STEM in the Workplace: Industry Perspectives

A qualitative, exploratory study of the attributes, behaviours and skills that comprise science, technology, engineering and mathematics (STEM) capabilities required in beer manufacturing.

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1 / The Research Problem
My motivation for this research stems from my experiences as a science/mathematics educator, as well as being a mother of three ... and not because I like beer.

Literature says ...
Education reforms that build STEM skills to meet the needs of rapidly changing work and workplaces in Australia are a matter of national urgency (Office of the Chief Scientist, 2013). Gaps are reported between STEM skills demanded by employers and those being generated in education systems (Australian Industry Group, 2015). Integrated STEM educational approaches that build skills in the disciplines and foster 21st Century skills are available, but the problem is ... BUT the problem is ... … we do not have common understanding of the nature of the required outcomes of a STEM education.

My Research Questions
From the perspective of beer manufacturing:
1 What STEM capabilities, inclusive of attributes, behaviours and skills, does the manufacturing industry require now and into the future? 2) How does the manufacturing industry currently use STEM capabilities in the workplace?

2 / Research Methodology
Qualitative exploratory approach through an in-depth case study of beer manufacturing.

Purposeful / convenience sampling (Patton, 1990)
The STEM-rich beer manufacturing industry.

Data triangulation (Yin, 2014)
– Semi-structured interviews (Brinkmann & Kvale, 2014) across levels of employees from management to technical personnel
– Business artefacts, such as position descriptions, business plans, and process guidelines.

Analysis (Patton, 1990)

3 / Conceptualising Capabilities
Capabilities are a set of attributes, behaviours and skills that enable an individual to convert their knowledge into meaningful action in varied and changing situations (Fox, 2016).

4 / Anticipated Outcomes
A STEM Capabilities Framework generated from the perspective of beer manufacturing that:
– describes STEM industry workplace practices and
– has the potential to
  – underpin discussions on educational outcomes that will meet the STEM capability needs of workplaces now and into the future; and
  – contribute knowledge to inform the design of STEM curricula and pedagogical approaches.

REFERENCES