RE-DESIGNING PROJECT MANAGEMENT: STEPS TOWARDS A PROJECT MANAGEMENT CURRICULUM FOR A SUSTAINABLE BUILT ENVIRONMENT

PAPER REFERENCE NO: _____AO18_____

Sustainability concerns add a wide range of both stakeholders and performance expectations to building projects. The transition of a circular economy will also have a significant impact on the way in which building projects are carried out. This in addition to an already established escalation of stakeholder involvement and performance expectations. Even simple projects are acquiring a substantial degree of complexity. Taken together these factors (and others) suggest that we need to move beyond classic project management to an alternative approach to project management education which prioritizes outputs over outcomes (Morris, 2013b), placing the emphasis on project sponsors business strategies, and the social and environmental ambitions, and focussing on the early stages, the social aspects, and the problems solving activity of project management. The scope of this paper is to propose a framework for an alternative approach to project management education for built environment professionals. The framework will make use of principles of Practical Pluralism, Project Management as Design, Project Management Design Cycle. The intention of the framework is to facilitate graduate project managers is making use of the wide range of recent project management scholarship.

Keywords: sustainable project management, project management education.

INTRODUCTION

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The scope of this paper is to propose a framework for an alternative approach to project management education for built environment professionals. The framework will make use of principles of Practical Pluralism, Project Management as Design, Project Management Design Cycle. The intention of the framework is to facilitate graduate project managers is making use of the wide range of recent project management scholarship.

SUSTAINABILITY AND CIRCULAR ECONOMY CHANGE EVERYTHING

Sustainability, and the transition to a circular economy will add additional layers of both performance expectations and project complexity. The successful determination and implementation of the appropriate sustainability measures requires close cooperation with stakeholders throughout the project in order to maintain a "willing-ness-to-pay" (Kaatz, 2005), and to ensure that sustainability measures survive the inevitable cycles of cost cutting through which most building projects pass (Doorn, 2012). The transition to a circular economy will require that new business plans are developed, often transgressing what we now conceive of as the boundaries of the project. Further the gradual adoption of CE will mean that the business practices in the built environment continue to change radically for the foreseeable future.

The implementation of existing and the development of new sustainability technologies also requires a close multi-disciplinary collaboration between project members (Robichaud, 2010). Such collaboration requires that the project team develop shares conceptual frameworks reference which will facilitate the development and maintenance of the project mission, and make possible the translation of this mission into inter-related courses of action for each project member. (Kaatz, 2005). Without this projects are likely to revert to the competitive and self-interested behaviour that is already a common problem in building projects (Groák, 1992).

All of these issues lie outside the Iron Triangle of cost, quality, and time. These are not issues of efficiency, but rather issues of holding together a team, in a productive relationship with it's context, and maintaining focus on the mission while overcoming the inevitable difficulties which occur along the way.

MOVING BEYOND CLASSIC PROJECT MANAGEMENT

Recent research has shown that despite the application of project management techniques and practices, many projects underperform, failing to deliver the original objectives of the project while running over budget and over time. Attempts to identify the factors leading to project failure have generally drawn attention to early stage factors such as "unclear success criteria, changing sponsor strategy, poor project definition, technology (the fascination with, uncertainty of, and design management), concurrency, poor quality assurance, poor linkage with sales and marketing, inappropriate contracting strategy, unsupportive political environment, lack of top management support, inflation, funding difficulties, poor control, inadequate manpower, and adverse geophysical conditions)." (Morris, 2013a) While this is presented as a critique of Classical Project Management, one might also see it as a measure of the success. The classical tool set has proved itself capable of addressing issues of coordination, planning and cost control, thus exposing the more complex social issues typically associated with the early and pre- project phases. Issues of program and process management. Many of these factors not only lie outside the

conventionally determined time boundaries of projects. Further, many are not addressed by measures addressing issues of control and efficiency.

These findings are reflected in a shift in focus within project management research. For more than 10 years researchers have been rethinking of project management (Cicmil, 2006; Winter, 2006; Svejvig, 2015), reconstructing project management (Morris, 1994; Morris, 2013a; Morris, 2013b), making projects critical (Hodgson, 2006), making projects Scandinavian (Sahlin-Andersson, 2002; Lundin, 1995; Packendorff, 1995), and recasting projects as practices (Blomquist, 2010). This work has been motivated by the widely shared belief that project management theory is not adequate to the task of helping projects managers carry out their work (Koskela, 2002). All of the above authors find that what is variously called classical -, main stream -, systems -, or type 1 - project management is too limited in perspective, and does not capture or address many of the most important issues or problems facing project managers. In general all of the new approaches make a "social turn", acknowledging projects as primarily social phenomena and apply a variety of theories and methodologies drawn from social science to the study of projects. Other turns have taken place as well, such as the practice turn, and a complexity turn (Cooke-Davies, 2008). In addition, many scholars have shifted from an engineering perspective to a 'critical' perspective (Cicmil, 2006) seeking not so much to propose improvements to project management tools, but to challenge beliefs, theories, and "bodies of knowledge" about projects and how they are managed. This has led to a large body of research rich with new insights and observations. However, many of the leaders of these movements have also come to the conclusion that as yet little of this research has led to significant advances in project management tools, practice, or education (Svejvig, 2015; Morris, 2013a).

This may, in part be due to the diversity of focus, research methods, theoretical foundations, and findings. Given this diversity, it has not bee possible for authors to present project management as a single coherent body of knowledge or underlying theory. The frequent citation of Koskela and Howell's paper (Koskela, 2002) is a clear enough signal of this. A new approach will be required to present this material in such a way that graduate project managers can draw upon its richness and diversity.

NEED FOR AN ALTERNATIVE PROJECT MANAGEMENT CURRICULUM

Taken together, the emergence of sustainability and circular economy along with the critique of classical project management amount to a call for a new approach to project management education. This alternative approach should, as Morris proposes (Morris, 2013b), focus on the sponsor's strategy and goals. It should also place environmental and social needs central to the practice and understanding of project management. This means that project management must focus on early stages in the project – and even on pre-project stages. The clarification of sponsor strategy, defining objectives, understanding what value means, and developing the scope and the brief are key to the eventual success of projects – as is the choice of contract / project organization form/ and tendering method. These choices can lock in incentives that make it very difficult for a client to see their goals realized through the project.

We further suggest that this alternative curriculum should be built around the notion of project management as problem solving, rather than the acquisition of competence in the use of project management tools. The core of this approach should be a framework which provides project managers the ability to understand the situation in

which they find themselves, and to draw upon the entire repertory of project management research, knowledge and tools to craft an effective course of action.

We have observed that many student interested in the management of design and construction projects gravitate to positions in organizations that are traditionally seen as clients or sponsors, or into organizations which advice them. This has drawn our attention to the need to prepare these young professionals for a project management role outside the classical bounds of the project – acknowledging the existence of a project manager distinct from the construction project manager working for a general contractor. These new project managers are as much concerned with the administration of projects from the client side as with the conduct of projects from the supply side.

Project managers, or professionals describing themselves as project managers can now be found in many roles in building projects, focussing on many different aspects of the project. The tools and insights of classical project management remain important, especially in construction management, but other project managers working for clients, or as consultants, or for consortia will focus on other aspects of the project. Sharing many of the concerns of what is often called program or process management.

Finally, in the present and future dynamic environment, graduate project managers will have to continue to learn throughout their careers. Project managers must be able to use a wide range of approaches to project mamagement (incorporating the latest research) to solve a wide range of problems, and to continue to learn to adapt and improve their skills throughout their careers. The alternative curriculum should emphasis an approach to project management that incorporates learning as a fundamental element.

THE PROJECT DESIGN SCHOOL

The goal of the Project Design School is just this, to draw on this body of research lessons to assemble a ne alternative approach to the education of future project managers, and to prepare materials that can be used for this purpose.

Our intention is to lay the groundwork for the development of just such a new approach to project management education. It is not our intention to reinvent from scratch, but to create a framework which will facilitate project managers to be opportunistic, and eclectic in their approach to project management science, able to take up and apply the insights, tools and techniques that seem likely to be of service in a given situation, to equip them to address unclear problems, and to continue to learn.

At the heart of the Project Design School we propose to place a framework for project management practice. This framework will incorporate several fundamental approaches to project management practice:

- Practical Pluralism
- Project Management as Design
- Project Management Design Cycle

This framework governs the basic approach to how one might act as a project manager, it does not pretend to unify the contemporary understandings of project management into a single theory. Rather, by remaining epistemologically agnostic, it leaves the graduate project manager free to choose from the entire range of project

management research, knowledge and tools to determine a course of action at any particular moment.

PRACTICAL PLURALISM

Leading researchers in both built environment research and project management research have made clear their view that a pluralism of approaches is required to address the many facets of project management and their complicated relationships. (Sage, 2014; Söderlund, 2011). The new lines of research into project management have made it clear that project management can be usefully viewed from a number of different viewpoints. Whether it is 5 (Anbari, 1985) or 7 (Söderlund, 2002) or 9 (Anbari, 2008) schools of research into project management, it is clear that researchers, using different tools drawn from difference sciences and professions, have illuminated different aspects of projects, described, diagnosed, and prescribed solutions for different problems, and proposed a wide variety of tools. What is challenging about this variety of research approaches is that on either an ontological or an epistemological basis they are incommensurable, incompatible. What counts as an object of unit of research, what counts as knowledge and what counts as proof varies dramatically between these different research approaches. Supply chain systems based on systems theory describe a fundamentally different world from that described by research into the performance of anger in project management (Lindebaum, 2011). The result of this plurality of research approaches is an undoubtedly rich, but potentially bewildering range of research and recommendations that cannot be reduced to a single theory or picture of projects and project management.

Our claim is that the need for pluralism applies not just to research but also to the practice of project management, especially in the built environment. Gareth Morgan suggests that one way to understand how to make use of fundamentally different theories in management is through understanding theory as metaphor (Morgan, 2006). Metaphors are necessarily distortions of reality, but these distortions can be useful, creating “constructive falsehoods” which help managers to read situations, and to act in them, more effectively. The different schools of project management research provide practicing project managers with a set of powerful metaphors, complete with tool sets, through which they can read situations, and with which they can design courses of action to address them. For this reason it is important to recognize a substantial range of theories or metaphors. It is important to provide project managers with multiple metaphors through which they can have new points of view on their projects and generate new insights. No single metaphor will be ‘right’, i.e. useful, all the time. Each will be helpful in filtering out the significant from the insignificant in different situations. The advantage, though, is that once a project manager has found a view or metaphor that makes clear what is happening in a given situation, that metaphor comes with theory and tools to intervene.

This is often a process of recognition. Experienced project managers relate their current situations to past situations, and choose courses of action based on what has worked well in the past. This way of thinking has been shown to be very effective, but is only available to project managers with a large repertoire of previous situations. Through providing young project managers with a range of metaphors through which they can understand current situations, they are enabled to make better use of the collective experience and research available to them through books, courses, and other modes of knowledge.

The education of building project managers should focus in particular on the actions of individuals in the project management context. This focus on personal awareness, design, performance and reflection makes the approach ideal for the education project management professionals.

In addition, thinking in terms of a range of metaphors provides project managers with additional tools to deal with conflicts. Disagreements are often specific to the frame through which they are viewed. By changing metaphor, project managers can change the frame through which the problem is viewed, and create new possibilities for designing courses of action that will be agreeable to the parties to the conflict (Schön, 1994).

PROJECT MANAGEMENT AS DESIGN

It is possible to view project management as a form of problem solving (Ahern, 2014), where problem is the determination of courses of action to change present states into more desirable states, then it follows that design and design thinking are necessary tools. For at its most general design can be described as "defin[ing] courses of action aimed at changing existing situations into preferred ones." (Simon, 1969) Projects present managers with design problems at several scales. The overall organization of the project, selection of partners, forms of contracts and tendering, structures of reporting and meeting is a large scale design problem facing any project manager at the outset. One might call this the strategic level. Resolving a scheduling conflict between two agents or a question of how to structure a BIM database would be examples of tactical problem solving.

While one may consider these issues as matters of choice, the interrelation between the different choices to be made (each representing a different frame), and the multiplicity and ambiguity of project goals and resources (typically seen differently by different stakeholders) raises the complexity of the network of choices to the level of a wicked problem (Coyne, 2005; Rittel, 1973) – i.e. a problem where there is no possibility of optimization or algorithmic approaches to decision making. This is a problem type for in which design thinking has been found to be very useful.

A variety of researchers have proposed that these sorts of problems are best addressed by design. Among them Boland and Collopy describe the advantages of design thinking in management contexts as follows:

"A decision attitude toward problem solving is used extensively in management education. It portrays the manager as facing a set of alternative courses of action from which a choice must be made. The decision attitude assumes it is easy to come up with alternatives to consider, but difficult to choose among them. The design attitude toward problem solving, in contrast, assumes that it is difficult to design a good alternative, but once you have developed a truly great one, the decision about which alternative to select becomes trivial. The design attitude appreciates that the cost of not conceiving of a better course of action than those that are already being considered is often much higher than making the 'wrong' choice among them." (Boland, 2004)

Projects provide their managers with one big design problem – designing the project (process, etc.) – and many smaller ones, designing interventions to keep it moving towards success. In designing the project the manager must (in collaboration with others) shape the project team through selection, contracting, governance, planning, and scope (the list is incomplete) to set out on the process of fulfilling (a subset of) the sponsors business goals through the provision of a building. But the greater portion of

the project manager's time is spent on dealing with the project as an evolving series of situations. Each situation calls upon the project manager to make an intervention that will further the project. Some situations, such as stage-gate reviews, are clearly outlined in project management literature. Others, probably the more important category, consist of unpredictable events caused either by members of the project team or by exogenous events that must be dealt with somehow. Some of these are normal challenges to a project, some are clearly problems to be solved, but all can be treated as design problems.

One of the values of approaching such problems in a designerly way is the practice of problem seeking – the process of finding what the 'real' problem is. Situations, as they present themselves to project members, are not transparent, and the solutions offered are perhaps not solutions at all. The designer seeks to understand the situation first, determining it's underlying nature, and who would be the best 'problem owner', and only then seeks to craft a solution. Thus, transgressions of schedule of budget, or loss of control of the scope would not be treated as a problem to be solved, but as an indication of perhaps larger problems that need to be addressed before control can be regained over budget, schedule or scope. Similarly the failure of a project member to comply with some aspect of the project specification need not simply be seen as recalcitrance, but possibly as an indication of hidden coordination problems. This process takes place within a project management design cycle.

PROJECT MANAGEMENT DESIGN CYCLE

The simplest description of the design cycle is as a cycle of generate and test, but the design cycle also bears similarity to Deming's Plan-Do-Check-Act cycle and the Kolb Learning Cycle: Concrete Experience – Reflective Observation – Abstract Conceptualization – Active Experimentation. These similarities are not coincidental, design and management both rely on learning and feedback from the situation to arrive at better outcomes than might otherwise be realized. For the purposes of illuminating the role of design thinking in building project management the following formulation of the cycle may be most helpful:

Awareness / Recognition – Design – Performance – Reflection

Awareness

The cycle begins with establishing awareness of the current situation. This awareness encompasses not only the formal project as captured in so called "project information", but also, and importantly, the social situation (situational awareness), including the status and state of the various actors and stakeholders in the project. Awareness has a very significant component of sense-making. It is at this stage that the project manager considers which metaphor – which project management perspective – best illuminates the situation. Using this metaphor and its terminology, the project manager can then describe the situation.

Design

Out of this awareness comes an understanding of both the current state and a desired outcome. Also, out of the choice of metaphor, comes a tool set which can be used to design a course of action to effect the change from the current to the desired state. Having determined that action is required, design refers to the shaping of a course of action. This course of action will consist a set of actions the project manager him- or her-self must to in order to initiate and guide the other actors in the actions they must carry out.

Performance
This set of actions must then be performed by the project manager. It is not just a matter of carrying out the design. A Performance is required in that management, requires that one changes people's minds and actions.

Reflection
Finally, there is a reflection upon the outcome, attempting to draw any lessons about the designed course of action or its performance that may be useful in the future. At this stage the project manager may, for example, choose to reconsider the choice of metaphor, and the description of the situation.

The cycle thus incorporates reflection and learning into the normal course of project management. This provides the graduate project manager with the opportunity to both improve their knowledge and skills over time, and in gain increased insight into the current project.

CONCLUSIONS

The framework proposed there is merely a skeleton upon which a project management course or curriculum could be built. It is intended to provide a means of re-centring project management education around the practice of project management rather than around the acquisition of knowledge and skill isolated from the reasons and contexts in which they will be implemented. Further it is intended that such an approach will open up building project management to permit project managers to foreground, not the project specification, but the business, social and environmental goals driving the project.

We intend this paper to invite discussion of the ideas presented here, and to further the development of a project management curriculum which can ore easily incorporate recent research results.

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