



# 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.

## 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?

Other similar questions

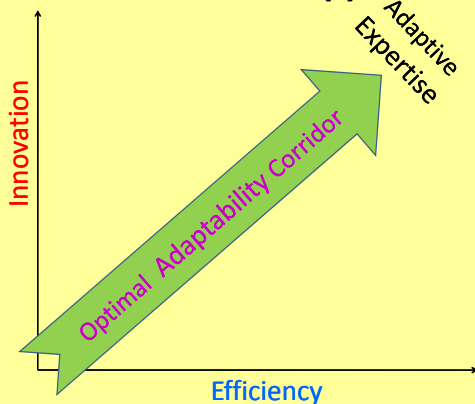
### INNOVATION

- 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

## 2. ADAPTIVE EXPERTISE

Schwartz *et. al.* [1]



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

## 5. TOWARD DEVELOPING A RUBRIC

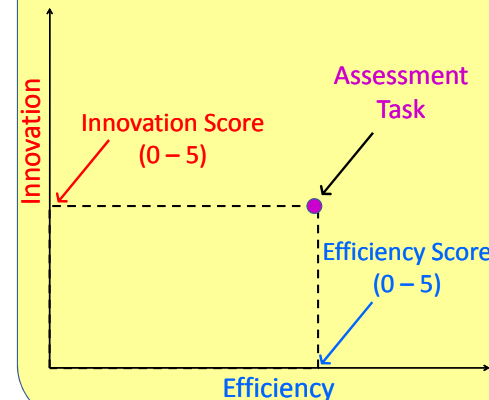
Seek input from educators & learners.

- ✓ 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

- [1] D. Schwartz, J. D. Bransford, and D. Sears, in *Transfer of Learning from a Modern Multidisciplinary Perspective*, edited by J.P. Mestre (Information Age Publishing, Greenwich, CT, 2005)
- [2] P. V. Engelhardt, E. G. Corpuz, D. J. Ozimek *et. al.*, presented at the Physics Education Research Conference, 2003, Madison, WI, 2003.