Title: Improving Writing Processes Using Lean and Kanban

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Key Points

- Concepts from lean manufacturing and Kanban production can usefully be applied to writing for academic publication
- Value and pull focus author's attention on the needs of reviewers, editors and readers
- Value stream and flow emphasise an end-to-end process of prioritisation, writing, editing, revision, resubmission and publication
- Perfection places emphasis on publication quality
- A Kanban board is advocated to plan and monitor the writing and publication lifecycle
- The author shows a steady improvement in output rankings and researcher reputation metrics over a four year period

Academic writing for peer reviewed publication is a fundamental currency of scholarly advancement (Boice, 2000). Good quality copy improves the chances of successful acceptance during peer review. Yet most scholars do not naturally learn about academic writing and publishing as a normal part of their career development (Murray, 2009).

In the debate about the kinds of tools publishers can provide to assist authors, I think we can all learn from developments in just-in-time manufacturing and advanced production systems, notably lean and Kanban. Lean is a systematic method for the elimination of waste in a production system, while Kanban is a way to regulate the supply of components. Having returned to higher education, after a period in industry and as an international development volunteer, I initially struggled to produce the kind of publications required by the UK Research Excellence Framework. For my own job satisfaction, and for career development, I needed to quickly re-develop my writing and publication skills. I became interested in lean and Kanban because of my research into practitioner approaches to the processes of computer software design and evolution. I wondered if these techniques could improve my personal academic production processes. The question I am interested to raise here is "what kind of tools and support can publishers provide, that encourage authors to take advantage of lean and Kanban production thinking?" But before I can answer that question, we need to understand more about lean and Kanban.

Toyota pioneered lean manufacturing in the 1980s, establishing concepts such as value, value stream, flow, pull and perfection (Ohno, 1988). Just-in-time manufacturing, lean production and Kanban have been influential in assembly processes but also in other creative fields such as the development of sophisticated software systems (Poppendieck & Poppendieck, 2003).

I have found it helpful to apply lean and Kanban concepts to academic writing, with the aim of improving publication quality and writing productivity. Of course, many ideas in lean and Kanban relate to team working, but they can also be applied to continuous personal and professional development. Each of these concepts is now briefly explored from an academic writing and publishing perspective.

Value

The value of an academic publication lies in its contribution to knowledge. Well written publications, which are clearly argued and make good use of evidence to support their claims, raise professional standards. Publishers can help raise author's awareness of the concept of value.

Authors also need to learn how to target their work to the needs of their audience (Hyland, 2010). The initial audience for academic research comprises reviewers and editors (Lamont, 2010). But ultimately authors need researchers that will cite their work or others that will use the research to generate 'impact' (Badgett, 2016).

Researchers who publish in top ranked journals gain esteem from critical review and revision by internationally renowned editorial and peer review teams. In contrast, researchers that repeatedly publish in middle- or lower-ranked conference and journal outlets, do not benefit from improvements made to their work resulting from such a rigorous vetting and refinement process. High quality publications are noticed by hiring panels, promotion panels and generally contribute to the reputation of the researcher and the kudos of the host institution (Goodson, 2012).

Value stream

Lean production processes encourage analysis of the value stream. A value stream is the entire end-to-end process of creating value, from research concept and planning to high quality peer-reviewed research outputs. Care is needed in the selection of writing projects and publication outlets, managing the stages of writing, editing and handling the peer review process. Value-stream analysis encourages authors to critically reflect on the clarity and strength of their arguments during each stage of the writing process. In addition, novice authors can learn to adapt their behaviour during each stage, to improve quality and throughput. The aim of value stream analysis is to make each stage contribute value as efficiently as possible.

Novice authors can fail to take prompt action to make a new submission from a rejected article. They think a rejected article is not good. In fact, a rejected article and the feedback obtained from reviewers represents a significant investment, which can be turned into value by development into something worth presenting to a different outlet. Rejected articles, not redeveloped for resubmission, are a waste of previous effort. Effort has been put into the work, but no value has been realised. The rejected article needs to be revised, improved and submitted to a new outlet, in the hope of a more positive outcome.

Flow

Flow is the concept that authors should be producing and monitoring a regular pipeline of academic papers. As soon as authors finish one writing project (submitted), another project should be prioritised. Prolific authors schedule writing sessions in their diaries (Mayrath, 2007), monitor the overall time taken to produce each paper and identify bottlenecks in their academic writing processes. The key goal here, of course, is to improve productivity, without compromising quality (Boice, 1990; Silvia, 2007). Authors might be efficient at collecting data, or conducting experiments to generate results, but then their analysis of findings might be a source of delay. By analysing the flow of writing for publication, authors can focus on stages of the research and writing process that reduce time variations from initial draft to final submission.

In lean manufacturing, inventory and waste are viewed as undermining flow. Inventory, perhaps in the form of multiple unfinished draft submissions, detract from obtaining value from writing outputs. Waste, such as rejected submissions, need to be converted into value, by promptly addressing reviewer feedback and submitting (elsewhere if necessary). It is important for authors to maintain momentum during the revise and resubmit stage or when handling rejection (Hargittai, n.d.).

Pull

The pull approach reminds us that papers needs to tell an interesting story. Academic papers need a narrative arc (Schimel, 2011). Novice authors, think the purpose of an academic paper is to describe all the results of their findings (regardless of the interest or relevance of those results). Of course, it is unethical to omit contradictory results or sacrifice truthfulness in our search for an interesting story. But, authors need to put in extra work to explain why their results are interesting and useful to their audience. Some people talk about taste in selecting research problems and experiments (Heard, 2016). Sometimes the interesting story emerges only while the research is in progress (and it is not always the expected story!).

The academic author needs to identify and articulate a niche for their work (Lim, 2012). This involves how authors 'indicate a gap' and 'add to what is known'. Novice authors sometimes miss this crucial step and their papers get rejected as a result. Papers typically 1) develop new evidence in an old way, 2) approach old evidence in a new way or, 3) pair old evidence with an old approach in a new way (Belcher, 2009). Authors can spend a long time writing papers that generate old data using old approaches, with little chance of ultimate success.

Perfection

The lean production concept of perfection, reminds authors that publishers are looking for quality (Greenhalgh, 2014). Each aspect of the written work must be high quality (Manser & Curtis, 2002). Quality includes the style as well as the basic craft of writing (Zinsser, 2006) (Strunk & White, 1999). Academic communities develop highly precise conventions about the acceptable models of research and dissemination (Becher & Trowler, 2001). For example, within the broad fields of computer science and information technology, the information systems community is more likely to accept a broader definition of the meaning of "theory" than the software engineering community. Descriptive theory can be more acceptable within the information systems discipline (Gregor. 2006). Whereas, software engineers prefer narrower definitions of theory as predictive and falsifiable models of external reality. Using the wrong methods, or the wrong way to structure the article is unlikely to be received well by reviewers.

Several academic writing self-help guides encourage authors to focus on the specific parts of their paper in turn, to improve quality (Belcher, 2009) (Goodson, 2012). There are often quite detailed conventions, which vary between disciplines, about the structure and content of specific sections in papers (Smagorinsky, 2008). Some recommend that authors conduct targeted practice on specific aspects of their papers (Goodson, 2012). Using this approach, authors should practice writing a good methods section or a good discussion section, and so on.

Kanban boards

Kanban is the Japanese word for a "signal card." At Toyota, Kanban represented a physical card that moved through the just-in-time production system. The idea behind the Kanban is to visualise the flow of items, helping to identify backlogs, blockages and bottlenecks. In software development, the elements that flow through the production system are abstract and as a result the cards are collected onto a white board. The cards are physically moved across columns on the whiteboard to reflect their progress through production. Traditionally the Kanban board has three columns, 'to do,' 'in progress' and 'done.'

For several years now, I've kept a Kanban board in my office to monitor my academic writing. This is in some ways similar to the software tools some people use to help narrative development in fiction writing (Writer's Café, n.d.). I've experimented with a Kanban board integrating writing in the research process, as shown in Figure 1. The columns represent phases in the overall writing process and each sticky note represents a writing project. While rows represent different types of writing project (journal articles, conference papers and funding proposals). In Figure 1, columns have been added to include the research phases: data collection and data analysis. I thought this would help to monitor and prioritise aspects of research to encourage a pipeline of research activities into writing activities.

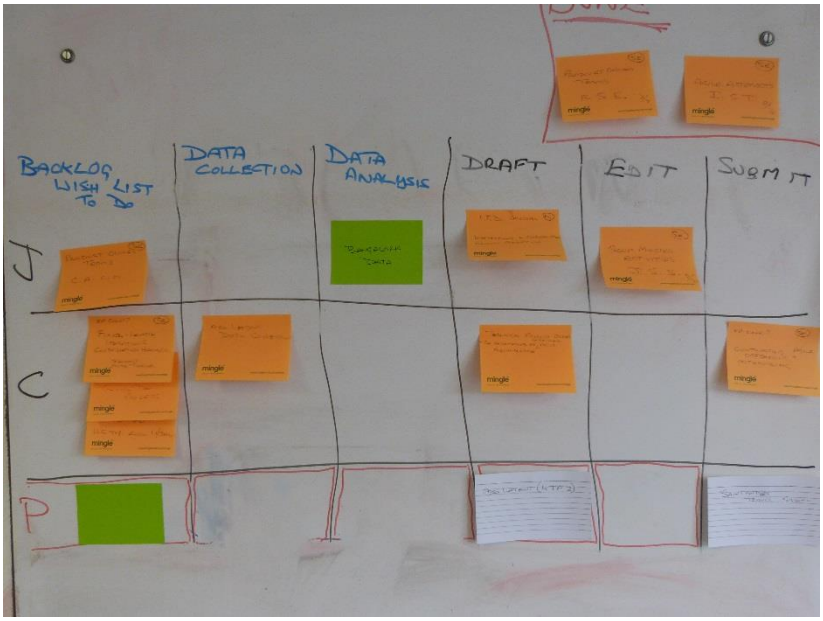

Figure 1 Kanban baord linking research and writing tasks

But for me, the writing is much more of a challenge than the research. I have come to realise that monitoring the data collection and data analysis phases of research is less important. As a result, I've now reverted to a simpler Kanban board that only focuses on the writing as shown in Figure 2. This illustrates an example of how using lean methods helps me to focus on writing practice as an arena for on-going professional development. I now use separate rows on the Kanban board to monitor journal articles, conference papers, grant proposals and teaching-relating writing, in order to remind me I ought to be working on all four, for different purposes. In Figure 2, the grant proposal row is a bit empty, which indicates my current priority on getting publications rather than funds. The columns have been reduced, compared with Figure 1, to focus on prioritisation (writing projects moving from 'to do' into drafting), creating a first draft and then editing. Writing projects iterate between the 'done' column when a writing project is submitted, the 'edit' column, when reviewers ask for changes, and finally the 'done' column again, when a submission is accepted for publication.

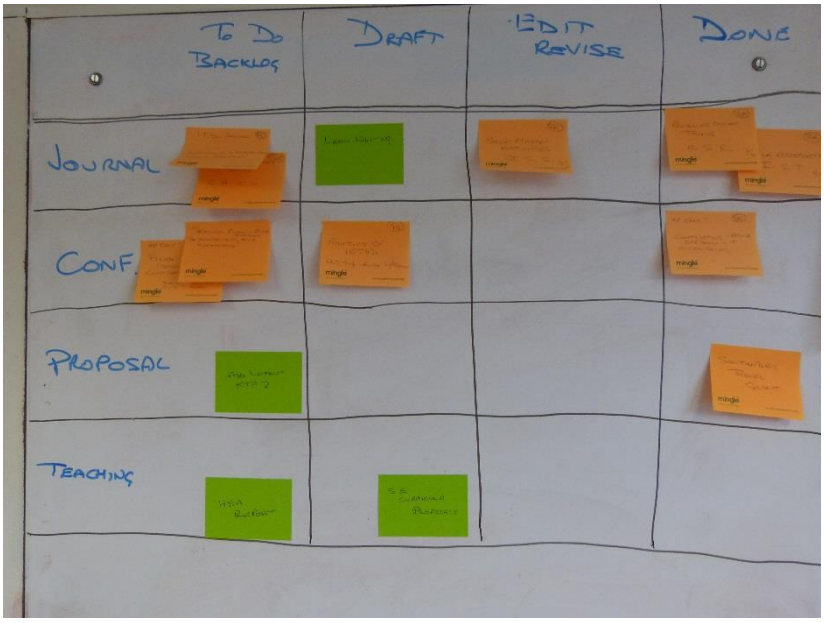

Figure 2 Kanban board, writing only

The Kanban board helps to capture ideas for new writing projects, a new sticky note can be added to the 'to do' column. But also helps with reflection on the transition from draft to submission and the transition from revision to acceptance. For example, reducing the delay from a rejection to a re-submission is a good way to improve the flow of writing projects that create value.

Using these lean production and Kanban techniques has helped me publish two sole authored articles in 'A' ranked journals (Bass, 2015; 2016) as well as see a modest increase in my citation count and h-index. As a result of these improved objective measures, I've been able to get a job in a more research focused university.

What can publishers do to help authors that would benefit from using these techniques? It is becoming more common for publishers to provide basic advice about written English, such as the training materials provided on the Elsevier Publishing Campus (Elsevier Publishing Campus, n.d.). Such author support can become a marketing tool for publishers and encourage author loyalty to publisher's journals. Although more focus on written English where this not an author's first language would be welcome (Glasman-Deal, 2009). Advice more targeted toward specific stages of the academic writing process: drafting, composition, editing, revising is helpful. However, these skills are a necessary but not sufficient condition for success.

Targeted advice about the content of specific sections is required. Authors benefit from learning about the features of a good abstract, or how to write a good methods section. Guidance will need to be focused on specific disciplines regarding norms on paper structure.

But prolific authors also monitor and manage the flow of their publication output. There is less support available about the process of managing a pipeline of publications. Publishers should consider providing a platform for authors to create personalised interactive dashboards comprising their writing projects. Such tools enable authors to set objectives, monitor progress and record success. This approach is similar to personal development planning tools provided, for example, by BCS, the Chartered Institute for IT (BCS - Personal Development Plan, n.d.). Online Kanban boards are already available for project managers. Tools like Trello (Trello, n.d.) are free for individuals and allow customised Kanban board creation.

The ideas from lean production and Kanban can help authors enhance the quality of their academic publications and increase productivity. Focus on the value of academic publications encourages authors to carefully consider the needs and expectations of their audience. The value stream encourages authors to consider each stage of their end-to-end publication process. The concept of flow addresses the regularity and frequency of publication production. Pull encourages authors fulfil a need for the intended audience by clearly describing an important research contribution and attracting citations. Perfection emphasises the relentless focus on quality. Publishers can support authors by providing online tools that target the holistic publication process. Authors can then decide how to prioritise writing projects, improve productivity, enhance quality and maximise the value they obtain from their effort spent on writing.

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