

# Managing Flow Processes in Lean Software Development Practices



Dr Denis Dennehy. Supervised by: Dr Kieran Conboy

## 1 Objective

- » To understand how to manage flow in Information Systems Development (ISD).

### Motivation

- » "a focus on flow, rather than a focus on waste elimination, is proving a better catalyst for continuous improvement ... in software development" (Anderson, 2013, p. 5).
- » Contemporary lean thinking in software development begins with understanding flow and impediments to flow (Power and Conboy, 2015).
- » New agile methods such as lean software developments represent software development processes that include both lean and agile elements (Wang et al., 2012).
- » Paucity of academic research on how agile is used or tailored in practice (Fitzgerald et al., 2006).

## 2 What is Flow-based Product Development?

Flow is concerned with *processes, people and culture* (Melton, 2005).

Flow is "the progressive achievement of tasks along the value stream so that a product proceeds from design to launch, order to delivery, and raw materials into the hands of the customer with no stoppages, scrap, or backflows" (Womack and Jones, 2010, p. 306).

Flow focuses on managing queues rather than managing timelines and project phases (Power and Conboy, 2015).

### Impediments to Flow

Impediments are "anything that obstructs the smooth flow of work through the system and/or interferes with the system achieving its goals" (Power and Conboy, 2014, p.2).

Impediments that impact the flow of work include:

- » Delays
- » Handovers
- » Extra features
- » Extra processes
- » Failure demand
- » Work-in-progress (WIP)
- » Context switching
- » Unnecessary motion
- » Unmet human potential

## 3 Primary Metrics to Measure Quality of Flow

- » Queue size
- » Cycle time and lead time
- » Cumulative flow diagrams
- » Throughput with demand analysis

### Lean Software Development Principles

- » Principles of lean thinking are rooted in manufacturing, notably the Toyota Production System.

The Principles of Product Development Flow (Reinertsen, 2009)	Kanban Principles (Anderson, 2010)
→Use economically based decision-making	→Limit WIP
→Understand behaviour of queues	→Visualize workflow
→Exploit variability	→Measure & optimize flow
→Reduce batch size	→Make process policies explicit
→Apply WIP constraints	→Manage quantitatively
→Use cadence, synchronisation and flow control	
→Use fast feedback loops	
→Decentralise control	

## 4 Next Steps

- » Identify and prioritise key flow problems in ISD practices.
- » Design templates to understand the different states that work passes through organisations.
- » Provide a panoptic understanding of flow and its implications for international policy makers and funding bodies.
- » Advance current pedagogy of ISD at third level institutions.
- » Mature theoretical understanding of flow and metrics used to measure the presence of impediments.

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