MANCHESTER 1824
The University of Manchester

The University of Manchester Research

Toyota Kata

Document Version
Accepted author manuscript

Link to publication record in Manchester Research Explorer

Citation for published version (APA):
Proudlove, N., & Furnival, J. (2020). Toyota Kata: A missing link in quality improvement in healthcare? . In *Proceedings of the 27th European Operations Management Association Conference: EurOMA27* (pp. 1818-1827)

Published in:
Proceedings of the 27th European Operations Management Association Conference

Citing this paper
Please note that where the full-text provided on Manchester Research Explorer is the Author Accepted Manuscript or Proof version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version.

General rights
Copyright and moral rights for the publications made accessible in the Research Explorer are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Takedown policy
If you believe that this document breaches copyright please refer to the University of Manchester's Takedown Procedures [http://man.ac.uk/04Y6Bo] or contact uml.scholarlycommunications@manchester.ac.uk providing relevant details, so we can investigate your claim.

OPEN ACCESS

Download date:24. Jul. 2020

Toyota Kata: a missing link in quality improvement in healthcare?

Nathan Proudlove (nathan.proudlove@manchester.ac.uk)
Alliance Manchester Business School, The University of Manchester

Joy Furnival
Alliance Manchester Business School, The University of Manchester

Abstract

There is great attention in the literature to how to achieve the culture change necessary for adopting and sustaining quality improvement, particularly 'lean', in anything more than a superficial way. This is a particularly prominent issue in the English NHS. Toyota Kata is a set of organisational routines designed to embed the foundational behaviours underlying Toyota's management system. They are currently being tried for the first time in the NHS. We find evidence that, even in this very challenging environment, kata can develop lean management behaviours. Though it is necessarily slow and demanding, these behavioural habits can be embedded.

Keywords: Toyota Kata, NHS, quality improvement

Introduction

The literature has now gone beyond *whether* QI (and in particular 'lean') can improve performance to *how* to implement it successfully and why this can be difficult (Netland *et al*, 2015). Increasing attention is being paid to the importance of lean management (or leadership) behaviours (or practices, routines or rules), e.g. Camuffo and Gerli (2018). Descriptions of such practices, underlying the well-known lean principles and tools, goes back several decades. Whilst the academic literature focuses on synthesising or deriving lists of lean management practices, and relating these to implementation success, they are rather abstract and so may be of limited use to managers (Netland *et al*, 2019).

There are exemplars of work to introduce lean to healthcare, but many attempts are limited, with a focus on tools (Blackmore and Kaplan, 2017) and, in particular the English NHS has struggled with the culture change required for wide and deep adoption (Radnor *et al*, 2012).

Toyota Kata (Rother, 2010) are suggested practical *routines* to enact lean management behaviours, and so establish the foundations for a lean (Toyota-like) culture. Some use of Toyota Kata has been made US healthcare, but there is little real consideration of this in the academic literature.

This paper takes the opportunity of another wave of NHS 'lean', which for the first time includes Kata, to investigate the research questions: in NHS organisations:

- to what extent can Toyota Kata embed lean management behaviours?
- what challenges and rewards are there in using Toyota Kata?

Literature

The essence of lean thinking has long been recognised to be disciplined scientific problem solving (hypothesis-driven active experimentation and discovery), forming the cornerstone of continual organisational learning and improvement (Spear and Bowen, 1999; Spear, 2004; Secchi and Camuffo, 2016).

Despite this, many organisations have focused on the (more visible) tools and techniques (Netland *et al*, 2019; Hines *et al*, 2020) whilst researchers increasingly argue for the importance of the management system and culture in Toyota Production System – but recognising they are difficult to imitate and sustain (Samuel *et al*, 2015; Camuffo and Gerli, 2018). These underlying fundamental behaviours, which guide how things are done around here, are sometimes differentiated as the Toyota Way (Jayamaha *et al*, 2014; Hines *et al*, 2004). Both academics and practitioners have attempted to synthesise lean management behaviours. Table 1 lists what may be the first, and three recently used sets.

Table 1 – Selected sets of lean management behaviours

25 LEAN BEHAVIOURS (Emiliani, 1998)	14 LEAN MANAGEMENT BEHAVIOURS (Camuffo and Gerli, 2018)	8 IMPROVEMENT ROUTINES (Knol *et al*, 2019), *from Bessant et al (2001)'s widely-used instrument 8 key routines associated with CI*	6 GENERIC LEAN LEADERSHIP PRACTICES (Netland *et al*, 2019), *based on Spear (2004)'s **4 lessons** + 2 more*
Humility	Organizational focus	Understanding improvement	**Go and see**
Compassion	Managerial responsibility	Getting the improvement habit	**Structured problem-solving**
Suspension	Basis of performance evaluation	Focusing improvement	**Continuous improvement**
Deference	Planning	Leading the way	**Coaching**
Calmness	Managerial versatility	Aligning improvement	Daily layered accountability
Quietude	Managerial development	Shared problem-solving	Strategic alignment
Reflection	Decision making	Improvement of improvement	
Honesty	Problem solving	The learning organisation	
Benevolence	Standards development		
Consistency	Supportiveness		
Generosity	Managerial reflexivity		
Patience	Capability development		
Humour	Managerial mindset		
Understanding	Challenge		
Respect			
Listening			
Observation			
Trust			
Sincerity			
Equanimity			
Objectivity			
Discipline			
Rectitude			
Wisdom			
Balance			

Whilst Camuffo and Gerli (2018) and Knol *et al* (2019) empirically demonstrate a link with adoption of lean operational practices (such as pull), (Netland *et al*, 2019) questions how useful these abstract concepts are in helping practitioners appreciate *what* to adopt and *how* to spread and sustain it. As Rother (2010, p. xvi) notes, the literature:

> "provide[s] lists of the organization's practices or principles… [which] circumvents explaining how Toyota manages people and … are not actionable… practices and principles [are] an *outcome* from its members' routines of thinking and behaviour. …culture arise[s] from the routines and habits by which the people in the organization conduct themselves every day. It is an issue of human behaviour."

It is this problem that the Toyota Kata are intended to address. Rother (2010) suggests two 'starter' kata: the process operator (Learner) practises the Improvement Kata, with the support of their Coach, who is practising the Coaching Kata (Fig.1). Two further texts (Rother, 2017; Rother, 2018) are designed to guide adoption, with very strong emphases on a Coach starting as a Learner, and the need to practise frequently to make the mindsets habitual patterns of thinking.

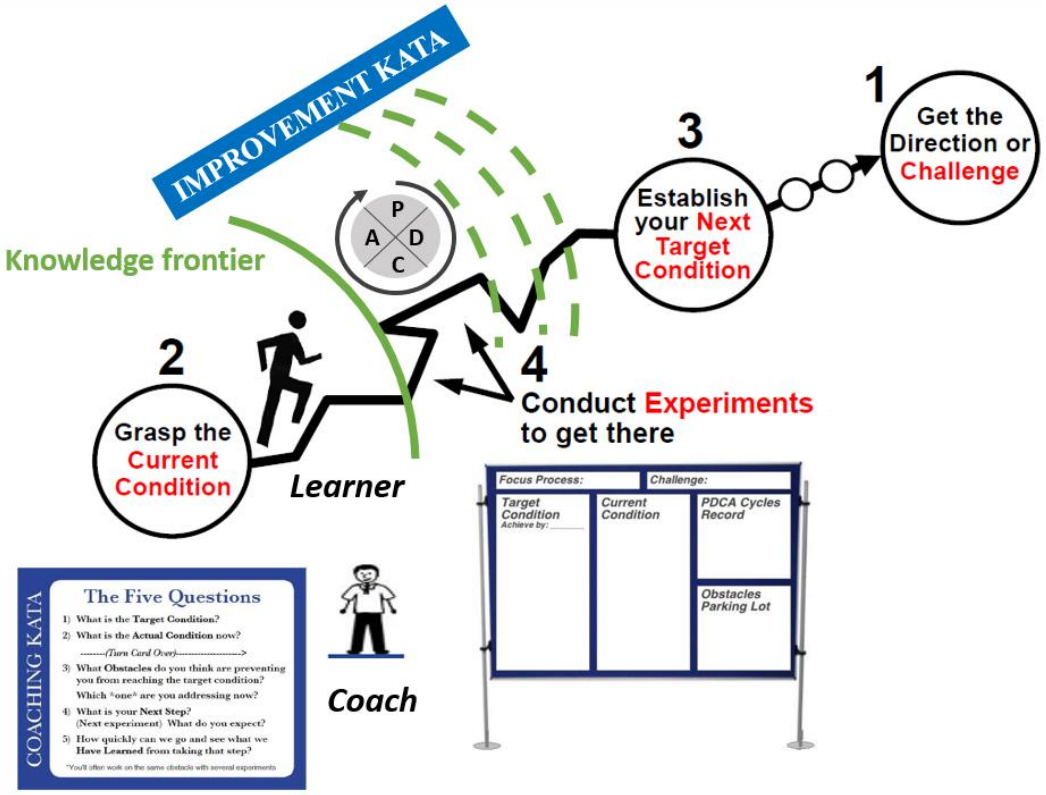

Figure 1 – Starter Kata (based on slides by Mike Rother, Creative Commons)

The Improvement Kata provides a framework for PDCA cycles, as well as any useful process analysis tools to establish the Current Condition (method of working and performance level). The Learner's Board (bottom right of Fig.1) might be viewed as a variant of the A3, and can be regarded as another view of what others have described as Toyota's 8-step process or A3 problem solving (Liker, 2004). Indeed these Toyota Kata are acknowledged in the literature as "a good description of coaching behaviours in a lean environment" (Netland *et al*, 2019, p.545) and to parallel the Toyota Way's *Respect for People* (high-involvement human resource practices to developing people's capabilities) (Jayamaha *et al*, 2014). The first text (Rother, 2010) is highly cited, but as a source on lean or the Toyota Production System: kata themselves are very rarely mentioned in the academic literature and we found no academic investigations into use.

The one faithful adoption found is a first-hand descriptive account from a construction firm. They report in a conference paper (Casten *et al*, 2013) how, after implementing and tailoring the Starter Kata, they developed a 'Conformance Kata' with amended coaching questions. They report it being popular with workers and managers as it standardised

interactions and clarified expectations for both. Rother suggests organisations would become comfortable with the starter kata, then develop their own, as here. There is very little reporting of this in the literature.

Two healthcare journal papers (Merguerian *et al*, 2015; Boyce *et al*, 2019) mention use of Toyota Kata in the US, but only in passing. The former inaccurately describes kata as a 'tool' in a paper that mainly describes time-driven activity-base costing, and is cited by several other healthcare papers which conflated the two.

Holmemo *et al* (2018) describes what they describe as *similar* to Toyota Kata, used by a large international consultancy firm and labelled as 'Kata', which would seem to be the firm's take on it. They were attempting to implement lean in a public sector company in Norway, coaching client teams through A3-focused problem solving. The researchers report this was unsuccessful: after 18 months client enthusiasm had waned, and staff had reverted to a tools-based mindset. Suggested causes include insufficient client senior commitment, reversion to the consultants' natural directive style, age/seniority issues between consultant-coaches and experienced client staff, and insufficient time allowed for developing internal coaches and routines.

Methodology

In 2018 one of the authors (JF) had been on a scouting trip to the University of Michigan, on behalf of the NHS, to take part in Toyota Kata familiarisation and see it in action in a hospital, where the CEO was themself coached as a Learner during an executive meeting, and at a mail order firm (see Liker *et al* (2019)). Subsequently she was involved in developing the familiarisation sessions for the NHS and coaching a first group (an 'Advance Party') in an acute hospital trust. Moving to academia in 2019 presented the opportunity to look at Toyota Kata in the NHS from an academic point of view.

To develop this paper, we used the Toyota Kata logic of Vision → Challenge → Current Condition → Target Condition → Obstacles → countermeasures → Experiments. The Challenge was to develop the paper; the first Target Condition was to understand the attention paid to Toyota Kata in the literature; and the Experiments were of the 'Go and See' type (Rother, 2018). To experience the kata process, JF coached NP over 10 weeks.

Academically this was literature reviewing, systematically looking at all mentions of Toyota Kata in the Scopus database. We used the *R* programming language to merge the search results from Scopus with information about journal academic field and reputation (using the Academic Journal Guide from the Chartered Institute of Business Schools). Sources not in the list were coded by hand. This data-driven approach was also useful to update the search and look at the development of interest over time.

The next Target Condition was to find out whether Toyota Kata use and experience 'on the ground' was as the kata literature would suggest and what obstacles and countermeasures were emerging in the NHS context. We undertook fieldwork in an acute hospital trust ('OrgA') (not the one JF had coached at) and a Community provider ('OrgB'). Both had adopted kata as part of a national lean-based initiative. The sites were chosen to contrast environments. OrgA, in common with all acute hospital trusts has a very wide range of inpatient and outpatient services and many staff have encountered a variety of quality improvement (QI) initiatives previously – this is where the bulk of QI activity has occurred in the NHS over the past decades. OrgB, again as usual, was smaller, but runs several community hospitals with minor accident and daycase surgery units and inpatient rehabilitation, adult social care, and mental health and learning disabilities. There has been much less operations-management-style QI activity in this sector.

We observed five coaching sessions (around 10-15 minutes each) and conducted 14 semi-structured interview sessions (around 30-40 minutes each) with 15 Learners (five of

whom were also experienced coaches and three of these we regarded as 'Champions' for kata). The interviews were structured along the lines of the kata and designed to pick up experiences, obstacles, learning and results. Sessions were audio recorded (with permission), transcribed and coded for lean management behaviours and other interesting aspects to enable thematic analysis (using templates (King, 2012)).

We finished the above fieldwork on the last day of February. Coronavirus planning was starting in the organisations, and the first attributed deaths in the UK occurred throughout the following week. Further fieldwork, including deepening contacts with two other NHS organisations adopting Toyota Kata has not yet been possible.

Findings

Literature

Our first Target Condition was to become familiar with the academic literature on Toyota Kata. Our prediction was there would be papers particularly in Operations & Technology journals, with possible spill over to the adjacent Operational Research & Management Science field, a few descriptive cases from US healthcare and nothing from the NHS. Though the search for 'Kata' and ('Toyota' or 'Rother') in English produced over 300 papers and books, as described in the Literature and Methodology sections, a methodical search through this revealed no clear investigations into use of Toyota Kata in the academic literature. This is backed up by finding only one citation of the Practice Guide (Rother, 2018), and this again only a passing mention in the context of general lean. This was surprising.

Personal experience with using kata for this 'go and see' was a useful experience. Compared with usual academic pace and juggling of multiple priorities, being a Learner felt uncomfortable and stressful at times. It certainly bumped the work up the list of priorities, especially versus the usual 'urgent-but-not-so-important' tasks. It produced a strong feeling of responsibility or accountability for doing what one had committed to. This was successful in overcoming obstacles of procrastination and prioritisation: agreeing to the content next step (experiment) and a data and time to review the outcome (at the next coaching session in one or two days' time). We also discovered that, in this academic context (with an abstract 'gemba'), coaching could be done fairly satisfactorily remotely by sending photographs of the Learner Board in advance of a telephone coaching session.

Kata in practice in the NHS

Kata had been introduced to organisations over a year previously, so we initially expected considerable kata activity. However, less formal links and visits to another trust had made us question that. Given knowledge of the intention and workings of the kata, as designed, we expected it to be developing lean management behaviours, though were very aware of the strong emphasis on perseverance to build habit, whereas the NHS QI has had a 'tools' mindset and tendency of picking up a wide range of tools rather than focusing on fundamentals first.

At OrgA we interviewed three experienced QI coaches [A7-A9], the QI Champion [A9] and six middle managers [A1-A6] who had been learners for 2 to 12 months, only one was coaching formally. At OrgB we interviewed two very senior managers, who had been learners and coaches for over a year [B1 & B2], and four senior managers [B3-B6] (direct reports of B2) who had been learners formally and concertedly for one to four months (some had been involved informally on and off for longer), they were beginning to coach their own direct reports.

Interviews were coded to attempt to pick up lean management behaviours, primarily using Camuffo and Gerli (2018)'s 14 items. Without clear definitions for some of the items, we found this rather difficult to use, but did find clear evidence of the kata practice building all behaviours. A couple of examples are:

- *Problem solving*

"in the NHS you get into that mind-set that it has to be a positive outcome from whatever I'm doing and it is getting over that, you know, it doesn't matter what the outcome is, it is all learning." [A2]

Though it seems slow at first you then realise it is a richer method and have got better results [reported B2]

"this approach of not coming up with solutions and using experiments to test things out is quite different, I guess. And also, that really structured way of going through obstacles. So, I have never really done that before [in the past I] worked out a way to get there but never really had a structure to do it." [B1]

"kata gives permission to do things differently" [B5]

- Supportiveness

The Learners feel valued and appreciated [B2]

"I have really noticed that you work better as a team … what is it I need to do to help YOU, so that is kind of great as a way to get more out of them through the coaching approach." [B1]

- *Managerial reflexivity*

The kata champions are continually thinking about how to embed kata better [B2]

"And every time I coach now, I take a moment just to put myself in that mindset… I remind myself that I am coaching a learner, and stopping myself, making sure I don't do that operational management thing of telling the solutions… I know that my learner knows to expect those questions and they also know that I will ask clarifying questions" [B1]

- *Capability development*

"When I first started doing it, I felt all fingers and thumbs. And I guess it is that bit about wanting to get it right. Because it is really different, isn't it?" [B1]

"using different types of questioning, that's what I have noticed about what I do differently now since I started practising kata." [B1]

"all my 6 deputies are all practising and starting to coach and then my service support manager, and then pockets of people… It absolutely could be that everybody is a learner." [B1]

- *Managerial mindset*

"in the NHS … there are projects which are protracted, which suck in resources, … they have just been allowed to run and run and run. No end. And eventually someone will pluck up the nerve to say, you know this is going nowhere, maybe we should stop. We have wasted so much time. This kata approach, … is the perfect way to try something out, without any fear" [A2]

One senior manager reported it becoming her new habitual routine: "I feel like it has now become the way I work, you know: what is that challenge? where do I want to get to next? where am I now? what are my obstacles?" [B1]; her senior colleague had observed her using Kata thinking informally when running other tasks like team huddles [B2].

"I do find myself using the word 'obstacles' more and trying to focus on resolving them …. So, I know I'm thinking differently about my approach to what I'm doing" [B3]

Of the 14 behaviours, there was notably less mention of *Organisational focus* and *Standards development*. For the former this may be because the learners are still on their

first or second Challenge, so often looking at established, front-of mind problems, though the mechanism for the behaviour is clearly present where the learner is being coached by their manager or someone even more senior – as was generally the case (or at least the intention after initial practice) in both organisations. The need for metrics for the kata did drive some *Standards development*, and kata projects were being used to support development of visual management boards, but both organisations had a focus on marked improvement more than standardising existing operating procedures.

There were strong behaviours that more-closely matched items from other sets in Table 1. These are picked out in the Discussion. Some other learning and behaviours were:

Individual learning

Commonly-reported learning is the value of **relationships** – from experimenting with going to talk to someone rather than the old habit of send an email "because I'm so busy" [observed by B2]; "the tiny steps help make that connection with people and getting to know people again" [B1]; "it had relational value" [B3]

Knowledge is *really* not **understanding** – at the levels of Learner, Coach and 2nd Coach – one has to practise and experience it

A fairly common experience is not having **time** to do the agreed step before coaching. Going ahead with coaching anyway can lead the Learner to realise that this is an Obstacle to Experiment with Countermeasures against – these are lightbulb moments. Related is the discipline, **prioritisation** and constancy of purpose. Managers comment that they never have one job at a time, but sticking to the next step [Experiment] is surprisingly effective. "When I started this, I did think I won't have time to do this… I think quite quickly I switched from 'this is extra work' to thinking 'this is really helping me to do my work'… one of my learners last week, lobbed [lack of time] off [her list of obstacles] because she has said, 'this has really helped me to work and I do have time, this is important and it is what I'm going to do'"[B1]. Intrinsic rewards started to develop too: it became rewarding in itself: "I really found I started to enjoy using it. And I started to see results from it as well." "I'm really passionate about it" [B1] "It is really great when you see that moment, when they go 'Hah' and there is a proper lightbulb moment." [B1]

A manager recently starting to use kata regularly still felt the tension between really liking in and not having time to do more and "part of it is: have I done the work to be coached? There is always that fear because you're thinking 'right, when am I going to do what needs to be done? Because she's going to come and ask me!'" this bumps it up the priority list [B3].

Technical difficulties reported are getting the hang of the **terminology**, which seems "alien" [B1], strange) or a struggle (at first, then all-but-one said it becomes comfortable; and of establishing the **Target Condition**. This was much stronger at OrgB where most staff had nursing or similar backgrounds; in OrgA most interviewees had science or a longstanding managerial background (usually including QI).

Adopting, Spreading and Sustaining

This is itself, of course, a Challenge and each step is an Experiment to overcome Obstacles and which may reveal further Obstacles. OrgB had a faltering start with how they tried to spread kata, but learnt a lot. A major problem at both organisations was **coaching capacity** as cohorts of Learners finish familiarisation and are ready (and usually eager) to start; a coach can cope with up to 3 or 4 Learners and if it's several days before coaching can start it can feel like starting from scratch. Having a **consistent Coach** was also found to be important for a new Learner to persevere: at OrgB several learners had dropped out, and at OrgA some learners were struggling without much coaching support.

This can be compounded by the NHS habit of 'equitable' access, meaning places for new Learners are **spread thinly**, compounded at OrgB by geographical separation, which also exacerbates the coaching shortage. Have experimented with **virtual coaching,** OrgB found face-to-face best, but videocon better than phone, and phone still useful as a last resort.

As a response to obstacles to spread OrgB, is experimenting with **organic spread**, with pull from direct reports who have seen their bosses doing it and their Learner Boards: "I kind of felt privileged" to join. They recommend starting with like-minded people (noting kata seems to appeal more to organised, methodically-minded people), and had several start informally 'on-the-job' with a Coach, whilst OrgA had been more directive about who and what areas were enrolled.

A really notable contrast between the organisations was in OrgB the immense hands-on commitment of the champions, including hosting a supportive **community** of TK practitioners meeting face-to-face weekly to do coaching in front of the group and learn from each other's strengths & weaknesses and board progress. All interviewees in the organisation commented on this. There was opportunity for similar in islands of kata learners in various departments in OrgA, but interviewees only recognised this as an aspiration for the future – even when they could see colleagues' boards around. Though still committed, it felt a much lonelier experience. This may be a result of the attempt at greater pace of spread and that at OrgA kata was clear just one part of a much wider set of lean-type application and usually layered on a lot of previous QI/lean experience. In OrgB it was generally staff's first encounter with 'proper' QI and the most prominent practice in the package of initiatives.

Discussion

As noted, we found some of the behaviours in other sets in Table 1 came out prominently. Knol *et al* (2019) / Bessant *et al* (2001)'s *Leading the way* is an espoused part of kata, and came out strongly in OrgB. The very senior managers' enthusiasm and very visible Toyota Kata practice lead their direct reports to want to get involved. They also exhibiting Emiliani (1998)'s *humility* by being coached in group meetings – as was the US hospital CEO mentioned in the Methodology. Recognising that the senior leaders "know how bloody hard it is" [B3] and make time to coach, despite being really busy, inspires staff to make the effort too. B1's comments about the value of the step-by-step disciplined Kata practice mirror (Knol *et al*, 2019) / (Bessant *et al*, 2001)'s *focus the improvement.*

More generally comments about kata being slower, but richer and with better results, resonates with much research into low quality problem solving behaviour in healthcare (e.g. with PDSA (McNicholas *et al*, 2019)). The quotes from many staff about it being their new way of problem solving demonstrates that it has become established as new habitual behaviour – the habit loop of cue, routine, reward (Duhigg, 2012) has been retrained. Several remarked that it was hard for them as experienced managers to adopt coaching rather than directive style, as also noted in the literature (Netland *et al*, 2019), but disciplined practice was overcoming this. It is also recognised to be difficult to coach a superior (Holmemo *et al*, 2018; Netland *et al*, 2019), but this was not encountered in OrgA where there is little evidence of upward spread yet, or OrgB where there is a flat hierarchy and close, supportive relationships.

The supportive community in OrgB represents the 'community of scientists' Spear (2004) notes that the TPS aims to build. Peer support (and pressure!) is also an important motivator to preserve with a new routine to habituation (Duhigg, 2012). The enjoyment and passion expressed, in particular by B1, suggests Deming's joy in work and echoes

Christensen *et al* (2012)'s comments about the most rewarding aspect of management being developing staff and increasing their own joy in work.

The use of Kata thinking, informally, in other routines suggests scope for developing new Kata (e.g. a 'Huddle Kata'), as recommended by Rother and reported by the construction firm (Casten *et al*, 2013).

Our interviewees were selected by champions in the organisations visited, so we did not have the chance to interview those who had tried kata but dropped out. However, our aim was not to examine the proportion of uptake, but to investigate whether, here, finally, was an approach that could do what others have signally failed to do: to build the sort of culture of behaviours that the literature agrees is necessary for deep and sustained lean adoption.

Conclusion

It has been notoriously hard to build QI (for example 'lean') culture in the NHS, with most initiatives being tool- and project-based, developing little capability. Acute trusts have the challenge of large amounts other current and previous initiatives, with thinly spread QI-specialist support. Towards the other end of the spectrum, community-delivery organisations have staff with less-technical backgrounds, geographically thinly-spread and with little or no specialist QI support.

We have seen, though, that, even in these challenging environments, Toyota Kata can be the vehicle for developing lean management behaviour. Crucially, it can make scientific problem solving habitual to form, as in the TPS, the foundation for solid and on-going QI.

However, it is very different from other QI initiatives – it is a fundamental practice rather than a tool for mass training and 'roll-out' or one-off facilitation. To produce the change in habitual mindset it is intensive and demanding. The need for coaching suggests that patient organic growth, connected with line management (as standard management work) seems appropriate. The start-up from scratch is particularly difficult. The charismatic *leading the way* and commitment to a supportive community of practice in OrgB was striking and bearing fruit.

As a final reflection, most improvement activity in the NHS has been enacted through events like training workshops or rapid improvement events, bringing together fairly large groups of people. This of course has potential benefits from sharing knowledge and creating networks but can be difficult under conditions of social distancing and reduced travel. Developing quality improvement capability through Toyota Kata fits this 'new normal' well: short (10-15 minute) standing meetings of two people (or three if a 2nd Coach is available), 2m apart in front of the Learner Board, as Liker and Convis (2011) advocate: building culture by practice

Acknowledgments

We are very grateful to the staff of the anonymous NHS organisations who agreed to be interviewed, audio recorded and observed for this research.

References

Bessant J, Caffyn S and Gallagher M (2001). "An evolutionary model of continuous improvement behaviour". *Technovation*, Vol. 21, No. 2, pp. 67-77.

Blackmore CC and Kaplan GS (2017). "Lean and the perfect patient experience". *BMJ Quality & Safety*, Vol. 26, No. 2, pp. 85-86.

Boyce JM, Laughman JA, Ader MH, Wagner PT, Parker AE and Arbogast JW (2019). "Impact of an automated hand hygiene monitoring system and additional promotional activities on hand hygiene

performance rates and healthcare-associated infections". *Infection Control and Hospital Epidemiology*, Vol. 40, No. 7, pp. 741-747.
Camuffo A and Gerli F (2018). "Modeling management behaviors in lean production environments". *International Journal of Operations & Production Management*, Vol. 38, No. 2, pp. 403-423.
Casten MH, Plattenberger J, Barley JM and Grier C (2013). Construction Kata: adapting Toyota Kata to a lean construction project production system. *IGLC-21*.
Christensen C, Allworth J and Dillon K (2012). *How will you measure your life? Finding fulfilment using lessons from some of the world's greatest businesses.* HarperCollins: London.
Duhigg C (2012). *The power of habit: Why we do what we do and how to change.* Random House: London.
Emiliani ML (1998). "Lean behaviors". *Management Decision*, Vol. 36, No. 9, pp. 615-631.
Hines P, Holweg M and Rich N (2004). "Learning to evolve: a review of contemporary lean thinking". *International Journal of Operations and Production Management*, Vol. 24, No. 10, pp. 994-1011.
Hines P, Taylor D and Walsh A (2020). "The Lean journey: have we got it wrong?". *Total Quality Management & Business Excellence*, Vol. 31, No. 3-4, pp. 389-406.
Holmemo MDQ, Rolfsen M and Ingvaldsen JA (2018). "Lean thinking: outside-in, bottom-up? The paradox of contemporary soft lean and consultant-driven lean implementation". *Total Quality Management & Business Excellence*, Vol. 29, No. 1-2, pp. 148-160.
Jayamaha NP, Wagner JP, Grigg NP, Campbell-Allen NM and Harvie W (2014). "Testing a theoretical model underlying the 'Toyota Way' – an empirical study involving a large global sample of Toyota facilities". *International Journal of Production Research*, Vol. 52, No. 14, pp. 4332-4350.
King N (2012). "Doing template analysis" in Symon G and Cassell C (Eds.) *Qualitative organisational research: Core methods and current challenges.* SAGE: London, 426-450.
Knol WH, Slomp J, Schouteten RLJ and Lauche K (2019). "The relative importance of improvement routines for implementing lean practices". *International Journal of Operations & Production Management*, Vol. 39, No. 2, pp. 214-237.
Liker J and Convis G (2011). *The Toyota Way to Lean Leadership: Achieving and Sustaining Excellence through Leadership.* McGraw-Hill: New York.
Liker J, Lander E and Mondisa J-L (2019). "Unpacking the possibilities: Using kata to engage employees in continuous improvement". *Lean & Six Sigma Review*, Vol. 19, No. 1, pp. 10-17.
Liker JK (2004). *The Toyota Way: 14 management principles from the world's greatest manufacturer.* McGraw-Hill: New York.
McNicholas C, Lennox L, Woodcock T, Bell D and Reed JE (2019). "Evolving quality improvement support strategies to improve Plan–Do–Study–Act cycle fidelity: a retrospective mixed-methods study". *BMJ Quality & Safety*, Vol. 28, No. 5, pp. 356-365.
Merguerian PA, Grady R, Waldhausen J, Libby A, Murphy W, Melzer L and Avansino J (2015). "Optimizing value utilizing Toyota Kata methodology in a multidisciplinary clinic". *Journal of Pediatric Urology*, Vol. 11, No. 4, pp. 228.e1-228.e6.
Netland TH, Powell DJ and Hines P (2019). "Demystifying lean leadership". *International Journal of Lean Six Sigma*, Vol. 11, No. 3, pp. 543-554.
Netland TH, Schloetzer JD and Ferdows K (2015). "Implementing corporate lean programs: The effect of management control practices". *Journal of Operations Management*, Vol. 36, No., pp. 90-102.
Radnor ZJ, Holweg M and Waring J (2012). "Lean in healthcare: The unfilled promise?". *Social Science & Medicine*, Vol. 74, No. 3, pp. 364-371.
Rother M (2010). *Toyota Kata: managing people for improvement, adaptiveness and superior results.* McGraw-Hill: New York.
Rother M (2017). *Toyota Kata culture.* McGraw Hill Education: New York.
Rother M (2018). *Toyota Kata practice guide.* McGraw-Hill: New York.
Samuel D, Found P and Williams S (2015). "How did the publication of the book The Machine That Changed The World change management thinking? Exploring 25 years of lean literature". *International Journal of Operations & Production Management*, Vol. 35, No. 10, pp. 1386-1407.
Secchi R and Camuffo A (2016). "Rolling out lean production systems: a knowledge-based perspective". *International Journal of Operations & Production Management*, Vol. 36, No. 1, pp. 61-85.
Spear S (2004). "Learning to Lead at Toyota". *Harvard Business Review*, Vol. 82, No. 5, pp. 78-91.
Spear S and Bowen HK (1999). "Decoding the DNA of the Toyota Production System". *Harvard Business Review*, Vol. 77, No. (5): Sep-Oct pp. 97-106.