Learning From Experience via Data-Driven Reflection

Viktoria Pammer-Schindler, Institute for Interactive Systems and Data Science & Know-Center GmbH
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About me

Assistant professor - at Graz University of Technology, Institute of Interactive Systems and Data Science
Research area manager - at Know-Center GmbH

Viktoriapammer@tugraz.at
Twitter: @Viktoriapammer
Web: http://viktoriapammer.wordpress.com/
Team

Senior Researchers

PhD Students

Junior Researchers and Research Developers

Co-Supervision w Eduardo Veas
External Co-Supervision @ NTNU w Monica Divitini
Designing for Workplace Learning

Current cases
- **time management**, searching
- apprentices in metal and electrical engineering
- training management in a global company
- rework in car series production

Past cases: Stroke nurses, b2b call center, IT consulting

Organisational learning: development of data-driven business models in automotive industry, and related to open science
Learning from Experience via Data-Driven Reflection

Why reflection?
Learning mechanism that refers to and impacts action without necessitating a curriculum or teacher

Why data?
- Use data as representing relevant aspects of work practice, as complement to human memory and perception
- Fitness apps (Runtastic, Fitbit, etc.), quantified self, and learning analytics as examples in private life and educational settings.
What you can expect in the next 30 minutes

1) Design-oriented Theory

**Naming concepts in reflection**: Pammer et al. (2017) - Let’s Talk about Reflection at Work (IJTEL); Pammer & Prilla (in submission) - Reflection Object

2) Socio-technical interventions and reflection guidance

**Activity-log based learning about and improving time management**: Pammer et al. (2015) – The Value of Self-Tracking and the Added Value of Coaching in the Case of Improving Time Management (ECTEL); Pammer & Bratic (2013) – Surprise, surprise: activity log based time analytics for time management (CHI EA)

**Adaptive reflection guidance**: Fessl et al. (2017) – In-App Reflection Guidance: Lessons Learned across Four Field Trials at the Workplace (IEEE TLT)

3) Vision: Conversational Intelligent Mentoring for Professionals
Naming concepts in reflection

Pammer et al. (2017) - Let’s Talk about Reflection at Work (IJTEL)

- Terminology that enables
  - interdisciplinary discussion
  - fine-granular differentiations and analysis of reflective practice
Naming concepts in reflection

Pammer et al. (2017)

Reflection process

- Work/plan
- Reflection trigger – what starts reflection
- Reflection session – a concrete time and space for reflection
- Reflection outcome: intended change in practice

Process characteristics

- Observable vs unobservable processes
- Who reflects vs who learns vs who should learn
Naming concepts in reflection

*Pammer & Prilla (in submission): The reflection object*

**Perspective**

Reflection as longer-term endeavour (activity), with multiple iterations of time-limited reflection sessions

**Reflection object**

- That which is reflected upon
- That which changes through reflection
- Missing in literature – named only via examples
Activity-log based learning about and improving time management

Pammer & Bratic (2013) – Surprise, surprise: activity log based time analytics for time management (CHI EA)

- No evidence that activity logging “works” despite commercial tools
- Perspective: Activity log data plus manual annotations represent those aspects of work practice that are relevant to TM
- Finding: Data are surprising, especially worktime fragmentation
Adaptive reflection guidance

Why reflection guidance?
Minimal or no guidance only works for domain experts

Fessl et al. (2017) – In-App Reflection Guidance: Lessons Learned across Four Field Trials at the Workplace (IEEE TLT)

Implementation
- In-action, on-action, contextualisation prompts
- Reminding to reflect and highlighting salient data

Evaluation
- Four field trials using three different prototypes (activity logging, mood tracking, quiz-based learning)
- Adaptive prompts incite users to reflection
Activity-log based learning about and improving time management

Pammer et al. (2015) – The Value of Self-Tracking and the Added Value of Coaching in the Case of Improving Time Management (ECTEL)

- Activity logging and reflection guidance in two studies
- Rationale for adding coaching: Plausible evidence that coaching works
Activity-log based learning about and improving time management (Pammer et al., 2015)

Self-tracking incl. generic reflection guidance:
Users reflect on data and experiment with different time management strategies
Users found data to become less interesting over time

Coaching:
Same, and
- Conscious intention to change behaviour
- Significantly better self-reported TM behaviour (post)
Meta-Reflection: What’s Different about Workplace Learning?

- Social context of work defines what is relevant for learning - Data represents relevant aspects of work practice

- Social context is not designed for learning – **finding time and space for reflection is challenging**. Esp: manual tracking needs time, but serves as reflection-in-action; automatic tracking requires time f. reflection-on-action

- **Manually curated materials** complement data; and support i) explanation of data, ii) documentation and explication of reflection outcomes, iii) representation of reflection activity

- **Sensitivity and confidentiality of data**, w.r.t. the learner, clients/patients, and organisation.
Meta-Reflection: What to do better/differently next time

- Design for exchange with peers – even though time management is strongly framed as individual endeavour in literature

- Support data interpretation with respect to learning domain

- Support identification and implementation of learning strategies

- Interactivity and feedback
Working towards a vision...

Conversational Intelligent Mentoring for Professionals
Working towards a vision...

HELP!

http://tiny.cc/timeTool - it only takes 15 minutes and the design intention is that your answers help me AND you!

+ I’m looking for people who’d volunteer 30-45min of follow-up interview

Reflection Guide for Time Management

- Goal setting, planning, and task completion as evidence-based TM practices
- Describing, judging, drawing insights, and planning as structure for reflection
- Data collection: Survey, interviews
- Design: Bazaar-based chatbot

Conversational Intelligent Mentoring for Professionals
Working towards a vision...

**Reflection Guide for Time Management**

**Scaffolding planning, documentation and reflection on learning tasks for apprentices**

**Conversational Intelligent Mentoring for Professionals**
Working towards a vision...

- Reflection Guide for Time Management
- Conversational Intelligent Mentoring for Professionals
- Scaffolding planning, documentation and reflection on learning tasks for apprentices
- Systematic, usable learning goal formulation
Working towards a vision...

Scaffolding planning, documentation and reflection on learning tasks for apprentices

Systematic, usable learning goal formulation

Reflection Guide for Time Management

Conversational Intelligent Mentoring for Professionals

Work guidance and conditional guidance for team/organisational learning
Conversational Intelligent Mentoring for Professionals

- Scaffolding planning, documentation and reflection on learning tasks
  - Learning tasks based on pre-defined learning goals
  - Reflection chatbot

- Systematic, usable learning goal formulation

- Reflection Guide for Time Management
  - Goal setting, planning, and task completion as evidence-based TM practices
  - Describing, judging, drawing insights, and planning as structure for reflection
  - Data collection: Survey, interviews
  - Design: Bazaar-based chatbot

- Work guidance and conditional guidance for team/organisational learning
  - Usable, navigational access to living organisational memory
  - On request: scaffolded interaction to update knowledge base and set in motion team and organisational collaboration procedures