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I am passionate about Lean, Six Sigma or Lean Six Sigma in higher education (HE). Lean is a methodology of high performance, enabling organizations to focus on improvement and value. Respect for people and continuous improvement is the foundation of Lean. Lean has a long history in manufacturing, more recently in the service environments, health, and the wider public sector. Application of Lean in HE has the potential to transform this sector too, and the number of Lean practitioners in universities is increasing.

Stephen Yorkstone enables continuous improvement in Edinburgh Napier University as an internal consultant. In his role, he facilitates and runs interventions, from "process reviews" to more tailored workshops; convenes an internal community of practice; and delivers support and advice informally and formally in terms of consultancy, coaching and training. He is an experienced speaker, trainer, coach, working with senior leaders on facilitation and change. Externally to the University, he chairs Lean HE, the international organisation for continuous improvement in universities (www.leanhe.org.). Lean HE conducts an international conference annually and operates three continental divisions, each of which organises a programme for universities in their regions. In previous roles, he has worked with several Universities, including establishing the 'Lean team' in the University of St Andrews where he co-designed the Lean 'St Andrews Model' and established their internationally successful consultancy services.

This book, *Global Lean for Higher Education*, edited by Stephen Yorkstone, consists of contributions that that represent the global practical applications of Lean HE. It aims to demonstrate the scope of how Lean is implemented in universities, in a way that can inspire others to engage deeply in their specific context with Lean Thinking; to drive efficient, productive, sustainable, lean work. Lean HE provides the university with an established platform to tackle these challenges and fulfil other essential tasks.

In *Global Lean for Higher Education*, the editor aims to offer a broad range of readings from lean experts and practitioners from all over the world, sharing findings, methods, resources and case studies that provide rich knowledge and practical observations that can direct universities pursuing Lean adoption. It provides a useful compendium for universities exploring the possible application of Lean at their institutions. It also offers additional tools and approaches and suggests new ideas for continuous improvement to further enhance efforts at universities that are currently implementing Lean.

The authors are 24 well-known Lean HE experts, as well as emerging practitioners. They reside internationally, in countries like Australia (3 chapters), Canada (1 chapter), Malaysia (1 chapter), Poland (2 chapters), the United Kingdom (16 chapters) and the U.S. (1 chapter). They represent higher education environments ranging from specialised teaching institutions to research-focused universities; from universities less than 50 years old to universities more than 800 years old.

This book is not focused on Lean theory. Instead, it discusses how HE institutions have taken Lean forward and lessons learned. It comprises six sections and a total of 24 chapters:

1. Starting out (5 chapters)
2. People (4 chapters)
3. Projects (4 chapters)
4. Technology (4 chapters)
5. Sustaining Lean (3 chapters)
6. Culture (4 chapters)

Each chapter is identified as research (1 chapter), case study (10 chapters), approach (9 chapters) or tool (4 chapters). Each contribution is also drawn from a different institution so that the reader can select the field of greatest interest and relevance to them.

Section I – starting out

The first chapter "Establishing process improvement capability in higher education" is by Rachel McAssey who co-founded the award-winning Process Improvement Unit

at the University of Sheffield (UK). This chapter explores what HE organisations are doing to implement capacity for process improvement and to help those who are considering or those already doing so. The second chapter "Tools to get you started" is by Bonnie Slykhuis, a Lean and Continuous Improvement (CI) consultant at Des Moines Area Community College (DMACC), Ankeny (Iowa). Her responsibilities include driving Lean throughout DMACC's six campuses, designing Lean training programs. Slykhuis's chapter demonstrates that the team's responsibility includes helping plan and drive ongoing activities, monitor outcomes, communicate to the masses and look for ways to continually improve and expand the institution's Lean efforts.

In chapter 3, "Value Stream Mapping as a tool for creating a Lean Culture in a University", Justyna Maciaq (Jagiellonian University in Cracow, Poland) shows how the application of Value Stream Mapping (VSM) can influence Lean Culture. Lean Culture often depends on the higher education model in a specific country and the attitude of the authorities of that university. In chapter 4, "Lean into your service model: An institutional case study using library system", Tony Wai and Lenore O' Connor explain how, through the What We Do Matters program (64), Macquarie University Library motivated workers to optimise processes and apply Lean methodology to increase the quality of workflows and enhance the client experience.

In chapter 5, "Developing a continuous improvement service: From inception to reality in 18 months", Katie Wall and Emma Morris introduce the Continuous Improvement (CI) Service (81) at Sheffield Hallam University (UK). The authors focus on how senior leaders gained support, how they used a platform of Lean tools and strategies to adapt the company to meet customer needs, plus the challenges, achievements and lessons learned along the way in a timescale of just 18 months.

The first section aims to outline some of the key points to know and do when starting Lean in the sector. In Lean, all work steps are sorted into two basic categories, value-added and non-value added. Lean is about identifying waste, analysing and improving processes to remove waste, standardising work steps, and engaging people to solve problems with the aim of continuous improvement. The Lean methodology aims at achieving efficiencies by reducing the amount of process waste. Lean must be a part of a university's DNA code, focused on shared values and principles pursued in person and group actions, everyday philosophy and management practices. Getting the right people involved in these processes for quality improvement and seeing their ideas recognised. Any implementation of the Lean concept requires a previous diagnosis of the maturity of a university's organizational culture for planned change.

Section II – People

In chapter 6, "Identity and value to drive respect for people: A case study based on embedding kindness as an operational value", Susanne Clarke, Laura Poper, Lois Farquharson and Vianna Renaud (Bournemouth University, UK) outline their case for kindness and share their experiences in embedding it as a virtue in the workplace – empowering others to make kindness a central part of their daily lives. Their favourite quote: "Be kind whenever possible. It is always possible" (113). Kindness, care and respect for people are a core part of their identity and strongly influence their beliefs, values and motivation – they propose to apply kindness in the Lean initiative and relate kindness to Lean's 'respect for people'.

Tammi Sinha and Claire Lorrain are discussing how Lean embedding is important to people at Winchester University (UK). Chapter 7, "Inspiring sustainable Higher Education and Lean through a Lean Ambassadors Network", explains the Lean Ambassadors Network that operates in Winchester University (UK), bonding people through training and networking to help them change. Workshops enable participants to build up their confidence, capability and experience in applying Lean principles and gaining their Lean foundation.

Chapter 8, "Improving performance through engagement – The impact of daily stand ups in the University of Strathclyde" by John Hogg and Heather Lawrence at the University of Strathclyde (UK), introduces 'daily stand ups' (an innovative meeting style) which have been proven to be powerful in achieving a culture of continuous improvement. The 'daily stand ups' are based around three pillars: people, performance and continuous improvement. The impact of 'daily stand ups' at Strathclyde has 70% of employees feel more empowered in their role, over 70% feel more confident about raising concerns and improving ideas, and 100% feel that teamwork and collaboration have increased. 'Daily stand ups' may provide a practical mechanism to positively change the institutional culture and continuously improve the university's collective mindset.

At Universiti Putra Malaysia, Dr Siti Raba'ah Hamzah and Dalina Kamarudin addressed how they used a survey approach to access readiness for change among their employees against a challenging context posed in chapter 9 – "Lean transformation management among employees in Universiti Putra Malaysia". Critical to ensuring the effective application of Lean change management is the strong engagement of all stakeholders within the organisation. Lean Thinking is a management approach that prioritises the interests of consumers whether they are internal or external clients. Readiness requires the elements of a worker's confidence, disposition, and purpose on the need and ability to incorporate organisational changes.

Section III – Projects

The tenth chapter, "Applying Lean in projects: from visualisations to process engineering – It's covered!" by Laura Hallett, York St John University (UK), explores the application of Lean concepts to manage projects, providing practical advice and guidance for project implementation and delivery. It provides a variety of tools and examples of how Lean principles can be implemented when running projects. The chapter focuses on people, adding value, visualisation and eliminating wastes. It is easy to transfer Lean principles to project management. Lean places people,

processes and perfectionism themes at its centre, valuing the skillset of people. Process mapping is the technique of mapping the sequence of actions which get people from the start to the end of an activity.

The University of St Andrews (UK) employs a project-type approach to Lean, and in chapter 11, Mark Robbin outlines one of the main methods that they use in the early stages of a project: "BOSCARD: A scoping tool for Lean Continuous". The model is based on the broad stages experienced and then identified by the Lean Team during its early stage Lean project work. BOSCARD is an acronym that stands for Background, Objective, Scope, Constraints, Assumption, Risks and Deliverables. The Lean Team had three main goals: culture change, effectiveness and efficiency.

In chapter 12, "Six Sigma as a Method for Improving University Processes: The Case of the Academic Assessment Process" by Justyna Maciaq, Jagiellonian University in Cracow, Poland, shows how Six Sigma has been applied to HE processes. This chapter demonstrates how the DMIAC (Define, Measure, Analyse, Improve, Control) model, which is at the heart of the Six Sigma method, can be used to improve the process of lecturer assessment. Six Sigma is a highly effective approach to quality assurance management and defect removal, implemented in high-volume transaction processes.

Chapter 13, "Lean training to Lean project" by Marion Malcolm, University of Aberdeen (UK), concludes the book's third section with the story of how to relate their Lean training to a project approach, and how this supports their development and growth into a Lean culture as a result of organisational change within the university. A more tailor-made training approach can lead to substantial benefits for different areas such as time savings for workers, more collaborative work, etc.

Section IV – Technology

In chapter 14, "Machine Leaning – Adopting Lean into a University IT culture", Brian Stewart, Lee-Anne Klein and Melanie Clements (University of Alberta, Canada) present how the library launches their Lean initiative with work focusing on technology, and what they learned from this. The project results have made service delivery more reliable with reduced turnaround times. Machine Leaning has the potential to change the information technology function in organisations away from running increasingly marginalised infrastructure and declining relevance to a source of strategic value through the adept use of digital technology to solve wicked organizational problems.

Linda Spinks, University of Cambridge (UK), is developing a Network of Lean Change Agents (258) using a kata approach in a higher education programme (HEP). Kata is a structured practice, referring to a 'way of doing' for consistent improvement. Chapter 15, "Can information services lead a network of change agents in a HEP?", examines how this has happened, and what are the implications of a technology department that leads to this initiative. At Cambridge, there are examples of Lean initiatives being carried out within IT areas, within business areas, and collaboratively across both IT and business. The answer must be 'yes, it can', but it relies on the motivation and creativity of people willing to lead the charge.

In software development, agile is an umbrella word that encompasses several different tools, approaches and working methods. Like Lean, it focuses on consumer satisfaction at its heart, encouraging quality improvement and reducing the waste from the software development process (272). Richard Arkless at University of Edinburgh (UK) explains in chapter 16, "Lean, Kanban and Agile, A story of continuous improvement in a University Software Team", how agile and Lean approaches were used by the Student System team who are passionate about Lean and system development, to help them realistically handle their task. The aim is to generate value by influencing the production process to help produce the best product with customer throughput.

The University of Lincoln (UK) used the acronym PETEWORM (People's potential, Excess inventory, Transport, Excessive processing, Waiting time, Overproduction, Rework, Motion) to identify the eight wastes. Having a 'worm' as the issue, what would be better than a 'mole' to devour it; remove the waste? A tweet size of 280 characters means that you must ensure that your information is succinct and important so that you draw the attention of the reader (292). The author, Stuart Morris, highlights one aspect of the University of Lincoln Continuous Improvement Team's work towards solving this problem, with Muda (Japanese: 'wastefulness') Mole, the team's star Twitter correspondent in chapter 17 - "Every organisation needs a mole!". The most common challenges in implementing Continuous Improvement (CI) or Lean across any organisation is obtaining buy-in from all staff and developing the culture of identifying and addressing waste.

Section V – Sustaining

Chapter 18, "Head, heart, hands: The three essentials to sustaining Lean in HE", explores how Macquarie University's Business Process Management Plan became a part of the story. It considers the importance of core dependencies for Lean's successful implementation, including executive support, the unit leader and a highly functioning central team. Sustaining Lean in Higher Education needs continuous support from the executive and a group of senior staff who advocate and provide practical support to the leader and team for Business Process Change. Chapter 19 describes the lessons from implementing Lean at the Veterinary Teaching Hospital at the University of Queensland (Australia). According to its author, Chris Shannon, implementation included embedding Lean in the hospital strategic plan, running a rapid improvement event, and implementing changes and addressing cultural and behavioural change within the hospital. The Lean leader's job is to inspire the organization to create a culture of continuous improvement and strengthen the capacity of the organisation to recognise and eliminate problems. Chapter 20, "Cardiff University. A Lean University or a Better University" by Sarah Lethbridge from the same university, reflects on the ten years since

the university introduced its first Lean implementation at a UK university, the history that contributed to the birth of that Lean project, the lessons learned and where Cardiff University is heading next.

Section VI – Culture

Chapter 21, "Developing a culture – The essentials for continuous improvement" by Natasha Bennett and John Perkin from Middlesex University (UK), explores tools and learning in building this culture of sustainable continuous improvement across the institution. Together these tools interlink to support a continuous improvement culture that is proactive, responsive and student-focused. Chapter 22, "Growing a Lean approach in a changing University" by Brent Hurley and Stephen Yorkstone, describes the journey of Edinburgh Napier University (UK) in experimenting Lean type activity since 2009, and outlines the current approach that the university is undertaking as a case study. The university was a relatively early adopter of Lean-type improvement in the UK higher education sector. The approach taken by Edinburgh Napier University continued to develop in 2017, concentrating on a Business Improvement Programme as one of six programmes in the University's Change Portfolio strategy. The Business Improvement Framework brings together both new and existing information on Business Improvement tools, training, "people who can help", external resources, FAQs and case studies, and is designed to support and empower staff to carry out improvements.

Chapter 23, "Making sense of learning, practice and theory" by Grete Stonebridge, Claire King and Leanne Sowter, discusses how people combine practice and theory and how they use learning to involve both practise and theory to shape and implement in Leicester University (UK). The Leicester approach to continuous improvement uses a range of tools. The leaders helped to allocate adequate staff resources and they showed flexibility in taking action, decision-making and process control. Staff involvement in learning is the key to the shaping and development of the approach. The theory comes from practice, practice comes from theory: learning is the glue between theory and practice. Finally, the last chapter "What if we knew the future could be different!" by Radka Newton at Lancaster University (UK) offers a challenge to the culture of Lean itself in the context of universities, questioning if they still take respect for people seriously in universities, and proposing they should take more time to think about their improvement activity, to make a real difference.

The book has several strengths in helping readers better understand the steps of Lean process. Lean begins with a series of projects, using project tools at certain stages, learning from different project approaches, and linking project work to learning to become Lean. By looking at value, techniques, tools and ways of measuring, the authors demonstrate to the readers how people engage and enable Lean. Although Lean can bring about short-term improvements, the real benefits of Lean are in sustaining activity over the long term. There is also a large intersection between Lean and technology since the rise of technology is one of the most important changes facing today's world of work. Lean culture is an important theme that has emerged throughout this book. Analysing culture (how groups of people behave) and moving these behaviours towards respect for people and continuous improvement can be conceptualized as an aim of Lean.

Over the past ten years, there has been a substantial increase in the discussion and implementation of Lean in higher education, and more recently particularly in the UK, where there is a continuing push to enhance quality and experience. Lean in Higher Education is instrumental in improving the student experience and using time and resources wisely. Stephen Yorkstone has done an outstanding job of providing a broad overview of Lean Higher Education. This rich and broad perspective will allow the reader to understand the many ways that Lean thinking is applied globally in higher education. Importantly, this book offers insights and realistic approaches about the what, why and how of Lean in Higher Education and may help the reader apply Lean to their work. In conclusion, it provides a great contribution to the growing list of publications on this significant agenda.