BEYOND PROCESS PROTOCOL: A REVIEW OF THE GENERIC DESIGN AND CONSTRUCTION PROCESS PROTOCOL TO EXPLORE FUTURE WORK

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ABSTRACT: The Generic Design and Construction Process Protocol (GDCPP) developed in 1998 represented a significant challenge to the traditional way in which design, construction and procurement activities were undertaken by enabling project participants to collaborate more closely and less confrontationally. It has since evolved to include more detailed deconstruction of processes and sub-processes, and the creation of a toolkit to facilitate industrial implementation. Albeit its breakthrough, the appropriateness of having a generic protocol has been questioned by skeptics. This paper revisits the GDCPP, addresses some of the concerns raised and explores potential future work on the protocol. Four preliminary conclusions are highlighted in this paper, namely refining the protocol to suit various genera of client organizations in the industry, the need for integrating the ‘technicians’ throughout the process protocol, investigation of skills and competence requirements, as well as experience capture, and the use of the process protocol towards process management.

Keywords - Generic Design and Construction Process Protocol (GDCPP), Integration, Process Management, Skills and Competence

1. INTRODUCTION

The sub-optimal performance of the UK construction industry is well documented in a plethora of governmental and institutional reports, particularly in the aftermath of the recession in the 1990s with the much-quoted Latham (1994) and Egan (1998) reports. Despite these reports, the reasons cited remains unchanged over the last fifty years, and is often attributed to the fragmented nature of the industry that brings about an adversarial working climate resulting in poor coordination and communication that eventually erodes the value to the construction client. All hope is not lost, though, for the last decade saw the drive towards improvement initiatives, many of which were transferred from a relatively successful manufacturing industry. Examples include partnering, benchmarking and process thinking. These examples are all embodied within a concept known as the Generic Design and Construction Process Protocol (GDCPP) (http://pp2 dct.salford.ac.uk) produced to significantly challenge the traditional way in which design, construction and procurement activities were undertaken.

Work on the GDCPP began in 1995, as an EPSRC funded project under the Innovative Manufacturing Initiative (IMI), at the University of Salford, together with seven industrial partners, based on the belief that “if everybody involved in a project can work to an agreed set of processes and procedures, then we will not only be more efficient, but we will be in a much better position to meet the client’s business needs (Kagioglou et. al., 1998)”. Using manufacturing principles as a reference point, a framework of common definitions, documents and procedures were developed to help construction project participants work together seamlessly. The design and construction process was mapped into eight sub-processes known as Activity Zones on the vertical axis (e.g. project management, design management, health and safety, statutory and legal management); and four broad stages on the horizontal axis (as in Pre-Project, Pre-Construction, Construction and Post-Construction),
which is further broken down into ten phases (e.g. outline feasibility, full conceptual design, construction, operation and maintenance).

The GDCPP was heralded by the industrial partners as one of the ways forward to integrating various project participants to collaborate more closely and in a less confrontational manner, based on “a common set of definitions, documentation and procedures” that form the framework of the GDCPP (Kagioglou et al., 1998). Kagioglou et al. further explained that the GDCPP “in its generic form, allows the objective comparison of projects, providing the basis for both company and industry knowledge database development” and stressed that the philosophies of the protocol could be adopted such that the processes are adaptable and customizable to suit organizational needs and working practices. The GDCPP offered a panacea to the many ills faced by the industry for this approach worked on “a new process paradigm, which can be managed and reviewed across the breadth and depth of the industry and which focuses on changing and systematizing the strategic management of the potentially common management processes in construction whilst accommodating the fragmentary production idiosyncrasies (Kagioglou et al., 2000)”.

To put simply, the focus in research has shifted towards understanding and tackling common work processes, rather than on the product.

Since its inception in 1995, the GDCPP has evolved from an ostensibly high level process framework into subsidiary sub-process maps that deconstructs the processes in level 1 into subsidiary sub-process maps in level 2, which can be further broken down to more detailed activities (see figure 1 below). Additionally, an IT toolkit has been developed to facilitate organizational adoption and implementation of the GDCPP [Lee et al. (2000) and Wu et al. (2000)]. It is, however, not the intention of this paper to dwell too much into the mechanics of the protocol, which is succinctly summarized in Kagioglou et al. (2000). Rather, this paper aims to revisit the work done on the GDCPP and identify the prospects for future development.

![Process Levels](Source: Wu et al. (2000))

2. A UNIVERSAL PANACEA FOR THE CONSTRUCTION INDUSTRY?

It is widely acknowledged that process mapping provides an invaluable tool for improving business performance, as Biazzo (2000) suggests “it can play an important role in helping to understand the structural dimensions of work flows so that evaluations of both efficiency and effectiveness can be carried out and direction given to redesign activities”. However, one of the initial questions that this paper wishes to address is whether the GDCPP can really be applied to the entire construction sector.
There are a number of commentators who suggest this is not possible. Winch and Carr (2001), whilst seeing the value of viewing building as a process and agreeing that a more widely shared perspective presumably at an industry level is needed, criticized the GDCPP for its naivety of the “realities of process-based competition”. Their argument is centred around the view that “in industries like construction, where firms do not possess strategic assets… process capabilities are all they can offer clients” led to their proposition that “if these processes become common between firms through a generic process protocol, then their ability to compete with each other is further diminished, leading to even lower levels of profitability”. Instead of having a generic protocol, they asserted that “every construction firm, to be successful, needs to offer clients a different process from its competitors”. However, it is felt that despite the term generic used in GDCPP, the process protocol allows for such differentiation, as it was earlier explained that the GDCPP could offer a customizable platform for analyzing business processes. Perhaps their strong opposition stems from their terminology used in understanding process maps where they contrast from the onset the distinction between true maps and protocols. What needs to be clarified here is that the GDCPP is not set out to emphasise the distinction between the two, but rather treats the two as complementary, for to create the process protocol, one would first need to understand what actually goes on in its current state (true map) before establishing what ought to happen (protocol).

It is firmly our belief that the adoption and implementation of a generic process protocol such as the GDCPP is still highly possible, albeit the need for further investigation. It is here that Groák (2000) might offer some form of encouragement, for although he reiterated that “we cannot yet properly represent some of the most common aspects of the building process” and was “increasingly convinced that the process (in construction) is more unique than the product… we are on the brink of a major qualitative shift in the capability to represent construction processes” and lends some moral support by suggesting that “it will be another five years before we have something worthwhile”. Furthermore, to support the counter-argument that the GDCPP does not erode competition, Ball et. al. (2000) concluded that “construction is a highly competitive industry, where sub markets can be entered, ‘raided’ or left with relative ease” and that while innovation in the organization and management of production can be quickly picked up by competitors (for which the GDCPP presents such an innovation), competition between construction firms can still be achieved through the innovation of products and they cited as examples in terms of materials and plant producers, supply and fixing of proprietary building materials, reputation and brand name, and the recruitment and retention of a skilled workforce.

So, can we have a process protocol that serves a one-for-all purpose? A possible answer lies in Winch and Carr’s (2001) very comparison between the GDCPP and the RIBA Plan of Work. They supported their concerns of developing and adopting a generic protocol by stating “the experience with the RIBA Plan of Work over the 35 years since its first publication in 1964 is not encouraging” and mentioned that although “its intention was to provide a model procedure for the methodological working of the design team”, the experience has proven that clients and others have routinely flouted the procedure by introducing changes where it is explicitly warned against. However, while the RIBA Plan of Work may pose as a disheartening predecessor, one probable explanation for its perceived failure could be the changing role of the architect in design teams. The RIBA Plan of Work was first published when architects tended to have a lead role in managing construction projects. This role is now questionable as it evolves with new procurement routes, e.g. design and build where the power shift is formally transferred to the contractor who directly employs the architect. Moore and Dainty (2001), in exploring the efficacy of the design and build process in a UK context discovered that “an integrated project culture had failed to develop,
and that roles and responsibilities had continued to be maintained as if under a traditional procurement system”. This misalignment points to the need to ‘re-educate’ architects to help them fit into their new roles under non-traditional procurement arrangements. However, although change in attitudes is much needed, it can surely be argued that say, in design and build arrangements, change would not be sufficiently filtered down should the RIBA Plan of Work be adopted, for architects would clearly retain a lead role by being involved in stage A of the plan (appraisal identification of client’s requirements) and contractors accordingly appointed in stage J (Mobilisation) (http://www.ribafind.org/plan.asp).

The example on the role of architects and the RIBA Plan of Work is yet another example of a problem that many construction management researchers often find baffling – the fragmented nature of the industry, and also the workforce and in this instance, the professions. However, the Brown (1968) report provides an indication that focusing on eradicating fragmentation may be a lost cause for the report affirmed that “the structure of the building industry is a product of the market it serves” and deemed “the criticisms ranged at the fragmented nature of the industry arise from a lack of understanding of its function”. In other words, fragmentation should not be viewed as the cause of the problems, but that we should understand, and even accommodate, fragmentation. This is, in fact, one of the intrinsic characteristics of the GDCPP – the potential to accommodate fragmentary production idiosyncrasies. Besides, the GDCPP, as stated earlier, begins with the mapping out of high level processes, principally driven through a top down approach from the clients and their organizations, thus addressing the issues of the market and not the structure of the industry.

One might then ask about the appropriateness of calling the process protocol generic. Indeed, the guide to the GDCPP highlights that “the process protocol is the result of collaboration between a number of like-minded organizations from various disciplines within the construction industry” (Kagioglou et. al., 1998). The breakthrough, at that time, was considered to be representative of the industry, given the spread of activities of the collaborators. Nonetheless, given the critique offered by observers above, it is now timely to revisit the process protocol and see if the GDCPP is indeed generic. It should be noted, however, that the definition of generic, according to the Oxford Dictionary (1994), refers to “the characteristic of genus (which is a group… with common structural characteristics)”. So, it is suspected that, just as we now have architects working under different procurement arrangements (and we have argued that the RIBA Plan of Work needs to be reviewed), there are, undoubtedly, different types of clients within the construction industry, whether it be public sector and private sector, or major clients who may be experienced buyers of construction products and smaller clients who may simply be a one-off client. It is therefore proposed that the GDCPP should be further investigated to see its adaptation to suit the various genera of clients within the construction industry.

3. AREAS OF IMPROVEMENT

Moving away from the discussion of its appropriateness, this paper also hopes to address the current GDCPP and seek areas of improvement, with a view of facilitating industrial implementation. Three issues, namely integration, skills and competence and towards process management have been identified, which will be further elaborated within this section.
3.1 Integration

Biazzo (2000) claimed that “one of the reasons why business process change is not successful lies in the fact that process designs pay insufficient attention to the social context of work” and recommended “critical evaluation of organizational practice (that) is closely linked to the ability to represent and understand actions and sequences of actions”. Cotoia and Johnson (2001) contend that while “process mapping techniques… illustrate visually the relationships between the activities and resources… relationships between process steps may be difficult to visualize in a new process (for) such techniques may encourage users to focus on the way the existing process is operationalised rather than developing a less detailed, conceptual understanding of the new process”. The latter argument mirrors that of the continued behaviour of architects under non-traditional procurement arrangements discussed above. Nevertheless, it is a major cause of concern for proponents of the process protocol, since its fundamental aim is to bring about process improvements, but the views presented by Biazzo and Cotoia and Johnson show that such inhibitors towards bringing about change as the lack of integration of participants at an operational level, so as to achieve improvements, exist.

The irony, of course, is that process protocols such as the GDCPP was intended to integrate project participants right across client and consultant organizations and the supply chain, and yet there is a risk that such protocols might not be ‘bought into’ by the very people who are supposed to execute the change. There are two possible reasons for this phenomenon. First, process protocols are principally developed using a top-down approach (Anjard, 1998), and we have established earlier that the GDCPP works on this basis, with a tendency for the client to take lead. Moreover, the GDCPP specifically emphasizes on the front end of the process (eight out of the ten phases of the GDCPP is concerned with the design and planning of the project with construction, and operation and maintenance of the project allocated to the final two phases). Although it is common knowledge and laudable to give more thought to the design and planning phases of the project, since the feasibility and scope for change is highest during this time, Fisher (2002), in his article on the implementation of business systems on the workforce, revealed that “a lot of initiatives fail because they are just front-end systems”. The second possible reason, which will be further explored in the next sub-section, relates to the lack of knowledge with regards adopting a new process for improvements.

So, what can be done to enhance the protocol in terms of integrating participants at the operational level? Fleming and Koppelman (1996) looked at the integration of project development teams and found that “membership on a project team requires cooperation from each member, and respect for other functions represented on the team”. What was also interestingly highlighted in their analysis was that although “the use of technical people to head the project teams during the early phases of projects makes good sense… certain of these technical team leaders are not prepared for management assignments”. This seems to reinforce the corollary that the best managers would always strive to seek the expertise of technicians, but never conversely. Fleming and Koppelman, however, do not provide evidence of the extent to which technical people are used to head project teams, or even an indication as to whether those managing project teams, whether or not from a technical background, do consult the technical expertise available. Nevertheless, a number of lessons can potentially be drawn from this study of project teams to our pursuit for integration of project participants within the process protocol.

Cooperation from all participants is required for the successful implementation of the process protocol to enable a successful change management to occur so as to achieve improvements.
What is more important is that participants should not only cooperate, but also understand how their function fits into the wider process protocol, and how others function within the same framework.

It is expected that there would be potential benefits to be accrued by feeding forward the expertise from the ‘technicians’ throughout the process to ensure a rich and complete front-end design and planning phase (phases 0 to 7 in the GDCPP).

One might question the need for the above propositions and claim that employees at the operational level, i.e. lower the chain of command, might not require or even want to understand the mechanics of the entire process. However, apart from the case put forward by Biazzo and Cotoia and Johnson above, Berg (1999) (cf. Pérrotin and Robinson, 2000) showed that “human resource policies that encourage worker involvement aim at providing employees with opportunities to have an input in decisions, incentives to expend discretionary effort and the means to acquire the appropriate skills”. Pérrotin and Robinson then claimed that participation schemes (in terms of the control of the organization) affect both opportunities and incentives and could result in improvement in work organization and information flows, leading to increased efficiency and productivity. It is therefore proposed that further exploration into the perceived need and desire for the ‘technicians’ throughout the process to get involved in the understanding and even formation of the process protocol is required. This could be achieved by first extracting from the ‘technicians’ an insight as to how and what they perceive the process issues to be, which should then lead to a better understanding as to how better involvement from the ‘technicians’, i.e. the bottom up approach, could be incorporated within the existing principle of the GDCPP, in the hope of achieving process improvements.

3.2 Skills and Competence

Groák (2000) commented that “we cannot forecast all the major problems and issues… we do, however, know something about the tools we shall have to hand with which to confront those problems: ‘more brain, less brawn’, the principle of Archimedes’ lever”. This statement perhaps paints a fairly accurate picture of where the workforce is today, although it is perhaps more brawn and less brain, with tools dictating to workers what ought to be done without the workers having to think through the process. Particularly with the introduction of Information Technology (IT), the workplace of today is flooded with far too many tools (the GDCPP again presents one more tool) to help deal with issues of work. Wrennall (1999) lamented “many organizations are awash with information, or its precursor, data, but have not internalized it or converted it into knowledge. Worse still they have ignored what they know… lack of knowledge is common. Organizations do not know what they know and worse still, do not know what they do not know”.

Drawing attention back to figure 1 on the three levels of the GDCPP, an exemplar of its application to phase 0 of the process protocol: demonstrating the need is depicted in figure 2 overleaf. From this example, it is evident that ‘what needs to be done’ is clearly an explicit output of the process protocol. However, while this may be useful, as mentioned briefly above, in terms of identifying for the participant the task(s) at hand, it does very little to address how it should be done. There seems to be a presumption that the participants enacting on the process protocol would have the relevant skills needed to achieve the deliverables. Consider the common metaphor of a road map. Although a road map serves its purpose in informing a driver or pedestrian how to reach point B from point A, it does very little to check if the driver possesses a driving license in the first place, or if the driver/pedestrian knows how to interpret the map or even if the pedestrian has the knowledge about proper
road safety when walking. This simple analogy indicates the potential danger of the presupposition of the level of skills, which would have unquestionably negative or even fatal consequences. It is therefore argued that the process protocol affords very little in terms of tackling the level of skills requirements of the participants for its effective implementation. This argument could also be extended to offer a likely explanation as to why participants might revert back to old operational ways of working, rather than conceptualise a new method of thinking to yield process improvements.

In an experiential industry such as construction, the failure to address skills and competence could potentially lead to repeatedly learning the wrong things, a case of the blind leading the blind. Chatzoglou and Macaulay (1997) supports this by pointing that “there is a common misconception that generally, as people gain experience in an activity, they always tend to make fewer errors” and noted that “the proportion of errors will remain fairly constant, but the speed with which the activity is performed will increase with practice”. The current body of knowledge where experience and the learning curve is concerned, with regards the study of processes, is rather sporadic. The GDCPP has a built-in legacy archive, that can potentially be a valuable knowledge management tool and so, it is proposed that further investigation into experience and the learning curve is needed. Additionally, it would be worthwhile to build within the GDCPP a skills map that studies the ‘as-is’ and ‘as-to-be’ skills and competence requirements so as to address the current inadequacy of the process protocol highlighted in this sub-section.

![Figure 2. An example of the application of the process levels](http://pp2.dct.salford.ac.uk/processmaps.htm)

3.3 Towards Process Management: a Shift of Power to Contractors

Brown et. al. (2002) believed that “the key to achievement… is the way companies manage processes, not how they structure and monitor outsourcing contracts or implement new Internet technologies in their supply chains”. The clarity of their message borne by the title of their article came as they coined the term ‘process orchestrators’. In the article, they broadly categorized the management of processes into tightly managed and loosely coupled. They
claimed that “today’s broad preference for the tight management of relations with partners carries an inevitable corollary: cutting the number of suppliers to a minimum”. They explained that this was sensible considering the level of effort needed in managing relationships tightly. They identified that under the tightly managed arrangement, enormous amounts of resources are required to manage the negotiations of partners, preparation of detailed contracts and the extensive monitoring of performance. Loosely coupled process management, in contrast, could involve countless number of specialized partners. They quoted an example from a clothing and textile trading company in Hong Kong, who has relationships with more than 6,000 specialised companies across 39 countries. This, according to them, allowed the trading company the flexibility in terms of choosing a supplier dependent on market conditions and more importantly the degree of specialism of the partner companies. They observed that under this arrangement, it would not be feasible to negotiate well-defined activities with each partner (as in the case of a tightly managed situation), but rather implied that the management of processes would involve the managing of each specialist’s activity and orchestrating the entire process.

Although the example cited by Brown et al. relates to the manufacturing industry, there could be lessons to be learnt by the construction industry and the use of the process protocol. It is proposed that the process protocol should not only be implemented as a tool for analyzing business processes, but progress to become a tool for the management of processes. It is felt that organizations that currently adopt the GDCPP do so with a view of tightly managing processes so as to maintain control. This can be ascribed to the fact that the GDCPP is very much client-led and therefore project participants, seen as actors within the protocol, are rigid as there is a tendency of pre-selecting participants along the linear course of the protocol.

Achieving Brown’s et. al. desire for loosely coupled process management networks would be extremely difficult (given a drastic need for cultural change), but not impossible. Consider for example, Ball’s et. al. (2000) emphasis that “the modern British construction firm has only limited plant and equipment (most is hired) and employ relatively few manual workers directly… for most construction projects the construction firm is not the main contractor but the construction manager… alternatively, when they are the main contractor, as in design and build schemes, in practice often they will be only the project and construction manager, subcontracting most of the design and execution tasks”. This suggests that the condition for flexibility in terms of choice of partner organizations is already met. However, in order to utilize the process protocol as a process management tool calls for radical thinking in terms of partnering arrangements. Instead of having the protocol client-led, it is proposed that the feasibility of having it contractor-led, with the client as a fixed ‘supplier’ of information, be investigated.

4. CONCLUSIONS

In conclusion, this paper is a research position paper, rather than a research paper reporting on actual research being undertaken. A brief overview of the development of the GDCPP was given at the onset before discussing some of the concerns raised by skeptics with regards the appropriateness of a generic protocol. It was proposed that the implementation of a generic protocol is highly feasible, although it would probably take the form of a number of generic protocols to suit genera of client organizations. Other gaps were also highlighted in this paper, which includes the need for integrating the employees at the operational level into the protocol, skills and competence, and a move towards the use of the protocol as a process management tool for contractors (see figure 3 below), signaling the path for future research.
5. REFERENCES


Latham, M (1994) *Constructing the team*. H.M.S.O.


