DUI (Doing-Using-Interacting) innovation and ICTs

Exploring the competencies that individuals use and develop when adopting 3D Printing/digital fabrication technologies

Susan Flavelle, Joint Program in Communication and Culture
Ryerson University and York University, Toronto

Charles Davis, Ph.D.,
RTA School of Media,
Ryerson University, Toronto

Ryerson University

Outline

—⟨∞∞∞⟩—

ରୁ Research problem

ରୁ Background

ରୁ Methods

ରୁ Findings

Research Problem

❧ Seeking to understand DUI innovation as competency-enable proficiency in adoption, adaptation, and exploitation of novel digital technologies

Modes of Innovation

❧ Innovation as an asset (Lundvall and Lorenz, (2012)

❧ Based on the concept of modes of innovation from Jensen et al. (2007)

  ❧ Science Technology and Innovation (STI): codified knowledge

  ❧ Doing-Using-Interacting (DUI): experiential learning, problem solving

Modes of Innovation

ल Most understanding of DUI innovation is related to its connection to STI, not learning process

Competency Framework

ॐ Thomä (2017) has introduced the idea of *firm-level* competencies to empirical research on DUI innovation

ॐ Individual competencies used to understand expertise

ॐ 5 distinct stages of expertise from Novice to Expert (Dreyfus and Dreyfus, 1980)

Competency Framework

ભ Mietzner, Kamprath & Wagner (2010, 2013, 2015)

ભ Professional (technical), methodological (analytical), personal-social (inter/intrapersonal)

Competency Framework

ભ Great Eight Universal Competency Framework (Bartram, 2005)

ભ leading and deciding, supporting and cooperating, interacting and presenting, analysing and interpreting, creating and conceptualising, organising and executing, adapting and coping, enterprising and performing

3D Printing as ICT

❦ Uses digital models to make three-dimensional physical objects

❦ Split between industry and consumer use

❦ Little standardisation in machines, materials, or application

3D Printing as ICT

ↀ Main technology of makerspaces and fab labs

ↀ Time intensive to learn, relies on informal learning

ↀ Perceived skill shortage

Method

Critical Incident Technique (CIT) interviews

Flanagan, 1954; Schluter, Seaton & Chaboyer, 2008

Structured interview technique; identifies ways users solve critical problems

Method

Asked about an event where they used 3D printing in a new way, and an event where they realised they had in increase in their capability in 3D printing

Key Insights

ও Competency building shaped by previous experience

ও No common set of experiences

ও More experience leads to breadth of competencies

ও Distinct stages of experience questioned

Key Insights

ↄ Previous experience and experience with 3D printing affected the competencies respondents felt were relevant

ↄ Shifts in categories of competencies (Mietzner, Kamprath and Wagner, 2010)

Final Notes

ଔ Support for view that ICT adoption is a DUI process

ଔ Insight into how experience is accumulated: other sectors, networks, and problem solving

ଔ Next steps: are DUI processes visible in cases of adoption of other ICTs?

Thank You

Susan Flavelle (susan.flavelle@ryerson.ca)

Charles Davis (c5davis@ryerson.ca)