Adopting rapid process improvement workshops in healthcare – what purposes do they serve?

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Abstract
This paper undertakes a secondary data analyses of 47 Rapid Process Improvement Workshops from five National Health Service Trusts (NHS). The Trusts were part of a much larger evaluation of a transformational change in the National Health Service North East (NHS NE). Rapid Process Improvement Workshops share similar characteristics to MasterClasses used to enact process improvement. The limitation of MasterClasses relate to sustainability. This work demonstrates mixed improvement outcomes from across the Trusts. It is not the method that produces change or continuous improvement long-term. Sustainability is embedded in policy, processes, and routines such as taking repeat measures of improvements.

Keywords: Healthcare, Process Improvement, Rapid Process Improvement Workshops (RPIWs)

Introduction
Continuous improvement has been defined as "*a continual quest to make things better in products, processes, customer service, etc.*" (Bessant and Caffyn, 1997, p. 7). It is argued, however, that sustainability and the continuous nature of the improvement is difficult for organisations to maintain. Bateman (2005) identified that for process improvements to be sustained, reinforcing infrastructural mechanisms needs to be in place. Improvement events such as the MasterClass or Rapid Process Improvement Workshops (RPIWs) are positioned as an approach to take this learning forward by trying to build these mechanisms in as part of the structured improvement process. Hulscher *et al.* (2003) argued that these 'intervention' programmes show differences in outcomes. These structured programmes such as MasterClasses are, therefore, different to continuous improvement.

The Rapid Process Improvement Workshop was developed by Virginia Mason Medical Center (VMMC) in Seattle, which is a widely cited exemplar of Lean in healthcare (Kenney, 2011; Plsek, 2014). This paper draws on 47 RPIW events from five National Health Service (NHS) Trusts that were part of a much larger evaluation of a

transformational change programme in the National Health Service North East (NHS NE) – the North East Transformation System (NETS) (Hunter *et al.*, 2014). The NETS was designed to bring transformational change to a whole healthcare region throughout the North East of England (NHS North East., 2008). The NETS adopted the Virginia Mason Production System (VMPS) to help structure this transformational change programme, which adopted Rapid Process Improvement Workshops as its 'method'. The NETS also comprised the vison (to achieve excellence in health-care services and to sustain continuous improvement) and the compact (aimed to establish a psychological contract between managers and healthcare professionals by clearly articulating the 'gives' and the 'gets') (Hunter *et al.*, 2014). It was this holistic aligned linkage between the vision, the compact and the method that aimed to achieve transformational change. This research seeks to answer what role Rapid Process Improvement Workshops (RPIWs) played in building improvement capabilities in healthcare through analysing the RPIW standard tracking sheets.

Literature Review

Continuous improvement involves company-wide, high frequency changes (Chartered Quality Institute, 2011). Continuous improvement does not necessarily require large capital investments (Terziovski and Sohal, 2000) and is usually not based on advanced methodologies (Rapp and Eklund, 2007). In Japan, continuous improvement is enacted through kaizen and kaizen has been labelled as an approach to enact continuous improvement in the West (Farris *et al.*, 2009; Glover *et al.*, 2011; Glover *et al.*, 2013). In the early stages of developing a kaizen culture, many companies implement off-the-shelf crash courses that attempt to disseminate the philosophy of kaizen (Brunet and New, 2003; Glover *et al.*, 2011). Glover *et al.* (2011) also added that such events also enact as a just-in-time approach to training, allowing participants to learn process improvement tools when they need to apply them. This implies that an event has a dual role in terms of training and enacting continuous improvement.

Improvement Events

Sheridan (1997) argued that as kaizen has started to be used, particularly in the West, there have been many different interpretations as to what and how to implement a kaizen event. To harness the benefits of kaizen, structures have been created and 'Lean' tools are applied in an attempt to accelerate the benefits. One problem, however, has been identified by Maalouf and Gammelgaard (2016) through identifying that applying 'Lean' could amplify organisational tensions, which could inhibit transformational change.

An example of one improvement event is the MasterClass (Pullin, 1998), which provides formal hands-on training and includes processes for identifying requirements and checking outcomes. It is important to note that Bateman (Bateman and SMMT Industry Forum, 2001; Bateman and Rich, 2003; Bateman, 2005) looked at the MasterClass as 'process' and not 'continuous' improvement. The aim of a MasterClass is to abstract a subset of Lean tools in an event that tries to influence the performance of a business as well influence human resource issues through improving attitudes, skills and application of improvement tools to the workplace – as well as providing a structure around improvement (Bateman and SMMT Industry Forum, 2001; Doolen *et al.*, 2008; Farris *et al.*, 2009). The event draws on the expertise of a cross-functional team who have a vested interest in improving the work area where five days are spent studying the area, collecting data, analysing data, identifying improvement selections and implementing the most

desirable improvement (Sheridan, 1997; Bateman and SMMT Industry Forum, 2001; Glover *et al.*, 2011).

This structure, which aims to enact operational improvement or 'Lean' programmes, has started to be adopted in healthcare. It has been argued, however, that 'Lean' has been used interchangeably with 'interventions' within the NHS (Matthias and Brown, 2016). Fillingham (2007) detailed how 'Lean' was applied to the Bolton Hospitals NHS Trust in the UK. The Rapid Improvement Event (RIE) was the structure to embed transformational change across the Trust. The RIE was described as a week-long practical improvement approach that incorporated a cycle of planning, implementing and following-up changes (Fillingham, 2007, p. 233), which are similar to MasterClasses. Radnor *et al.* (2012) investigated how 'Lean' was applied in four NHS Hospital Trusts in the UK. The authors' distinguished Lean activities as comprising: assessment, improvement and monitoring. Rapid Improvement Events were applied at the improvement stage and are described as an event held over 3 – 5 days that included staff in evaluating and redesigning processes (Radnor *et al.*, 2012, p. 365).

In Bateman's description of the MasterClass (Bateman and SMMT Industry Forum, 2001), a model of sustainability was proposed that categorised improvement events into five classes (referred to as class 'A' to class 'E') in terms of how sustainable an improvement event actually was. Class 'A' was identified as the only outcome that leads to continuous improvement, whilst class 'E' only leads to improvements within the workshop itself, and cannot be sustained beyond the event (Bateman and SMMT Industry Forum, 2001). Further studies by Bateman and colleagues (Bateman and Rich, 2003; Bateman, 2005) uncovered that class 'A' events had enablers that demonstrated more participation and 'buy-in' as well as being more focused in allowing time to be spent on improvements. It is interesting that in Bateman's (2005) research, she identified that a majority of the companies did not collect accurate performance data meaning Plan, Do, Check, Act (PDCA) loops cannot be fully completed.

Done *et al.* (2011) identified further enabling factors in what they described as 'best practice interventions' when applied to small and medium sized enterprises (SMEs). The authors also identified that the majority of the case organisations researched as part of their study also did not collect key performance indicators, or data that could be used to assess process performance. Done *et al.* (2011, p. 509) argued that partial implementation of Lean practices does not lead to short or long term success, or allow the practices to develop. This could be viewed as implementing 'fake' Lean. This was an issue Radnor *et al.* (2012) identified more widely in the public sector. The authors stated that focusing on RIEs may not align with an organisations strategy meaning such events may not be sustained in the long term. Papadopoulos *et al.* (2011) also added that 'Lean' has been applied as a label to interventions within the NHS meaning that participants interpret the meaning of the label and the event differently. This paper, therefore, investigates *what purposes do adopting rapid process improvement workshops (RPIWs) serve in building improvement capabilities in healthcare*, if the structure only leads to short term gains, and sustainability is elusive?

Methodology

This paper adopts a multiple case study strategy. The cases were part of an evaluation of a transformational change programme in the National Health Service North East (NHS NE), the North East Transformation System (NETS) (Hunter *et al.*, 2014). The purpose

of adopting a multiple case study approach for this paper comes with a longitudinal examination of a number of RPIWs from within the same transformational change programme. Case studies have been argued to be one of the best ways to make valid observations and contributions to knowledge (Voss *et al.*, 2002). Baker (2011) pointed out that the theory generated from a case study can help make sense of the complexities that are attached to healthcare and in this case the purposes of adopting RPIWs.

Data Collection

RPIW tracking report paperwork was the main data collected for analysis. The paperwork included: an overview (team members, current situation, process flow, TAKT time, targets and boundaries); an analysis of standard work; a progress report that measures prior performance and targets (for space, inventory, staff walking distance, parts travel distance, lead-time, quality, productivity, 5S and set-up reduction). The report-outs include a value stream map, TAKT time calculations and work flow diagrams that show the status before and after the intervention as well as a 30, 60 and 90 day follow-up (which forms part of the RPIW process). The RPIWs were selected through convenience sampling (Teddlie and Yu, 2007). The sample was drawn from a calendar year of RPIW activities when the study sites were expected to be running a high number of improvement events and the unit of analysis was at the hospital Trust level. The data was obtained through liaising with each study sites Kaizen Promotion Office (KPO) lead. From the data collected, 47 RPIWs were analysed. It needs to be highlighted that these 47 RPIWs were the improvement events where documentation was available to analyse.

Data Analysis

Documentary (content) analysis was applied to the 47 RPIWs. This paper reports on the initial analysis of these RPIWs. Adopting content analysis allows a researcher to draw valid inferences from textual/electronic documentation through interpreting the text (Bowen, 2009). Analyses of the RPIW documentation followed the steps of Bowen (2009, p. 32) which are: skimming, reading and interpretation. As an RPIW is standardised, analysis was able to focus on what was included and what was either not there or omitted in the first instance. This allowed the RPIWs to be organised into different categories that allowed the authors to interpret and address the purposes of adopting Rapid Process Improvement Workshops for this case study based on the reporting of such events by the case study sites.

Results

A brief synopsis of the five Trusts where the RPIWs were undertaken are: (A) an NHS Mental Health and Learning Disability Trust (created in April 2006, following the merger of two other mental health and learning disability trusts. Foundation Trust status was granted in mid-2008); (B) was established as an NHS Hospital Foundation Trust in 2005; (C) an NHS Ambulance Trust was formed around July 2006 following the merger of the previous service and part of three other transportation services; (D) an NHS Acute Mental Health and Learning Disability Trust (formed in 2006, subsequently gaining Foundation Trust status in December 2009); (E) a cluster of three primary care trusts (which was treated as a single entity for the purposes of the evaluation as a single management team operated the day-to-day PCT activities during the evaluation period).

The five study sites adopted RPIWs that aimed to achieve transformational change and Figure 1 is used to look at the RPIW activity by calendar month and also by the study sites.

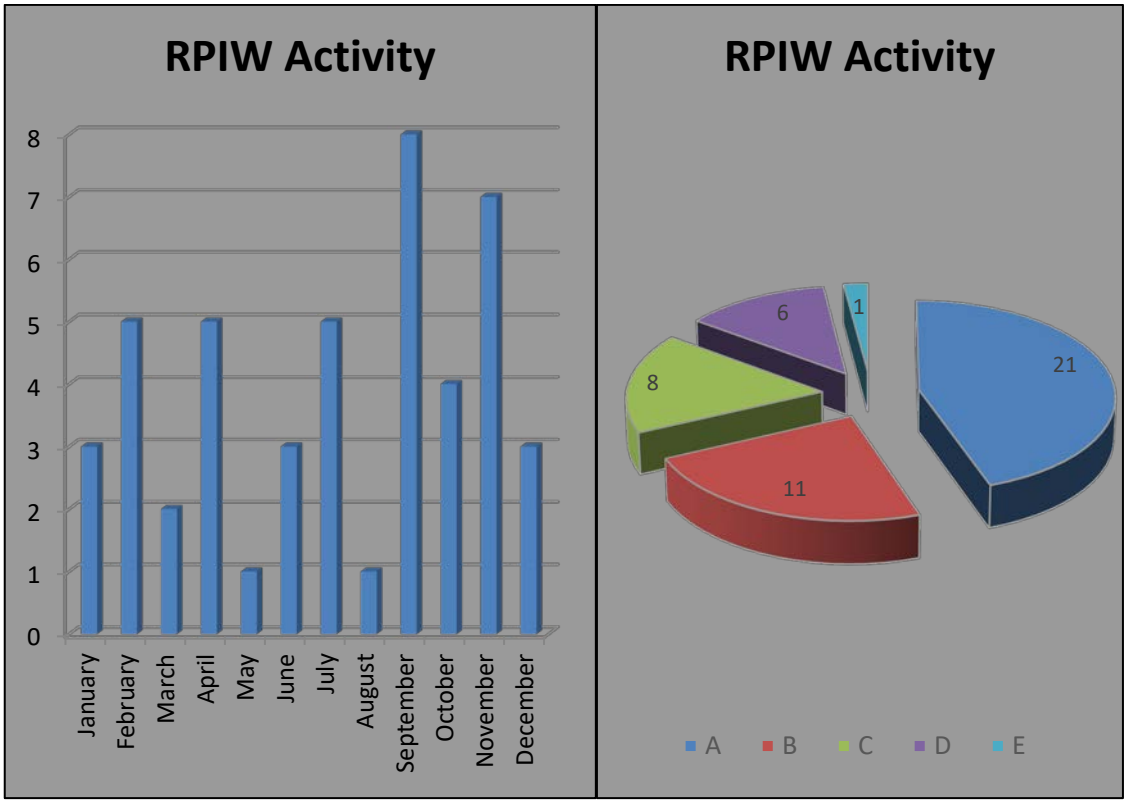

Figure 1 – RPIW Activity by Month and by Study Site

Figure 1 demonstrates that most RPIW activities were undertaken in September and November. What is important to point out is that RPIW activities were undertaken throughout the year, not just at specific times. Study site 'A' completed almost half of all the RPIWs from this sample. Study site 'E' is depicted to have only completed one RPIW. Study site 'E' may have undertaken more than one, but it was not possible to access the paperwork associated with other events. The paperwork also revealed that the structure of the RPIW was as described in the literature as a five-day event that brought together a cross-functional team to improve a pre-determined process.

RPIW Focus

A temptation of an RPIW could be to focus on areas that are seen as easier to tackle initially and where results may be obtained quicker. A review of the RPIW activity was undertaken to see where the study sites were focusing their efforts for this initial analysis. The RPIWs were classified into three categories: Primary, Secondary and Tertiary. A primary classification implies that the improvement event related directly to a patient (e.g., an operation, how drugs are administered, tackling the full patient pathway etc.). A secondary classification identified the improvement event relating to activities that supported patients (e.g., how a ward/room is organised and set up, how patients are transported to and from departments etc.) but did not relate directly to patients' clinical treatment. A tertiary classification looks at an improvement event relating to improving the quality of a patient stay (e.g., the quality of meals, bed linen etc.), or back office activities of a Trust (e.g., staff training, storeroom standardisation etc.). If RPIW activities are focusing more on these tertiary activities then patients may not be experiencing as many positive benefits to their treatment or stay as they might. The outcome can be seen in Table 1.

Table 1 – RPIW Focus by Study Site

Study Site Code	Primary	Secondary	Tertiary	Site Total
A	13	2	6	**21**
B	5	2	4	**11**
C	1	2	5	**8**
D	3	1	2	**6**
E	1	0	0	**1**
Totals	**23**	**7**	**17**	**47**

What can be identified from the analysis is that all of the study sites were identified to have undertaken at least one RPIW that can be classed as primary in nature. Whilst study site 'A' conducted more RPIWs, they also focused more on primary activities. This is similar for study sites 'B' and 'D', whilst not undertaking as many RPIWs, did seem to focus on primary activities. Only study site 'C' seemed to undertake more tertiary activities but this could relate to the core objectivities of the business being more conducive to this focus (an ambulance Trust). It may have been easier to concentrate solely on tertiary activities especially as they may be viewed as easier to tackle – this, however, did not happen.

Completed RPIW Paperwork and Measures

The first part of RPIW process adopts a standard framework that includes: an overview of the situation, which provides information on team members, current situation, process flow, Takt time, targets and boundaries. This information is contained on the RPIW project form. Forty-three of the 47 RPIWS had the process flow completed. One RPIW project form indicated that a process flow was not required to be completed, and three project forms did not indicate why there was not a process flow completed. Value stream maps are produced on a separate document but should accompany the project form. However, only 12 value stream maps were able to be viewed. The Takt time calculation was displayed on the project form and on the target progress sheet. Both documents were checked to identify if a Takt time calculation was recorded. From the 47 RPIWs, 32 displayed a Takt time calculation. Nine of the project forms communicated a Takt time calculation was not required, whilst the remaining six did not indicate that a Takt time calculation was not required so were classed as missing.

Baseline measures were usually collected prior to the RPIW starting. Not all metrics on the RPIW target progress report will be collected as different events will focus on different issues. The VMPS advocates that an improvement event should attempt to reduce lead time, or improve quality. Other metrics an RPIW may address could include: Space (square feet), Inventory (£'s), Staff Walking Distance (feet), Parts Travel Distance (feet), Work in Process (WIP), Standard Work in Process (SWIP), Productivity Gain, Environmental, Health and Safety (5S), and Set-up Reduction (minutes). Out of the 47 RPIWs undertaken, 40 of those RPIWs managed to collect a baseline measure for at least one of the metrics targeted. Thirty-two RPIWs, however, were not able to collect particular metrics as they were recorded as missing. Finally, 24 RPIWs recorded at least one metric as not being applicable for that particular RPIW. Figure 2 depicts the RPIWs ranked by their baseline metrics.

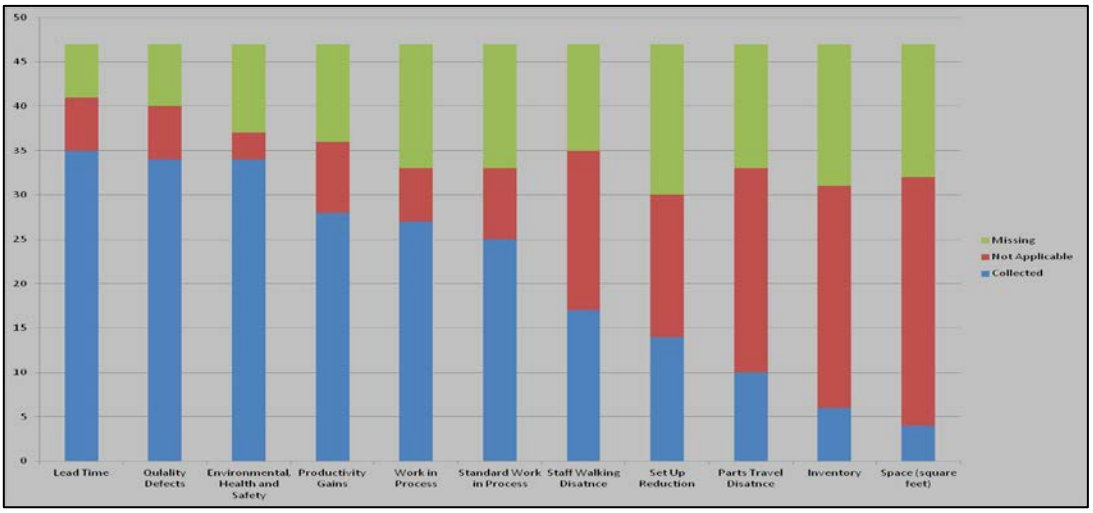

Figure 2 – RPIWs Ranked by Baseline Metrics Collected

Figure 2 demonstrates that lead time and quality were key metrics that were measured and collected prior to an RPIW starting. Environmental Health and Safety (5S), Productivity Gains, Work in Process and Standard Work in Process were also baseline metrics captured for more than half of the RPIWs analysed. Space, Inventory, Parts Travel Distance and Set-up Reduction had the lowest number of recorded baseline metrics but the highest number of metrics marked as not applicable for the RPIW. Set-up Reduction and Inventory, however, had the highest number of metrics missing from the baseline measures. Space, as well as having the lowest number of metrics collected also has a high number of RPIWs with this information missing. Once the baseline measures were collected the five-day RPIW would be undertaken to improve the pre-defined process(s). The RPIW would finish with a report-out on what improvements the event implemented. This competed the first stage of the RPIW, the second stage then requires the improvements to be monitored and followed-up.

Follow-up Activities

The second part of RPIW process requires repeat measures to be taken after 30, 60 and 90 days as a mechanism to embed and sustain the improvement. This study adopted a maturity model classification scheme to look at the follow-up activities. Maturity models have been identified as being developed from the capability maturity models as part of software engineering. The five stages of a maturity model include: "*Level 1: Initial (ad hoc); Level 2: Repeatable (abbreviated, planned); Level 3: Refined (organized, managed); Level 4; Managed (integrated); Level 5: Optimized (adaptive, sustained)*" (Jugdev and Thomas, 2002, p. 6). At stage 1: no 30, 60 or 90 day follow-ups took place. At stage 2: 30, 60 or 90 follow-ups may have taken place, but the target sheets do not reflect this. At stage 3: 30, 60 and 90 day follow-ups took place but not all corresponding measures have been recorded. The change measure may not have been updated. For stage 4: 30, 60 and 90 day follow-ups took place and corresponding measures have been recorded. The change measure has been updated to reflect any changes. Finally, at stage 5: 30, 60 and 90 day follow-ups took place and corresponding measures have been recorded. The change measure has been updated to reflect any changes and further follow-ups may have taken place to maintain focus on sustaining the improvement. In reality, RPIWs may border across classifications. It may be thought that if a majority of the RPIWs are around the (4) managed and (5) optimised stages there is more chance that the improvements will become sustained beyond the 90 day follow-up period.

The analysis identified that from the 47 RPIWs, four were identified to only be classified as maturity level one. Eighteen RPIWs were identified to fall into maturity level two. These RPIWs may have undertaken the 30, 60 and 90 day follow-ups, but the paperwork does not reflect this. If the paperwork or follow-up activities cannot be accessed, identifying how improvements came about, or what the actual improvements in terms of measurement were, cannot be shared or learnt from. Further, it suggests that 'Lean' was viewed as a training/one-off intervention rather than as continuous improvement. These outcomes may need to be accessed in the future to continue improving, or learn how a particular RPIW overcame a particular challenge. If the paperwork and measures are not correct individuals cannot do this. Only two RPIWs were identified as falling into maturity level three. The main issues associated with these RPIWs related to the corresponding measures not being recorded for all metrics and the change measures not being updated. These issues should be quite easy to rectify going forward, so it may be a case of focusing on the outcomes of the RPIW and recording any difficulties that may have been encountered. The remaining 23 RPIWs fell into categories four and five. These RPIWs were identified to be more managed and optimised in terms of following-up the RPIW activities and recording the re-measures/updating appropriate measures where necessary. Category 4 and 5 RPIWs were also identified to include additional information that made understanding what challenges and issues were encountered as well as how these challenges were being managed. The breakdown of RPIW activities by study site can be seen in Table 2 below.

Table 2 – Maturity Level of Follow-up RPIW activities by Trust

Maturity Level	Trust A	Trust B	Trust C	Trust D	Trust E
One			1	2	1
Two		9	5	4	
Three		1	1		
Four	13	1	1		
Five	8				

Table 2 demonstrates the classification of RPIW activities against the Trusts. It can be seen from Table 2 that Trust 'A' were able to conduct a full cycle of follow ups indicating that the improvements were more likely to be embedded. The remaining Trusts fit into a number of maturity classifications. Maturity classifications has allowed a wider perspective to be taken on reviewing how standardised the approach was in terms of managing and optimising the RPIW process.

Conclusion

The initial analysis of 47 RPIWs identified that they provide a just-in-time approach to training and learning about Lean tools through a standardised structure. This was also identified within the literature. A second role relates to following-up the improvements. If following-up activities are not undertaken there is less chance of improvements being sustained over the longer term. If RPIWs cannot go through the complete follow-up process they cannot really play a role in long term sustainability besides training in Lean tools. It is in this second role, however, that this study has identified conflicting outcomes. Most publications on 'Lean' or improving healthcare report positive improvement

outcomes. This work revealed initially positive improvements but in the majority of cases they were unlikely to be sustained due to a lack of follow-up. What is more interesting is that both the positive and unsustainable improvements occur from different units within the same case study. This work suggests that if the emphasis is solely on the method, then it is not surprising that the 'improvement' events focus on the application of tools only. It is not the method that produces change or continuous improvement long-term. Trust 'A' seems to be able to do this more effectively, but it is unknown how. It is important, therefore, to identify how the vision, compact and the method have been aligned. This research is limited in its scope as it relied on analysing the standard improvement documentation to determine improvement outcomes. Further work can be undertaken to triangulate this documentation with observations of improvement events and follow-up interviews with stakeholders.

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