CAN WE ASSESS EFFICIENCY AND INNOVATION IN TRANSFER?

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1. FRAMEWORK

Schwartz et al. [1]

- **Efficiency:**
  - Ability to apply well constructed prior knowledge to new situations quickly and productively.
  - Require learner to recall prior previously learned knowledge. E.g. ‘Plug and chug’ problems.

- **Innovation:**
  - Ability to let go of prior knowledge, construct new knowledge.
  - When existing models are inadequate, inappropriate. E.g. ‘Context-rich’ problems.

2. ADAPTIVE EXPERTISE

Schwartz et al. [1]

- Adaptive Expertise: We must balance both efficiency & innovation so that learners navigate the optimal adaptability corridor and develop adaptive expertise.

3. ASSESSMENT

Schwartz et al. [1]: Traditional focus is on efficiency, not innovation.

- **Our view:**
  - Whether an assessment requires efficiency or innovation depends upon the learner: An efficiency focused task for an expert may be innovative for a novice.
  - So, potentially every assessment has components of both efficiency and innovation.

Can we ‘tease out’ the ‘efficiency’ and ‘innovation’ aspects in our assessments?

4. ASSESSING EFFICIENCY AND INNOVATION

Answering following questions may help determine extent to which a task assesses...

**EFFICIENCY**
- Does the task involve a single idea or principle or a combination?
- Does the task provide all needed information to accomplish it or does one need to make assumptions?
- Does the task provide information in a representation or organizational scheme that one can directly use?
- Is it possible for the learner to accomplish the task merely by remembering it or something similar?
- Can the learner complete the task quickly and accurately through mechanically going through it?

**INNOVATION**
- Does the task require the learner to combine ideas and information from multiple sources?
- Does the task require the learner to take apart and re-examine previously learned concepts?
- Does the task require the learner to create new ideas that they may not have thought about before?
- Does the task require the learner to reflect on their learning?
- Is the task completely novel so that the learner has never seen anything similar to this before?

Other similar questions

5. TOWARD DEVELOPING A RUBRIC

Seek input from educators & learners.

- **Educators:** Answer questions above on 0 – 5 Likert scale.
- **Learners:** Interact with assessments in a teaching/learning interview, facilitated by teacher/researcher. [2]
  - After interview, learners complete survey questions above regarding assessments on 0 – 5 Likert scale.
  - Teacher/Researcher gauge efficiency & innovation needed by learner.

Combine data from learners and educators to generate a score for ‘efficiency’ and ‘innovation,’ each on 0 – 5 scale

6. REPRESENTING ASSESSMENTS

Using efficiency & innovation scores on 0 – 5 scale, we map assessments on to the representation by Schwartz et al.

7. LIMITATIONS

- Validity and reliability of survey questions posed to educators and learners must be ensured.
- Gauging level of efficiency and innovation depends upon learners, so have to repeat process above for different kinds of learners.
- Level of efficiency and innovation measured by an assessment varies as learners progress through a course, so rubric is not easily amenable to pre-post testing.

REFERENCES