 p. 145).

Burkhardt goes on to suggest that system wide responses to higher education engagement require a leadership capacity that functions at the level of ideas and values rather than a defined organisational framework.

This observation is supported by, and reflected in, QUT's engagement in the NCEP process; with institutional community interface that function at the level of ideas and values. As outlined above the NCEP had adopted a cross-sectoral leadership role in regional education and learning and was articulating and operationalising a shared vision. The NCEP and QUT were operating as Burkhardt suggested at the interface boundary.

Our experience has shown that any outcome must have direct relevance to the communities they serve. The use of GIS in this way has developed since 2002 through the convergence of the engagement and research work conducted by QUT Carseldine. This convergence has resulted in a collaborative project being funded by the Queensland Parallel Supercomputing Foundation (QPSF) designed to undertake a pilot study in the use of GIS technology as a platform for an SIS.

During the conduct of the collaborative project the concept has been applied in a series of community and regional settings. These applications have revealed a considerable amount of interest by a variety of QUT faculties, university partners, Government agencies, service providers, community based organisations and the private sector.

Subsequently, a number of additional development projects have now been identified and discussions have commenced around the utilisation of the GIS/SIS concept model as the tool that will allow the visualisation of layered data sets at the spatial level for example, education and transport data overlayed with regional census, population and development projections.

The GIS/SIS model has wide application across disciplines and organisational boundaries with the capacity to link contemporary socio-economic issues that are relevant to particular communities. The GIS/SIS model has a significant potential role in the "Sustainable Living" domain with complimentary capacity across the faculties involved. Representing this cross disciplinary and institutional approach is a series of research applications focused on the continued development of an open source community information system in which local knowledge will be able to be integrated with existing benchmark information both historical and in real time.

Discussions have also been held to conduct national and international collaborations through research linkages designed to validate the model at a global level. At the local level discussions are currently underway with national and state agencies, local community groupings and the NCEP to explore the potential of mapping SE Queensland from a socio-economic perspective. Such an outcome will not only benefit the community but also assist QUT greatly in our continued regional education sector engagement and allow for enhanced decision making at the regional and organisational levels.

A pilot NGO demonstration has been completed with the Youth at Risk Alliance (YARA) located on the Gold Coast to identify any inconsistencies or gaps in relation to service provision by the various member organisations and affiliates. The pilot will be used to justify a more comprehensive study, which will embrace the leading social issues in that region. An example is the layering of social benefit data with other socio-economic data such as aggregated rental vacancies and costs. In a group discussion using the visual data form it was discovered anecdotally that rental rate increases of over 20 percent had been observed but had not worked into the benchmark data. Therefore, the discussion was significantly more focused as a result.

The GIS/SIS model provides a powerful insight into contemporary community issues in a spatial, temporal and visual form. It is particularly suited to studies involving surveys and large data sets that historically have represented the complex social domain. The use of new visualisation capacities within the GIS programs has only recently evolved and provides an opportunity for QUT Carseldine to establish as a lead agency in this field and the regional commentator on socio-economic issues. This in turn contributed significantly to a coordinated and evidence based approach to forging community both internal and external relationships throughout the region.

"Collaboration, commitment and the grassroots" (Delaforce and Buckley, 2003) is a term used to represent QUT and the NCEP process. Over the past three years this has become the mantra for the precinct and associated relationships. This simple phrase reflects the process of regional level education interaction within and between the sectors as well as into constituent communities. During this period conscious decisions have been made to create a space for engagement and discussion to occur outside the organisational, agency and politically determined artificial boundaries. A space of engagement in which a regional level discourse supported by the unprecedented sharing of data has emerged, the result of which is the ability to create new knowledge and understanding beyond the available data sets.

As a result of the collaborations educators have begun to use both GIS and visualisation technologies to assist in the mapping and gapping of various data sets at a regional level.   This application assists regional sector level understanding, planning and evaluations, interventions and the socio-economic environment in which they and their constituent communities operate.

4. CONCLUSION

This paper discussed the theory, context and outcomes of our reflective process. It demonstrated the benefits that can be realised at a regional level through collaboration and subsequent sharing of information and available data to gain greater insight across previously impenetrable artificial organisational and regional boundaries. A significant further benefit of this approach is the readily recognisable synergies and gaps that historically exist and become apparent when a thematic view is applied.

Visualisations improve clarity of the overlayed data and the boundary spanning nature of the precinct allows for cross-sectoral decision-making and evaluation at the regional level outside the previous silos and leveraged off a shared regional vision. Another key aspect of programme theory that assists in guiding practice is the recognition that some contexts are more hospitable to certain programme mechanisms than others (Dahler-Larsen, 2001). In the social construct of the northern corridor geographic location, grounded within the education sector, QUT and the NCEP has identified a number of mechanisms that allow the articulated policy outcomes to be achieved. These include the capacity to:

- Host and support a space of engagement outside traditional organisational, geographic and political boundaries;
- Share physical, human and virtual infrastructure across sectors;
- Strategically identify, plan, operate, fund and implement regional level initiatives; and
- Evaluate articulated cross-sectoral strategies, processes and outcomes.

GIS and visualisation technology within a programme theory approach support the QUT and the NCEP to span the previously unbridged boundaries detailed above. The use of this regionally based approach and the space to discuss, plan and implement initiatives reflects the larger patterns of interaction outlined as part of the systemic education sector policy framework. Collectively, the approach taken has created an environment that is both hospitable to the enabling mechanisms at a regional level and sufficiently grounded within the social and policy context to bridge any gap between articulated and deliverable outcomes.

The mechanisms of boundary spanning detailed provide a common context for social patterns and problems to be viewed by the sector. Specifically, through the engagement activity around shared infrastructure and capacity building. All stakeholders have the potential to participate in an activity that abstracts them from the normal sectoral divisions in the field of education. These mechanisms identified through a constructivist approach to program development could be seen as key requirements for boundary spanning to produce the institutional thickness required for collaboration.

Future research will focus on the model outcome and the discussion will concentrate on the framework and the link to theory and the translation of theory into praxis that allows people to evaluate engagement in a reflective and

reflexive manner.

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