

RURAL CONSTRUCTION MANAGEMENT FOR DEVELOPING ECONOMIES: IMPLICATIONS FOR PROFESSIONAL EDUCATION—THE CASE OF ASSAM

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ABSTRACT

The authors are engaged in a three-year project, funded by the State of Assam, India, to develop new postgraduate qualification in construction management for Assam, and to research housing and infrastructure strategies aimed at improving rural life. This inter-cultural collaboration mirrors a common arrangement in international development assistance in which an institution from the Global North is invited to assist an institution from the Global South. However, the historical relationships between the North and South, and the way in which they play out in such arrangements has been critiqued from multiple perspectives. The North-South divide is rooted in colonial history, is based on a privileging of the North over/against the South, and works to place the South at a perpetual disadvantage. These privileges are often replicated in the historical-given curricula of post-colonial universities. It is important in undertaking this work for Assam that these historical influences be analysed and critiqued, in order to decolonise the curriculum. This paper outlines the process by which the Project seeks to identify Assamese problems and interests, source useful examples globally, and collect and synthesise them to create products that are tailored to Assam. The key findings: standard professional education is Eurocentric and does not relate to the construction needs of Assam's population, helps drive rural-urban and South-North brain drain. Nascent models are available to counter these tendencies, and can be studied to inform Assam-centric construction management education.

Keywords: Construction Management, Developing Economies, Professional Education, Rural Development.

INTRODUCTION

Professional education in the built environment professions—planning, architecture, engineering, construction—in developing countries is often modelled on the counterpart education in developed economies. There are several reasons for this, among them the colonial history of many developing countries, which saw these institutions set up by colonial powers to meet colonial needs, and the associated mythology of universal human progress or development, which suggests that all societies must follow the same pathway to becoming "developed."

These professions have been configured to serve the needs of capital, and the middle class in the colonizing countries. This includes tacit assumptions of a specialised division of labour, complex supply chains, large budgets, a skilled trade workforce, relatively wealthy clients with large budgets, and well-developed existing infrastructure making access to sites easy and inexpensive.

In the State of Assam, the case study for this paper, these assumptions do not hold.

This paper shows that infrastructure needs and construction operating environment of emerging economies are substantially different from developed countries. The difference is most extreme in rural and remote parts of developing countries, in which the majority, and often poorest sector, of the population live. Conventional developed world construction management education does not adequately prepare local professionals for the challenges of this task. This analysis suggests fundamental differences in the knowledge need to adequately manage issues such as design for remote logistics and low skill levels, supervision of remote sites, procurement, maximising use of local resources materials and labour, simplified quality assurance, management non-standardised material supply chains, and designing infrastructure for easy local maintenance and repair. New knowledge has been developed to deal with these problems. The paper outlines a process for designing

postgraduate construction management education that is tailored to Assam's development.

LITERATURE REVIEW

The literature provides several critical lenses through which to understand the Assamese context.

Global North, global South

The first of these looks at the bias of the Global North over/against the Global South, in which "geographic locations of nations are broadly identified with levels of industrialization, economic progress, science and technology, standards of living and political-economic power in the global arena" (Guttal, 2016). The risk here is if Australia is taken a model or objective for development, ignoring not just Assam's needs, but also its strengths which might take it in its own unique—and more competitive—direction. An example of a small region that have done this is the Greek domination of global shipping, based on its understanding of the Aegean, and the Netherlands, which now leads the world of flood engineering, based on its history as a country mostly below sea level.

Centre-periphery and dependency

Another important lens is that that of centre-periphery models and dependency theories of development, which analyse locations in relation to hierarchy of central places and countries (Seers, 1981). In this sense, Assam is allocated as peripheral in many ways. First, it is a part of India, once a colony of India. Within India, it is considered largely a tribal state. It has also had a long history of conflict with the Indian centre, which set it up against the state of India. Third, it is geographically isolated by the geographical "gooseneck", and prevented from easy development by the its bisection and flooding by the Brahmaputra, which plays havoc with normal infrastructure planning, requiring elevated roads and very long bridges, both threatened with constant erosion. Though these can be considered as threats, they are also potential sources of competitive advantage, if engineering education focuses on dealing with the specifics of Assam, rather than a generic Eurocentric education in which it will be forever geographically disadvantaged, and historically consigned to playing catch-up.

Postcoloniality

The third lens is theories of postcoloniality, which sees these relationships as the after-effects of the colonial era: not just in terms of the divisions North and South, but in the status of cities which live off but hardly contribute to the countryside (Choudhury, 2016.)

The current movement in South Africa to "decolonise the university" is most relevant (Heleta, 2016). Le Grange (2016) argues that the colonial structures of both the university and its curriculum is long overdue, and at this stage needs to focus not on a set of answers, but on new questions. To define what decolonisation means, Mgqwashu (2016), importantly, suggests seeing it as the "educational experience": "Educational experience implies more than just the topics covered in a course. It encompasses the attitudes, values, dispositions and world views that get learned, un-learned, re-learned, re-formed, deconstructed and reconstructed while studying towards a degree." Sharma-Brymer (2016) analyse the tension between the function of the university as producer of a workforce trained for industrialisation (which we might read as proxy for the city) and a more nuanced education, which allows a reflection on self and society.

Urban normativity

The fourth lens here is urban normativity, which privileges urban development over rural, and urban culture over rural culture, and the products of the urban economy over the rural. Though agglomeration economics tends to suggest that cities the will tend to have inbuilt economic advantage related to their internal connectivity, agglomeration can lead to an ecologic disadvantage, due to a dependence on transport for food and materials supply, and the concentrations of waste that urbanity creates. Related to this fourth lens is concept of "world cities in a world-system", which theorises that cities increasingly trade more with each other; that wealth is generated in world cities, and that cities are disconnected from their hinterlands (Knox and Taylor, 1995). This last suggests that cities no longer serve the countryside, but exist independent of it. This is not the case in material terms, only in an economy in which financial flows are increasingly disconnected from the material flows.

Freire

Within the realm of education, the thinker most clearly tied to questions of marginality is Paolo Freire. Freire sees colonial and capitalist power relationships process enacted out within the traditional education process through what he calls the "banking notion" of education. The banking notion of education imagines the teacher as full of knowledge and the student as empty, and the education process of a filling up of the student with the content already present in the teacher. Freire sees the learning process as primarily a liberating one, in which the teacher and student are both liberated from the confining structures of the past, and in which the teacher both teaches and learns, and the learner both learns and teaches (Freire, 1972).

Power structures

The above lenses help us see an underlying structure: of two parties, one of which is full, the other empty; one of which has, the other has not. The relationship is one of transfer from the one that has, to the one that has not. This implies a power relationship of the full over the empty, and a value relationship of the have over the have not. The supposed situation of Assam is as peripheral, tribal, isolated, and rural, and therefore ever at the have not position. The supposed situation of the University of Melbourne, within the normal view is central, global, connected, and urban—full of knowledge in contrast to Assam's supposed emptiness.

It is this way of thinking that needs to be overcome if Assam is going to have an MCM which serves its interests, rather than a reflection of biased and neo-colonial worldview which serves only to diminish it. And the reason that these larger abstract ideas are important is that it is the underlying metaphors of the production of an MCM for Assam that will determine the outcome of the task of producing it (Schön, 1979; Lakoff and Johnson, 1980).

It is therefore critical that the relationship between the University of Melbourne team and its Assamese counterparts and colleagues not fall into these historical patterns. The objective must be to produce something new, something Assamese. To do so requires a model of research as co-learning, in which both Melbourne and Assam learn something new of transformational value.

RESEARCH METHOD

The methodology for this paper has been developed in the context of the Assam Project, a three-year research project between the State of Assam, India, and the University of Melbourne, Australia. The general methodology is as follows:

- 1 *Problem identification:* Identify a problem in the State of Assam within the scope of the Project.
- 2 *Solutions search:* Carry out a global search, informed by a theory lens, for implemented examples that have the potential to address the problem identified. The search is focused primarily on implemented precedents supported by independent formal evaluations.
- 3 *Integrated design proposal:* Compile elements of these successful precedents into a new model for Assamese conditions, in close collaboration with Assamese counterparts and colleagues to ensure relevance and Assam-centricity.
- 4 *Testing and Prototyping:* Carry out testing of the proposed integrated design. This can range at the low end from user surveys or testing against expert panels, to fully realised field trials.
- 5 *Policy formulation:* Prepare policy proposals for consideration by the relevant agencies of the State of Assam for consideration for roll-out.

This model of inquiry is based on principles of design theory (nowadays sometimes referred to as design thinking), professional design practice, and the program cycle model used in international development project and program design (Brown, 2008; ACFID, 2012).

This paper represents preliminary work on Steps 1 and 2 on the case covered by this paper: the requirement to research and develop a new Master of Construction Management [MCM] to be implemented first at Assam Engineering College, and then other institutions.

The central issue is that of fitness for the Assamese context. All education processes seek to prepare a student for a role in society. If the MCM is properly designed for Assam, then it will be focussed on the kinds of infrastructure work Assam needs for its development.

In this paper, this issue is address first via overarching questions of how to move from an unreflective Eurocentric professional education towards a more considered and targeted Assam-centric professional construction education with two objectives for MCM education:

- it serves all the population, including the rural (87% at as of the 2011 census), not just the urban (13%).
- it serves Assam's construction needs, not generic needs assumed from a different economic, geographic and developmental context.

Failure to achieve the first objective will bias the construction management profession against service of most the population. Failure to achieve the second will create a mismatch between labour force and development needs, as well as preparing—unwittingly—a labour force for complex urban economies in other parts of India, or overseas.

RESULTS AND DISCUSSION

The centrality of construction management

Within this context above, construction management plays a special role, because construction management is concerned with the transformation of designs into physical reality. One might imagine that construction management is just one amongst many equal disciplines, it is construction manager that controls the efficiency and quality of the use of materials, and through which flows the design knowledge produced by the other disciplines.

Furthermore, good infrastructure is critical to the good functioning of the whole of the economy. No industry, even knowledge industries, can do well without transport, buildings, power, water, telecommunications, the management of overland flows, or well-housed, nourished, rested, educated, health and happy workforce, each dimension of requires its own infrastructure. Infrastructure is the operating environment of the economy. Again: without good construction management, infrastructure does not come into being. And if we think of construction management as part of an overall built environment lifecycle, it encompasses maintenance, upgrading, change and disposal of infrastructure.

By applying the theoretical lenses, we can see that to be an effective construction manager in Assam is not the same as being an effective construction manager in Melbourne. It is not a scaled-down version of a construction management in Melbourne, but requires an equally important—perhaps more difficult—professional set of skills. If a CM in Melbourne needs concrete, he can pick up computer and order a load, and it will be there on time and to spec, without further thought, effort or knowledge on his part. In most of Assam, creating concrete requires finding and excavating suitable aggregate, cleaning and grading it, transporting and storing cement, and then ensuring that it is mixed, poured, vibrated, finished and cured by a workforce of largely unskilled people. This is a completely different set of skills. That same remote Assamese construction manager may know nothing about crane lifting safety protocols—but will likely never see a tower crane.

The following table shows the differences in construction between Assam and Melbourne, and is typical of the extreme differences in context between the periphery and the centre, the country and the city.

Table 1: Differences in construction contexts

<i>Variable</i>	<i>Australia</i>	<i>Remote Rural Assam</i>
Works	Complex	Simple
Geographical spread	Compact	Distributed
Supervision travel	Short	Time-consuming
Materials Logistics	Easy	Difficult
Contractor capitalisation and management	Adequate	Fragile
Labour	Skilled and specialised	Unskilled and unspecialised
Supply chain reliability	Well-developed	Often non-existent
Beneficiary populations	Wealthy, educated	Poor, semi-literate
Interest in local work opportunities	Low	High
Access to services	Easy	None
Weather	Benign	Sometimes severe
Disaster frequency	Rare	Annual flood

The question: how to produce an MCM which is tailored to Assam, its peoples, and its interests. Following the methodology defined above, this comes in five parts, of which we deal with only the first two.

The first is the identification of the challenges that Assam faces, and the constructional needs of its people. These will determine what kind of construction manager is needed—to produce what works, and under what conditions. As noted before in the examples of Greece and The Netherlands: challenges tend to produce strengths. The table above makes a start towards identifying the challenges, but there is still work to be done with our Assamese counterparts and colleagues, because the answers are not only to be defined by them as a matter of practicality, but as a matter of right: to define needs and strengths that defines the future of CM education.

The second part, coming from our methodology above, is to sources and analyse potentially useful precedents from other parts of the world. A precedent has two uses:

- First as a case study, from which can be drawn lessons for an Assam-centric solution
- Second, by being contrary to the established norms, providing evidence that Assam is not required to adopt or follow Eurocentric norms, unless Assamese context and interests make it logical to do so. The norms are so commonplace that they become tacit assumptions. Counter-examples deconstruct those assumptions.

Preliminary research so far has revealed the following possibly useful examples. They fall into three categories: pedagogical, conceptual, and institutional:

Towards a new set of exemplars

The first two examples are pedagogical, looking at new ways of considering education aimed at rural life.

1 *The Rural Studio*

The Rural Studio is an acclaimed architectural educational program at the School of Architecture, Planning and Landscape Architecture at Auburn University in Alabama, one of the more rural states in the United States. It was founded in 1993 by Samuel Mockbee, and has been run continuously ever since. (Ruralstudio.org, 2017)

"The Rural Studio is a design-build architecture studio run by Auburn University. It aims to teach students about the social responsibilities of the profession of architecture while also providing safe, well-constructed and inspirational homes and buildings for poor communities in rural west Alabama, part of the so-called "Black Belt" (En.wikipedia.org, 2017).

Not only does the Studio orient students towards problems in their own State, but through its methodology it provides a tacit curriculum which teaches students to combine design and construction, and to look for projects among the rural poor.

2 *Rural Engineering*

Urban engineering assumes complex projects with high levels of specialisation. Rural engineering is a topic of study at many tertiary institutions which breaks this pattern, by combining all forms of engineering that are useful in one context: rural. Graduates of these courses become rural engineers, with their own associations, professional development, and awards for excellence. They are not defined by mechanical, electrical, structural or civil, but by where they work.

The structure of rural engineering education holds promise for lessons in how to develop construction managers who are useful in rural Assam.

The next two examples are conceptual: they provide total frameworks for conceiving in the first place the act of designing and constructing built works, and in the second a "clean slate" to the creation of a learning environment.

3 *Critical regionalism*

Critical regionalism is an approach to architecture—and through architecture to other forms of infrastructure—which takes it as given that architecture and construction are not universal, as is often presupposed in the culture of modernity. Each has to be fitted to local place, culture and resources (Frampton, 1983).

Critical regionalism starts with looking at the built environment and production practices of a region to date, and applies a critical approach to improve those practices piecemeal, while retaining what works well. Most countries

in the world today, in all regions, have some form of critical regionalism (whether it's called that or not) at work in the production of the built environment.

Critical regionalism—and its practitioners in developing countries—provide an encyclopaedic source for adapting design and construction practices to a local region, building on its strengths and developing its local economy.

4 *New Designs for Learning*

The New Designs for Learning is a research program in the United States led by Dr George Copa, and funded by the Federal Government. The New Designs methodology has been applied to both secondary and tertiary institutions, and began with the observation that the American high school has little changed since its invention over a hundred years ago, aimed at turning migrant children into effective factory workers.

The workplace today is very different for the Fordist plants of the time, and yet the high school remains similar in its structure, incorporating many of Fordist principles in the way it teaches: it assigns students individual workstations, gives them standardised assignments, and grades their output. Yet in a modern knowledge workplace, people work in multidisciplinary teams, on problems with no known answers, and their success depends upon the ability to convince others of their solutions.

The New Designs methodology starts with the key educational stakeholders—parents, teachers, industry. From them, it identifies educational outcomes tuned to the current day, then the educational processes needed to deliver those outcomes, and then the educational

The final two exemplars look at what kind of institutional support an MCM might need.

5 *The International Centre of Theoretical Physics in Trieste*

The centre was founded in 1964 by Pakistani Nobel Laureate Abdus Salam. It grew out of his experience as a graduate in physics returning to his home country, and finding that his sponsor—the government at the time—had no idea of what physics was, and were unable to assign him a place in which he could practice his trade. He was forced therefore to move to the UK, which he

considered unfortunate. He wanted to stay and contribute to his home country.

Salaam set up the ICTP so that scholars from developing countries could take breaks from their home environments, meet others like themselves, as well as physicists from the global North. Significantly, the Center is located in a rural setting in Italy, outside of Trieste. Today, the ICTP has a branch in Brazil, and publishes the African Journal of Physics.

What's significant about the ICTP is it recognises the challenges faced by scholars and professionals in the global South, and to providing a facility oriented towards those challenges. It also is significant in being an example of what is called 'South-South dialogue': countries of the global South seeking to learn from each other, instead of from the global North.

These last two attributes may be useful in the design of the institutional framework for the MCM: that it seek lessons from the global South, and that as an education program it provides ongoing opportunities for graduates to stay in Assam, and work in the most difficult parts of the state.

6 *Mawlynnong* (Indiatoday.intoday.in, 2017)

In thinking about institutions, it's natural to think about formal urban institutions. But the most important institution in India today is the village, which still provides home and livelihoods for some 80% of the India's population. What's extraordinary about the village of Mawlynnong is two-fold:

- It has transformed itself into the self-called "cleanest village in India". This involved not just new social processes and behaviour changes, but infrastructure which was itself clean and cleanable: well-built and finished.
- In so doing, it has put itself on the global map, and thus on the tourist map, thus generating additional income for itself.

Mawlynnong demonstrates two principles discussed in this paper. First, they addressed local needs through infrastructure. Second, in so doing they became more

than just another village in India: they became themselves a globally renowned example of village development. Finally, it has done so in a way that is economically rewarding.

Finally, Mawlynnong provides this key lesson to educated, urban professionals: never underestimate what a village can do.

These examples, and more, will require in depth study to yield reliable lessons for potential application to Assam. Even at this stage, however, they demonstrate the kinds of possibilities that are covered over and unseen with the lens of the conventional North-South paradigm.

CONCLUSIONS

This paper has discussed the ways in which Assam—because of its rurality, its river, its geographical isolation, its plurality of its colonial history, and its resistance to absorption into the Indian polity—is in many ways a paradigmatic case of marginality within the global and national power structures at work in the world today. These power structures are not simply external, but colonise our ways of thinking about the world, and endanger a project such as this one if we allow them to lead us to unreflectively recreate them in the way in which we design future education programs, such as the MCM for Assam.

Approaching a collaboration between an institution in Melbourne and its counterparts and colleagues in Assam requires an awareness of these background power structures in the way in which they inform thought, and hence the production of a Master of Construction Management.

The hold that historical forms of thinking about the relationship between the global North and South can be loosened by adopting a Freirean stance not just to the content of the MCM, but to the relationship of the various producers: as co-learners.

It can also be loosened by examining successful exemplars from around the world which show that the relationship between North and South, centre and periphery, and city and country are not cast in stone nor determined by nature. These relationships were created by human beings, and as such they can be re-created by human beings in a different mould.

Finally, Assam might look at the current movement in South Africa to "decolonise the university". The movement see the structure of the modern South African university curriculum as an historical residue of colonialism, and thus still oriented towards sustaining those in power, rather than empowering the poor.

Future work will involve completing the cycle of the methodology through close engagement between researchers at Melbourne, and civil servants, researchers, practitioners and communities in Assam. It will also involve finding other exemplars, analysing them, and distilling lessons thus learned into a uniquely Assamese Master of Construction Management.

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