Abstract

Purpose:

This paper reports on a research project, using Intervention Research (IR), which aims to identify how a Higher Education Institution (HEI) could develop Process Improvement (PI) capability.

Design/methodology/approach:

The paper adopts ~~the~~ a practice perspectives of routines, and classifies and catalogues the potential routines that could form process improvement (PI) capability. The development of these routines are investigated using the Constructive Research Approach (CRA), a form of Intervention Research (IR), in the Action Research mode. Within this approach the methodology of Mediated Discourse Analysis (MDA) was employed to trace the empirical trajectory of the routine development, in a student management office within the context of an improvement project by the institutions process improvement unit.

Findings

The study shows a smaller set 'initialising' practices; those which are present, or desired, and instrumental to the beginning of a process improvement activity. The analysis reveals the mechanisms of why process mapping is significant in the development of process improvement routines and the potential recursive power of the interrelatedness these.

Practical implications

Of relative significance is the implication that there is a small group of initialising process improvement practices which are accessible to practitioners, in contrast to a large set of critical success factors. Secondly these process improvement practices transcend particular methodologies, meaning their development can be incorporated into customised, contextualised methodologies, by individual organisations.

Originality/value

The study contributes to the appreciation of process improvement in higher education as a capability, and outlines the potential array of routines that could constitute that capability. It provides a theoretical view on *how* key process improvement routines are developed in an organisational field, and a more nuanced and richer view of process mapping and its effect on other process improvement practices.

Keywords

Process Improvement, Routines, Intervention Research, Higher Education, Capability

Introduction

UK Higher Education Institutions [HEIs] were already competing in a market environment before significant changes to the UK funding mechanisms occurred in 2011, (Gibbons, 2005; Carpentier, 2006; Hemsley-Brown & Oplatka, 2006). Byrde & Leighton (2009) suggest these commercial dynamics had already propelled HEIs to focus on effectiveness and efficiency, also identified by others (Coates & Mohat, 2014; Milliken & Colohan, 2004). The Universities UK group's report about efficiency and effectiveness made recommendations that universities need to "continue to prioritise streamlining internal and operational processes", (M&E Report 2010, p. 35), and Bendemacher et al (2017, p. 40) articulates a similar argument that universities "need to invest in organisational change processes in order to be able to gain position in an increasingly competitive market". This paper responds to the call by Bendermacher et al. for empirical research into how quality practices can be developed that support continuous improvement of organisational processes. This is aligned to the contention by Ahamd at al (2007) that Business Process Management [BPM] re-engineering initiatives in HEIs need to employ an organisational development element (Ahmad et al., 2007) as well as Klun & Trkman's (2018) call for BPM researchers need to develop more in depth theory that understands processes more as organizational routines. This response is the development of 'mode 2' knowledge (Veit at al., 2016) through an Intervention Research (IR) project, which is a particular mode of Action Research (Baard, 2010) to consider Process Improvement (PI) routines. We pose the following research question and sub questions:

'How can PI routines be developed in a University context?'

- What are the relevant PI routines?
- How are the PI routines developed?

The paper first considers the notion of PI capability within the theoretical context of 'Dynamic Capability', and the construction of such from groups of organisational routines. We then outline the particular type of IR utilised in this project, that of the Constructive Research Approach (CRA). This method contains a series of steps, which are presented in the paper, and the subsequent structure of the paper follows these steps accordingly. The steps include a systematic literature review, followed by the creation and testing of a 'construct' in the field using Mediated Discourse Analysis (MDA), which is an ethnographic approach to researching practice (Scollon, 2001; Nicolini, 2012). The findings section of this paper summarises the empirical identification of PI practices from the literature and the tracing of their 'trajectories' through time and place (De Saint-Georges, ~~De St George~~ 2005). The paper concludes with the final step of CRA, that of summarising the outcomes and examining potential generalizability to the HE sector and more widely within the public sector and the business process improvement field in general.

PI capability

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Process improvement (PI) is often used interchangeably with Continuous Improvement, but this paper seeks to cleave these concepts within the domain of Dynamic Capability. Therefore in order to move towards an understanding of PI capability, we need a brief consideration of these related concepts.

The concept of dynamic capability was developed to explore how firms compete, in a market environment (Eisenhardt & Martin, 2000), in response to the static resource based view of a firm (Barreto, 2009; Ericksson, 2013). Easterby-Smith (2009) and Barreto (2009) argue the concept of dynamic capability could be applied to other sectors, and a number of researchers have responded with empirical work to support this (Pablo et al., 2007; Ridder et al., 2005; Douglas et al., 2012). There is often a distinction made between 'capabilities' and 'dynamic capabilities', and there is also considerable blurring of, and subsequent effort to distinguish between 'levels' of capabilities (Bowman & Ambrosini, 2009; Peteraf et al., 2013). However there is a degree of consensus that routines are at the core of organisational capabilities (Salvato & Rerup, 2010; Teece, 2012; Vogel & Guttel, 2012; Wollersheim et al., 2013). Feldman and Pentland (2003) have a useful definition of an organisational routine, stating that it consists of 'repetitive, recognizable patterns of interdependent actions, carried out by multiple actors' (p. 95). Different authors utilise different terms to conceptualise how capability, dynamic or otherwise, could be constructed, as being variously; a set, arrays, bundles or assemblages of these routines (Salvato & Rerup, 2010) and that these are often interconnected (Labautut et al., 2011; Narduzzo et al., 2000). Teece (2012) argues that routines are undisputedly important to ordinary capabilities and highly significant to dynamic capabilities.

Leaving aside these theoretical distinctions, it is useful to firstly consider Continuous Improvement in the theoretical landscape of capability. Many of the definitions of this have resonance with those of capability, especially if the verbs 'modify' and 'reconfigure' are viewed as synonymous with 'improve'. In fact Zollo and Winter's (2000) definition of Dynamic Capability is almost identical to those of continuous improvement, as shown below in Table 1;

Dynamic Capability	Continuous Improvement
"a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness"	"Improvement capability refers to the strength or proficiency of a bundle of interrelated organizational routines for incrementally improving existing products/processes" Peng et al (2008, p. 734)

Zollo and Winter (2002, p.340)	
	"An organisation wide sustained process of incremental innovation" Bessant & Francis (1999, p.1106)
	"a systematic effort to seek out and apply new ways of doing work i.e. actively and repeatedly making process improvements". Anand et al (2009, p. 444)

Table 1: Continuous Improvement and Capability definitions

(Trkman, 2010) argues that BPM is a dynamic capability as continuous improvement of processes is required to sustain competitive advantage, whilst Beverungen (2014) is in agreement that processes being improved in a BPM context should be conceptualised as routines in order to better explore how this occurs. Anand et al. (2009) and Peng et al. (2008) assert that Continuous Improvement is a Dynamic Capability, utilising the argument that it is generated from, and consists of, identifiable bundles of particular organisational routines, and that these are orientated towards the deliberate changing of operational routines.

Within HEIs there is a low level of improvement activity (Radnor & Bucci, 2011) which corresponds to the relatively small amount of literature in comparison to the public sector, and business in general. An analysis of the literature shown in Appendix 1 suggests that improvement in HEI's is self-categorising by the distinctive methodologies, and indicates bias towards the use of the lean methodology. This preference is perhaps unsurprising given the dominance of the lean methodology in the public sector improvement applications (Radnor et al., 2006). Examination of the literature also illustrates what Taylor (20120 refers to as the 'faddish' nature of improvement in HEIs. Within the wider context of improvement in organisations there are arguments that the newer methodologies such as Lean and Six Sigma are in fact highly similar and often 'repackaged' versions of older methodologies such as Total Quality Management (Naslund, 2008; Anderson et al., 2006). There are a small number of studies which utilise an explicit BPM approach in a HEI context; (Chrusciel & Field, 2006; Dallavalle de Pádua, 2014). The most relevant is Ahmad et al (2007), who adopts a organisational development lens to generate similar insights to the other methodological implementations. One of the most comprehensive studies about improvement in an HEI was by Langer (2010), who categorised the predominant methodology actually being practised not as Lean, but characterised as "participatory process improvement" (Langer 2010, p. 66). Houston (2008) argues that more generic contextualised methodologies should be applied in HEIs in general, and for each HEI in particular.

Considering the concept of Process improvement (PI) and how this relates to Continuous Improvement there some helpful distinctions to aid clarity. Bateman (2005) identifies that PI is often the foundation for continuous improvement, and that the nature of this is derived from the *ongoing and sustained* activity of PI, echoed by others (Bhuiyan & Baghel, 2005; Myszewski, 2017).This view is also found within the BPM literature; , Vergidis et al (2014) states that a foundational aspect of BPM is structured process improvement, and Trkman (2010, p. 129) outlines that "process improvement should form a feedback loop in order to ignite continuous improvements".

If one juxtaposes the above definitions with scrutiny of the literature of improvement activity in HEIs, where improvement is not yet sustained, one can argue that PI is the prevalent concept to be explored, as opposed to continuous improvement. In sympathy with this view Radnor and Bucci (2011) and Lejuene (2011) suggest that HEIs should aim to develop PI capability as a starting point for continuous improvement capability. Therefore, to develop PI capability requires the development of a number of PI routines. This justifies the research question for this paper, 'How can PI routines be developed in a University context?'

Context and Intervention Research

As part of this general engagement of HEI's with PI, a large Northern UK University instigated a relatively small Process Improvement Unit (from now on referred to as the 'Unit'), with a stated strategic aim of developing PI capability. One of the researchers of this paper was a part-time member of the Unit, acting as an internal expert in the field of PI, but also as an embedded intervention researcher. Intervention Research (IR), a type of Action Research (Baard, 2010) is defined by Savall & Zardet (2014, p.556) as a "transformative method with interaction between the researcher and [his] field". Intervention Research is a 'mode 2' type of research (Bentley et al, 2015) and is composed of a sequence of steps configured around the construction of an intervention and subsequent analysis. There are a number of different sub- groups of approaches within IR; this particular project adopted and adapted the methodological steps for what is termed the Constructive Research Approach (CRA) (Baard, 2010) – for a detailed explication of the method see Labro & Tuomela (2003) or Oyegoke (2011). One of the distinguishing features of CRA is the aspiration to extract richness from the content contained in an individual setting (Jurisch et al., 2014) in order to develop theory that has potential applicability in a wider context (Jonnson, 2005). The CRA steps were adapted from a range of previous studies (Labro & Tuomela 2003; Oyegoke, 2011; Baard, 2010, Kasanen, 1983), and are defined below;

1. Find a practical problem that has a potential to make a theoretical contribution
2. Obtain a general and comprehensive understanding of the topic
3. Create a novel construct
4. Implement and test the construct
5. Identify and show the theoretical connections and contribution
6. Examine the scope of general applicability of the construct

In this paper step 1 is the development and justification of the research question presented previously viz; 'How can PI routines be developed in an HEI context?'. The remainder of the paper follows the structure of the CRA steps, including an explication of what each step entails. Oyegoke (2011) is clear that step 2 is a literature review, so this is considered next.

Step 2: Literature Review

The literature review is segregated into two elements aligned to the two research sub questions.

i. What are the relevant PI routines?
ii. How are the PI routines developed?

The first of these was to catalogue and classify appropriate and relevant potential routines from the body of literature on PI. The second is to frame the practice perspective on organisational routines to in order to identify how potential routines might develop.

Routine cataloguing and classification

Studies on PI, and in particular in HEIs, has tended to focus on determining the critical success factors or readiness factors (Antony, 2012; Radnor, 2010; Antony, 2014; Ahmad, 2007). They often include a broad mixture of organisational attributes, suggested good practices, and could be termed 'macro-management factors'. These are similar to the organisational context elements suggested by Bendemacher et al.'s (2017) configuration for the development of quality culture. Although they argue that leadership and communication are easier to address that other cultural aspects, their contention is that these higher level constructs are have limited practical relevance for actors in HEIs who are attempting to pursue improvement. In a similar vein Klun and Trkman (2018) in their review of the state of BPM, specifically identify that BPM critical success factors should be reconsidered by an in depth theoretical development of processes as routines. To assist therefore in the development of capability, what is required is an understanding of which 'bottom up' routines and practices are important, as opposed to an esoteric management wish list (Berg, 2001), the goal being able to use that knowledge to enact routines, and thereby achieve PI capability.

Two main sources of literature were used to identify potential practices; the body of literature on PI capability (Bessant & Francis, 1999; Peng, 2008, Anand, 2009; Wu et al., 2011) and the previous literature examination of PI in HEIs. Figure 1 shows the cataloguing and classification method undertaken to develop a list of potential PI routines for a HEI, from these two bodies of literature.

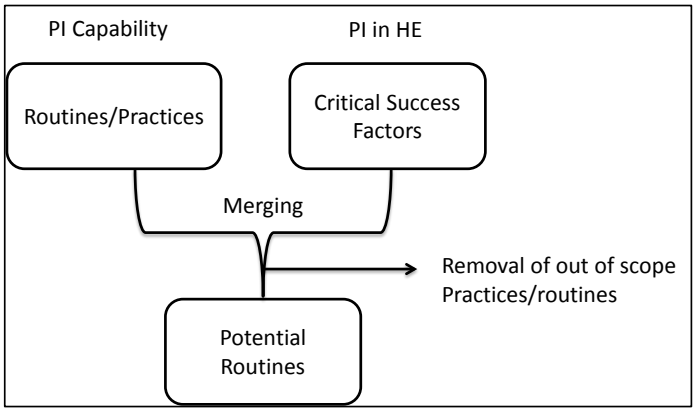

Figure 1: Potential Routines Cataloguing and classification method

The two catalogues were interrogated for practices outside the remit of the Unit, predominantly in the sense that as discussed earlier, they were more macro (senior) management factors. There were also some factors which had already occurred, or were more appropriate to a manufacturing context. All these elements were then removed and the results of this were then merged to form one coherent list which is shown in Appendix 1. The potential routines were classified under four headings; continuous Improvement formalisation, leadership practices, process management and customer orientation, these headings being derived by the cataloguing of the capability literature source. The analysis shows significant complementary evidence for many of the potential routines.

Routine Development

Hansen & Vogel (2010) identifies two different 'perspectives' on routines; that of the 'capability' perspective, which sees routines in a 'black box', and that of the 'practice' perspective which is seen as part of the wider 'practice turn' in organisational studies (Gheradi, 2009; Miettinen et al., 2010; Sandberg & Dall'Alba, 2010). The dominant conceptual ideology of the practice perspective of routines is the connection between the idea of the routine and the performance of it. Feldman & Orliowski (2011) state that routines are the:

"mutually constitutive and recursive interaction between the actions people take (performative aspect of routines) and the patterns these actions create and recreate (ostensive aspects of routines)" (p.11).

This approach sees routines as a dynamic and generative system, so "the development of the routine occurs through the enactment of it" (p.10). This concept of performativity within the practice perspective is influenced by the writings of Bordieu, so what it requires is similar to the approach taken by Kalfa & Taska (2016, p.4) of discovering the 'prevalent practices'.

The literature that investigates the development of routines suggests there are a wide range of potential underlying mechanisms. There is some similarity and overlap with these and the mechanisms identified by Bechenmacher et al.'s (2017) quality culture configuration. One example is the importance of actors and agency in the development of routines (Friesel & Larty, 2013; Narduzzo et al., 2000; Labutat et al., 2011). Artefacts are also seen as a significant mechanism in many studies (Narduzzo et al., 2000; Howard-Grenville, 2005, Pentland & Feldman, 2008; Bapuji et al., 2012; Cacciatori, 2012). Different authors grapple with the interaction of the local organisation context, structure etc., with routines, utilising different concepts such as organisational schemata (Labutat et al., 2011; Rerup & Feldman 2011) and 'embeddedness' (Howard-Grenville, 2005). Finally, political power in organisations is identified both in conceptual papers (Dionysiou & Tsoukas, 2012; Friesel & Larty, 2013) and in empirical investigations (Bresman et al., 2005; Howard-Grenville, 2005) as being highly significant and obviously connected to agency.

Step 3: Creating the construct

The Process Improvement Unit had already run two pilot projects, and experimented with some other interventions, including what are sometimes termed 'Rapid Improvement Events'. These type of interventions have been applied in public sector, including HEIs (Radnor, 2010; Radnor & Bucci, 2011). The stated priority for the unit was to develop capacity and competence in the wider team in running PI projects. However the pilot projects had been led just by the Intervention Researcher and the Unit manager. Hence it was agreed that the intervention to be constructed and tested was a PI project led by a PIU team member. This therefore, would be the arena for studying the development of PI routines. The project was based in a student management office located in the University, and included members from the office and related departments. The project had been scoped and agreed following an Improvement Event run by the Unit almost a year previously. The applied construct for the scope of the research design, was an improvement meeting, preceded by one of the Unit's 'normal' operating/planning meetings.

Step 4: Implementing and testing the construct

As discussed earlier this investigation into routine development adopts the practice perspective. One methodology that is seen as particularly useful for investigating practice is that of mediated discourse analysis (MDA) (Nicolini, 2012). Scollon and ~~de~~ De Saint-Georges ~~saint George~~ (2001) consider MDA as "a form of action research, intimately bound to the specifics of situation studied and issue researched" (p.15). MDA is also part of the ethnographic tradition (Scollon, 2001a) which itself has been used for empirical studies into routines (Howard Grenville, 2005). It has its roots in Activity Theory and can be tracked back to the sociologist Vygostky (Norris & Jones, 2005). Activity Theory and hence MDA assumes that all social actions are mediated through tools, external artefacts or internal (to the individual) tools. MDA shares some tenets with Critical Discourse Analysis, however, in contrast, MDA has a distinct focus on action, and sees discourse as just one among many potential mediational means. Of particular relevance is the inclusion, within these means, of material objects, such as artefacts, which as previously noted, are highly pertinent to the development of routines.

Routines are actions (Becker 2004) carried out by actors, and are social phenomena (Pentland et al., 2010). The fundamental unit of analysis of MDA is the mediated action. This is underpinned by the notion that there is no isolated action, that all actions have some form of mediational means. These 'means' accompany, and assist, how the action is carried out. As Scollon (2001a) indicates, this is intertwined with the notion of agency, a key aspect of routine theory; "the concept of the mediated action focuses on the unresolvable dialectic between agency and mediational means" (p. 146). A full explication of the MDA methodology can be found in Jones et al. (2017).

Sites of engagement facilitate the intersection of social practice and mediational means that enables a mediated action to occur in real time (Scollon, 2001a). No action or site of engagement is defined by a unique practice, hence MDA can reveal the intersection of different routines, across space and time via different trajectories (De Saint-Georges~~De saint George~~, 2005).

MDA has a much narrower view of practice than a typical usage of the practice perspective (Nicolini, 2012). In terms of scale, practice within MDA is seen as a "single recognisable repeatable action" (Scollon & Scollon, 2007, p. 13). Scollon (2001a) develops the linkage between actions and practice by conceptualising practice to be configured as 'chains of mediated actions'. Hence an organisational routine could be seen as being constructed from a chain of mediated actions, but these actions themselves could form part of other social practices. This interconnectivity, also central to notion of how capability is constructed from routines, is expressed as a 'nexus of practice', defined by Scollon as the intersection of multiple practices of groups of mediated actions.

Step 4 continued: Testing the construct: research design and data collection.

The pivotal activity in MDA is located in observation of the actual mediated actions at the site(s) of engagement. The site of engagement in this case was the 2nd meeting of the PI project team. Scollon (2001a) is clear that MDA assumes no priori assumptions about which mediational means or social actions will be important. Hence a form of pre-event data collection was used to establish the potential mediational means, the trajectory of relevant practices, and any other significant sites of engagement for these practices and participants (De Saint-Georges, 2005). Triangulation, and hence a degree of validity, is attempted in MDA by capturing different types of data, including generalisations of members, objective observations, individual members experience and observers interaction with members. Data was collected from observations (and additional interaction with participants), and a set of post-event interviews, followed by the sharing of the initial analysis with a group of the participants, referred to within MDA as a focus group. Figure 2 shows a summary of overall methodological design which has been constructed using the methodological steps outlined in Scollon (2001a), for the designated site of engagement.

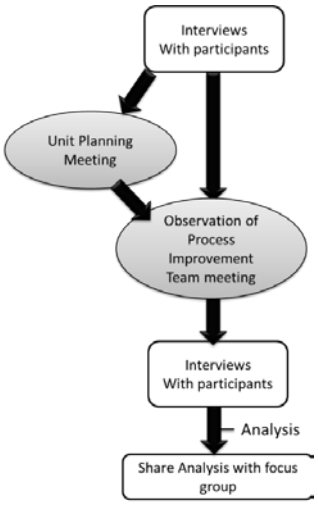

Figure 2: MDA Research design for this study adapted from Scollon (2001,p. 153)

The Intervention Researcher's role at the two sites of engagement is best defined as observer-participant (Hammersley & Atkinson, 1995), and as such required a degree of reflexivity. Aull Davies (2008) indicates, the role of the observer needs to be as explicit and transparent as possible, hence the use of reflective analysis of the ethnographic field notes was made. A recording was also made of the project meeting, and some sections were transcribed where the field notes identified this was an area of interest for the MDA analysis. The pre and post interviews were recorded, transcribed, anonymised and checked for errors and context clarifications.

Step 5: Findings and Analysis

The next step within CRA is to analyse the findings with a view to establishing the theoretical contribution. MDA provides a range of heuristic questions (Scollon, 2001a) and Jones et al. (2017) utilise these to develop an analytical pathway; this was used to provide structure for this analysis.

Primary practice identification

The field reports from the improvement meeting were coded for actions, and an action summary table was constructed with a hierarchy of these actions. The medium level actions were recoded to identify practices constructed from the lower level actions, utilising the literature of potential routines where relevant. These medium level actions were tracked by 'episodic' journey through the event. The descriptors of the relevant practices that were identified at the meeting were;

a) Having a process view
b) Working with a process map
c) Facilitation
d) Gathering process data
e) Scoping

Three of the coded practices, (a), (c) and (e), were both prevalent and easily identified within the literature. It was clear that some of the descriptors of the practices could be better refined, certainly for this context, and some of them are too broad; for example Peng's (2008) definition of process mapping: "Attempt to map, improve, standardize and adhere to organisational processes". There is relatively scant literature on process mapping, amongst the large quantity of empirical case study work, both within HEIs, the public sector and beyond,(e.g. Radnor & Osborne, 2008; Radnor, 2010; Adj & Visse, 2014; Cano, 2014). Nonetheless Hellström & Eriksson (2013) have a useful clustering of approaches towards process orientation, in which they distinguish different aspects of process orientation; Fumblers, Talkers, Mappers and Organizers. However, what is more interesting is their list of variables, which could be construed as potential practices and have some similarity to the aspects of the wide practice descriptor outlined above as well as to other practices (e.g. process measurements). Hence a newly configured descriptor of the relevant routines can be constructed using the notion of sub-routines (Pentland & Reuter, 1994; Labutat et al 2011; Bresman, 2013) and Hellström & Eriksson (2013) work. This is shown in Table 2.

Table 2: Process mapping descriptors

Process' related Routine/practice descriptors	Implied Potential Sub practices/routines
Defining and Mapping a process Hellström & Eriksson (2013)	Process mapping Cano et al (2014),Dorman (2014),Radnor & Bucci (2011), Antony et al (2014)
Developing a process view (Peng et al 2008) (Radnor & Bucci 2011)	Processes are something one thinks and talks about. Processes are identified Hellström & Eriksson (2013)
Working with a process map (Authors)	Corrections, revisions and clarifications Sharing with others Jones 2014(b)
Process and map (re)-construction (Authors)	Standardisation and/or Improvement of processes Peng et al (2008), Anand et al (2009) Assessments and improvements have been carried out. Hellström & Eriksson (2013)
Process management	Adherence to process Peng et al (2008), Anand et al (2009) Ongoing monitoring of processes Use of performance indicators Langer (2011), Comm (2005) Jenicke et al (2008),Antony et al (2014) O'Neill & Palmer (2004),Taylor(2012), Radnor & Bucci (2011),Christina (2003) Targets and measurements are connected to the process Hellström & Eriksson (2013) Process owners are identified (and given responsibility) Hellström & Eriksson (2013), Antony et al (2014)

This configurations allows the practice derived from the coding, that of 'working with a process map' to be located within the wider group of more clearly defined routines related to process mapping, including another new definition, that of process map re-construction. Biazzo (2002) argues that process mapping is not equivalent to what he terms 'process analysis'. Process analysis is a better articulation of the practice coded as 'gathering of process data'. This is because it is different than an *ongoing* measurement of processes and performance indicators. This then provides some additional clarity in the examination on the development of the PI practices for the next step of the analytical pathway.

Secondary practice identification

MDA utilises the concept that practices have trajectories in time and space to other nexus and potential sites of engagement (Scollon, 2001a; De Saint-Georges~~de Saint George~~, 2005). The participants were asked at the pre-event interviews about potential milestones in order to be able to track these trajectories. The interview transcripts were then coded for milestones for each of the practices. The output of this analysis was exported and excel was used to place a time/date index for each of the milestones. The key finding with respect to the development of the practices was the significance of a 'value stream mapping event'. This had taken place nine months earlier, facilitated by the researcher, primarily as a means of assisting the student management office with choosing and scoping a PI project.

Hence there was a need to retrospectively identify PI practices that might be significant, that intersected at the value stream mapping event. All the original interviews were after the value stream event, so this data could be utilised as retrospective analysis and these were reclassified as interview 1 and interview 2. These interview data sets were then coded using the list of potential practices established from the literature review to look for evidence of practices that may have occurred after the value stream mapping event. A summary of the analysis is shown in Table 2 below;

Table 3: Practice Identification

Practice	Interview 1	Interview 2
Having a Process View	++	+
[Working with a] Process map and Process mapping	++	+
Cross Functional working	++	
Engagement and motivation	+	+
Facilitation		+
Scoping		+
Process analysis		+
Stakeholder management	--	+/-
Trust and open relationships	+/-	+/-
Participation	+	+
Use of formal problem solving methods	+	+

+ some evidence for this practice - some evidence for lack of this practice
++ Substantive evidence for this practice --Substantive evidence for lack of this practice

In Table 3, items in **bold** were the practices that had already been traced back from the project meeting analysis. The table of results shows evidence of where the practices were present, but also some areas where practices were recognised by actors by their absence. One acute example of this is the practice of stakeholder management. However some of these practices relate to the project, and some to the value stream event. Therefore, there needed to be another, more detailed unpicking of this data to illuminate the ontogenesis and potential linkages between practices (Scollon, 2001a).

Of these practices, only four were traceable back to the value stream event. These were:

1. Having a process view
2. Working with a process map
3. Defining and mapping a process
4. Engagement and motivation

This is the point of departure for the final aspect of CRA Step 5 in relation to the 2nd research sub question; to identify and theorize about how those practices (routines) developed.

Step 5 Continued: Theoretical Development

Two key aspects of theorizing are the notion of abduction and retroduction (O'Mahoney & Vincent, 2014). Abduction is theoretical re-description of events often using theory gleaned from the literature review in order to obtain the most plausible explanation of events (O'Mhaoney & Vincent 2014; Bystad & Munkvold 2011). Retroduction is the 'what-if' creative analysis to identify potentially hidden mechanisms. Mingers(2006) and Ketovoki & Mantere (2010) both argue that abduction and

retroduction are often done in ‘one movement’ by researchers as they move from qualitative data to the best explanation of the data. O’Mahoney & Vincent (2014, p. 16) succinctly describe this process as “adding theory to data”, and this is seen as compatible with both intervention research in general and CRA in particular (Lukka, 2005). Lynham (2002) in her discussion on theory building in applied disciplines outlines that the conceptual framework developed must be broken down into elements such as propositions built from operationalising the theory from the data. Jonsson & Lukka (2005) confirm that the target of the exploratory intervention research such as CRA is to develop new theoretical propositions. In a synthesis of these two approaches, proposition sets, which are essentially candidate mechanisms, will be produced as a result of the abduction and retroduction process.

Routine Development

The enactment of the process mapping routine was highly significant in developing the ostensive aspect of the process view routine. Tessa and Zoe, both members of the project team from the student management office, both cite ‘writing down’, ‘talking about it’ and ‘looking at it’ as being significant for them. These performative actions associated with process mapping develop the idea of their work activities as a process, which are termed ‘having a process view’, referred to by the literature review and more widely (Gębczyńska, 2016). Although Tessa refers to the importance of capturing the process map on the paper, this was only at the event, as it was not shared afterwards with the team. What is interesting in this case is that artefacts are often seen as providing on-going structural resources as a complement to actors ‘mental models’ in the development of routines (Narduzzo et al., 2000). However In this instance the process map artefact was physically temporary, but became embedded as a mental representation, as a result of performing of the other process mapping routine. As Zoe said “we’ve had it in the forefront, well I have anyway, in the forefront of my mind”. Therefore the mental representation of the process map was more important than the actual artefact of the process map.

Proposition 1: The ostensive aspect of the ‘having a process view’ routine is directly developed through the performance of the ‘defining and mapping process’ routine.

The findings and analysis clearly show that the earlier value stream event engaged and motivated the participants to change their actual working processes. In fact a better descriptor of this practice would be of ‘empowerment’. This is because from an improvement perspective, it is desired that actors feel that they can, and do, change their own processes.

As discussed above the having a process view routine and the defining and mapping process routine are closely entwined, and the timeline of change suggests that the mental representation of the process map, which is the ostentive aspect of a process view routine, rather than the map itself was pivotal in the empowerment of actors to change their process. In this sense both defining and mapping routine and process view routines, like many PI routines aspire to be, are meta-routines (Driel & Dolfsma 2009). These are routines that have the capability to change other routines, as Zoe

suggests “I think at that point people realised, oh actually, we can change it if we want to change it; there’s no definite rule that that’s how we have to do it”. What is interesting here is the contrast to the other routine, in that the ostensive aspect arose first, (we can change it) followed by the performative (changing it). Here is evidence of the ontogenesis of that particular routine of empowerment. Here the dual process routines illuminated an unseen mechanism to actors that they were following constitutive rules (Iannacci & Hatzaras, 2012) of their work routines, (also referred to as ‘target’ routines), but not only could those rules be changed, they could be dissolved, thereby allowing the work routine greater flexibility to change in the future. This perhaps is illustrated by the notion that they had changed the subsequent work routine without even realising it. The literature on routines discusses the relevance of agency and power to affect routines, however here is evidence of a reverse of that relationship in that the process routines increased the agency of the actors in the work routine. This then provided them with a form of power to enact a different work routine. However the empowerment routine that led to changes to the work process did not have a reverse relationship to the process mapping routine. The process mapping routine was not re-enacted, to identify changes to the process. However some evidence that the performative aspect of the empowerment routine was linked to the ostensive aspect of the process view routine when Zoe says “We’ve been implementing little small elements of *it*”.

Proposition 2: Dual routines of having a process view and defining and mapping a process routine open up the ostentive aspect of an ‘empowering’ routine by acting as meta-routine to reveal the existence and incorporeal nature of constitutive rules regarding other standard work routines.

The analysis shows that there are a number of more narrowly defined social practices that constitute collaboration. Firstly there is the mode of ‘alternative view’, where actors seek or welcome the views of others on the process as a whole, or their part of the process. ‘Gaining perspective’ is what another team member, Liz, called “what their contribution was to a big process”. ‘Adherence to mapping’ is where actors are hopeful that the practices of defining and mapping of a process, and working with a process map, will assist in a consistency of other actors in following the defined process. This is exemplified by a further team member, Ruth, who starts to see the benefits of the practice to help standardise work; “That’s everybody’s sat in a room and spoken about what we do and made sure that people are actually doing the same thing”. Seeking understanding is where actors embrace the opportunity to explain to others why they do the things they do within their process. Zoe in her interview at one point, concisely articulates many of these different aspects of the collaborative working practices; “It gave them an opportunity to question what we do, and it gave us an opportunity to tell them why we do it; but at the same time you could have a discussion to maybe change elements of it because they have a different perspective on it.”

There are two aspects that illustrate that working with a process map enabled a cross functional collaborative routine to emerge. Firstly it appears to activate the mechanism identified by Bryant & Niang (2013) and Miller (2014), of trans-active memory (in knowing about who to talk to within an organisation about enacting the work routine. This enhances the performance of the work (target)

routine but also its potential to be flexibly performed and altered. Zoe uses the verb to ‘question the right people’ – potentially making the routine less ‘dead’ and more ‘live’ (Pentland & Feldman, 2008; D’Adderio 2010).

Secondly the analytical pathway (Jones et al., 2017) identified a discourse relating to the desire for cross functional collaboration. The threads of this discourse were articulated as separate departments, which recognise the need to work together, but often don’t because the mechanisms are not available to them. A number of theorists have tried to articulate how routines as generative systems are connected to the wider organisational context; the notion of organisational schemata (Rerup & Feldman, 2011; Dionysiou & Tsoukas, 2012) and ‘embeddedness’ (Howard-Grenville 2005). Howard-Grenville suggests that a routine can become strongly embedded if there is an overlap with organisational structures (technological, co-ordination and cultural). Another team member, Beth, illustrates the gaining perspective aspect and development of a shared schemata within the ostensive aspect of the process view routine, but also the ostensive aspect of the future practice of working to a process map as part of the work (target) routine. “Because it’s like more understanding about how you are seeing those and who is involved because this is like a proper map, agents, [Student management] office and who has got what, and what’s at what stage. It will be easier for everyone”. Therefore the routine of a working with a process map provided to the actors what Pentland (1995) calls an ‘affordance’; a chance to align with the schemata of a cultural expectation of needing to collaborate. As Pentland & Feldman (2005) identify, the behavioural incentive was there for actors to perform the working with a process map routine. Overall this results in the following two propositions;

Proposition 3: The practice of collaborative working is constituted from a subset of social practices, including seeking alternative views, gaining perspective, seeking understanding and adherence (to an agreed process).

Proposition 4: The ‘working with a process map’ routine enabled a cross functional collaborative routine to be performed, and was strengthened by the alignment with organisational schemata about the gap between actual and desired cross functional collaboration.

The project members appeared to have difficulty in performing the working with a process map routine after the first construction. The ostensive aspect was clearly that the routine had been activated but was no longer a ‘live routine’ (Pentland & Feldman, 2008) for them.

However by the time of the project meeting, the actions of working with and correcting, revising the process map had become more prevalent, resulting in the establishment of the working with a process map routine; both in terms of the ostensive and the performative. This is suggested by the ‘comfortableness’ referred in the analysis and the fact that it took significant application of power to halt the enactment of the routine at the site of engagement. Agency within the meeting (i.e. facilitation) and outside was clearly an element of establishing this routine. In her pre-meeting interview Zoe refers to the importance of the facilitation of the process mapping “because like yourself and Martha kind of questioned things a lot, which then made us question things”. Agency outside the

meeting was identified as a result of the trajectory analysis; “But I know that at least one of the [team] has sat with Martha and gone through this to fill in the gaps of the new document that she’s put together in the last meeting”

Proposition 5: The routine of ‘working with a process map’ was able to be performed through the use of both agency, and the practice of facilitation.

The literature on PI in HEIs and beyond seems to focus more on the ongoing measurement of processes against targets as opposed to the gathering data to gain understanding of root cause as to why processes produce the outcomes they do. However some of these practices are located in a smaller granulation within the concepts of the utilisation of basic PI tools, which usually includes the use of tools such as run charts and histograms (Radnor & Bucci, 2011; Langer, 2010; Antony, 2014) The local gathering process data routine was similar to these notions of the practice, and as identified previously, of particular resonance was the process analysis descriptor (Biazzo, 2002). The MDA analysis suggested that there was a potential intersection of the trajectories of the scoping and gathering process data and the process mapping practices. This resulted in Martha producing an artefact (in the form of a briefing powerpoint presentation) that linked the two practices together for the project – that the aims and objectives of the project should inform what data should be collected about the process. Conversely in the improvement meeting when the episodes that concerned data collection occurred, this stimulated a dialogue within the meeting about the ongoing relevance of the original scope, and the potential for adding to objectives.

Proposition 6: The scoping routine and the process analysis routine are interdependent, enacting one can mean the other is initiated.

Conceptual Territory

Figure 3 below shows the result of the attempt to retroduct the propositions in order to identify the foundations of a conceptual model for how PI routines interact. The routines themselves were imposed along a supposed ‘time trajectory’ based on the process mapping descriptors, but also the activity timeline within the process improvement methodology utilised in this instance; a customised and contextualised version (Jones & Smith, 2014). This analytical outcome is termed a nexus, taking inspiration from the MDA methodology, which as noted before, uses this term to describe the multiple intersection of practices. This analogy is perhaps useful when applied to a PI project or activity.

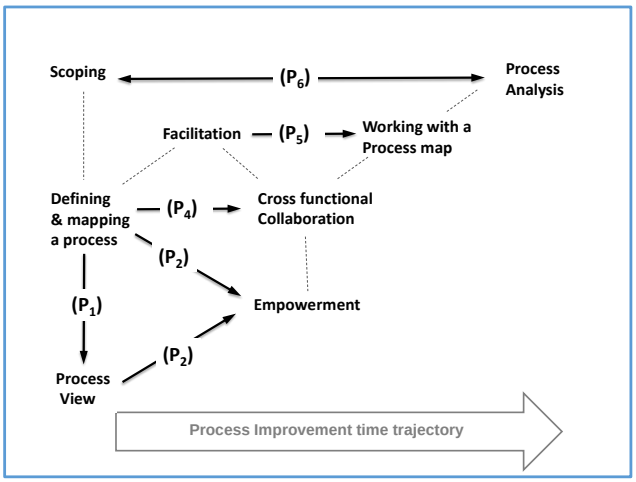

Figure 3: Nexus of Initialising Process Improvement Routines

Here presented in the conceptual model provided by this research. These could be potentially categorised as 'initialising'; those which are present, or desired, and perhaps instrumental to the beginning of a process improvement activity. We do not suggest this is a complete model, as our analysis has shown there are still gaps in the conceptual territory to be explored. What it does do, is provide clear areas, indicated by the dotted lines in Figure 3 that are suitable for further investigation.

Step 6: Conclusions and Examination of applicability

The latter steps of CRA involve excising the theoretical contribution and examine the scope of potential applicability and generalizability. This is mainly focused on the applicability of the identified mechanisms, with some consideration of the similarity of the context in which the outcomes occur (Ackroyd & Karlsson, 2014). In order to provide substantiation for the relevance of these PI routines beyond the higher education sector, these were tallied with the wider process improvement and BPM literature. As to be expected there were numerous reference to these practices, so three indicative, illustrative studies are identified for each routine, shown in Appendix 2 This provides a degree of substantiation that the routines investigated have some potential generalizability outside the HEI sector, to any organisations attempting to develop PI capability.

The nexus of 'initialising' practices and the analysis outlined in Table 2, reveals smaller sets of PI practices/routines. This is perhaps more useful to practitioners than the larger more unwieldy list of critical success/macro management factors usually found in the literature. Of relative significance is that these practices transcend particular methodologies, as they fit within the oeuvre of the typical improvement methodology subset of tools, principles, etc. as outlined by others (Naslund, 2008; Anderson et al., 2006). Therefore development of these practices can be incorporated into customised, contextualised methodologies, by individual HEIs (Houston, 2008) and in a wider context (Matthews et al., 2015). This is also supported by the illustrations in Appendix 2.

The analysis also shows the importance of the practice of process mapping to the development of the PI practices. The refinement of the descriptors related to process mapping shown in Table 2 is a substantive contribution to the appreciation of these initialisation practices in particular and PI practices in general. The findings support other work, for example, Radnor & Osborne (2008) that the practice of working with a process map is developed through facilitation, but also that agency outside formal sites of engagement is also important.

The analysis and theorizing suggest that collaborative working can arise as a result of collaborative participation in the context of defining and mapping processes, and working with a process map. The analysis identified that the practice of collaborative working, is itself, constituted by a subset of social practices. For those working in the field of BPM, particularly within the public sector, who wish to develop collaborative working, this provides a manifest of practices that need to be provided an affordance or opportunity to occur. Firstly, participants in PI projects need to be given opportunity to gain perspective: Secondly, offer others their view of a process, and explain their rationale for their own actions in their own part of the process. Within this participants should have a means by which they can find out what others do and why they do it.

Of particular note is the need to further understand the nature of the process analysis practice, how this is developed, looking at the mechanisms behind the linkage between the ones found in this study, of project scoping, and others. Further research could be carried out to validate this and investigate the interconnectedness of the practices identified within the proposed nexus as an investigation into how process improvement capability could be constructed from an ‘initialising’ set of PI routines.

Appendix 1

Routines/practices [1]	**PI as capability**	**Higher Education PI**			
		Macro Management Factor	Lean	Six Sigma	PI/CI/BPM
Continuous Improvement Formalisation					
Use of projects to target specific PI goals	Anand et (2009)				
Prioritising projects			Langer (2011)	Anthony et al (2012) Holmes et al (2014)	Taylor(2012)
Project scoping				Anthony et al (2014)	
Use of Rapid Improvement type workshops			Radnor & Bucci(2011) Cano (2014) Emilliani (2004)		
Sustained incremental improvements	Peng et al (2008)		Langer (2011)		
Use of a range of formal problem solving processes	Bessant & Francis (1999) Anand et al (2009)	Understanding of methodology principles	Radnor & Bucci (2011) Comm (2005) Cano et al (2013)	Kim (2010)	Thalner (2005) Taylor(2012)
Formal deployment of the strategic goals , by projects marching strategic objectives	Bessant & Francis (1999) Anand et al (2009)	Prioritising projects	Langer (2011)	Anthony et al (2012) Holmes et al (2014)	Taylor(2012)
Monitoring & measurement of project outcomes against strategic goals	Bessant & Francis (1999) Anand et al (2009)	Understand and use performance indicators	Langer (2011) Comm (2005)	Jenicke et al (2008) Anthony et al (2014)	O'Neill & Palmer (2004) Taylor(2012) Ahmad et al (2007)
Governance of projects including multi-level steering				Anthony et al (2014)	Ahmad(2007)
Leadership practices					

Team work & Group problem solving	Wu et al (2011)	Teamwork /Collaboration			Ahmad et al (2007)
Use of participation	Bessant & Francis (1999)	Involvement of relevant staff	Radnor & Bucci (2011)		
Range of Training from Basic CI Tools, to leadership and change management	Bessant & Francis (1999) Anand et al (2009)	Provision of relevant training	Radnor & Bucci (2011) Comm (2005)	Anthony et al (2014) Can et al (2014)	Taylor(2012)
Use of highly motived employees as Improvement 'champions'	Wu et al (2011) Anand et al (2009)	Development of champions	Cano et al (2014)		
Motivate employees in achieving organizational goals	Wu et al (2011)	Interest/engagement and motivation of participants	Radnor & Bucci (2011) Cano et al (2013)	Kim (2010) Anthony et al (2014)	Temponi (2005)
Leadership involvement in quality improvement	Peng et al (2008)	Hands on approach/action learning for managers	Radnor & Bucci (2011) Langer (2011)	Anthony et al (2012)	Thalner (2005)
Cross functional activity	Bessant & Francis (1999)	Cross functional Projects	Langer (2011)	Anthony et al (2014)	Thalner (2005) Ahmad et al (2007)
Establish Openness and trustful relationships			Comm(2003)	Anthony et al (2012)	
Facilitation			Christina (2003) Kumi (2006) Radnor & Bucci (2011) Emilliani (2004)	Anthony et al (2012) Anthony & Douglas (2015) Kim (2010)	Taylor(2012)
Process management					
Having a 'Process view' of an organisation	Peng et al (2008)	Process Ownership and process perspective	Radnor & Bucci (2011)	Anthony et al (2012) Anthony et al (2014)	Ahmad (2007)
Attempt to map, improve , standardize and adhere to organisational processes	Peng et al (2008) Anand et al (2009)	Process mapping	Cano et al (2014) Dorman (2014) Radnor &	Anthony et al (2014)	

			Bucci (2011)		
Use of Visual management			Radnor & Bucci (2011) Cano et al (2014)		
Understand and use performance indicators			Langer (2011) Comm (2005)	Jenicke et al (2008) Anthony et al (2014)	O'Neill & Palmer (2004) Taylor(2012)
On-going Monitoring of processes			Radnor & Bucci (2011) Christina (2003)		
Focus on reduction in variation	Peng et al (2008)				
Focus on reduction of waste	Peng et al (2008) Wu et al (2011)				
Consider Flow and pull	Wu et al (2011)				
Statistical process control	Wu et al (2011)				
Cause & effect analysis			Doman (2011) Cano (2014)	Anthony et al (2014)	
Pareto analysis			Anthony et al (2014)	Isa & Usman (2015)	
Customer orientation practices					
Voice of the customer, a common feature of PI projects	Anand et al (2009) Wu et al (2011)	Understanding the Voice of the customer	Radnor & Bucci (2011) Comm(2003) Cano et al (2013)	Anthony et al (2014) Isa & Usman (2015) Holmes(2014)	
Understanding and representation of key stakeholders				Anthony et al (2014)	

Appendix 2 : Applicability - Illustrative Studies of initialising PI routines.

Initialising Routines	**Illustrative Studies**
Project scoping	Seethamraju & Marjanovic (2009), Aken et al. (2010), Jones & Monks (2011)
Use of participation	Bessant & Francis (1999), Bakotić & Rogošić (2017), Jurburg et al. (2016)
Empowerment [Motivation]	Garcia-Sabater Marin-Garcia (2011), Scherrer-Rathje et al (2009),Jurburg et a.l (2017)
Cross functional collaboration	Bessant & Francis (1999),Da Silva et al. (2012), Smith et al. (2012)
Facilitation	Jaca et al. (2012), Achanga et al. (2006) Easton & Rozenwieg (2012)
Having a 'Process view' of an organisation	Peng et al (2008), Gębczyńska (2016), Naslund (2008)
Attempting to map organisational processes	Peng et al. (2008), Anand et al (2009), Biazzo (2012)
Process analysis [Process and performance measurement]	Oliver (2009), Jaca et al. (2012), Jager (2004)
Use of formal problem solving methods	Achanga et al. (2006), Bakotić & Rogošić (2017), Jurburg et al. (2016)
Trust and open relationships	Jabnoun (2001), Atkinson et al. (2012), Singh & Singh (2013)
Participation	Bessant & Francis (1999), Bakotić & Rogošić (2017), Jurburg et al. (2016)
Stakeholder management	Garcia-Sabater et al. (2011), Anthony (2006), Clegg et al. (2010)

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