Herramientas de analítica del aprendizaje
Más allá de datos y dashboards

GARNET

Grupos de Trabajo de Formación Online y Tecnologías Educativas
3 Julio 2018

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University of South Australia

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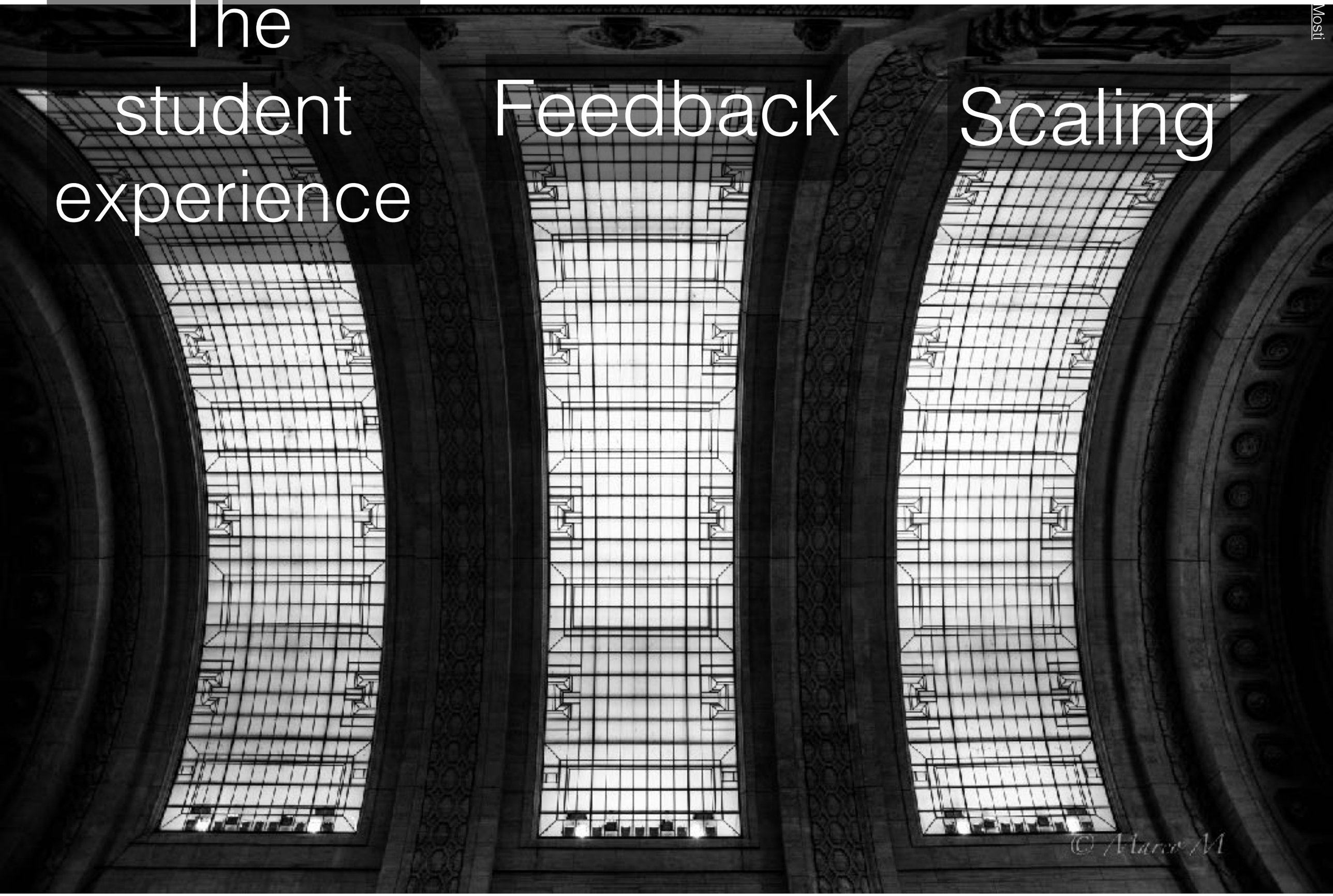
The student experience

Feedback

Scaling



The student experience

http://www.provost.gatech.edu/educational-innovation/reports/lifetime-education/executive-summary

Executive Summary

This moment is ripe for change in higher education. Scores of technology entrepreneurs, foundations, and policymakers are already trying to shape what the future looks like for both learners and institutions. The message for colleges and universities is clear: they can either sit idly by or join in to design their own destiny. As a selective public institution with a history of educational innovation, the Georgia Institute of Technology sits squarely in the middle of the forces shaping higher education. It is uniquely positioned to model what the university of the future might look like.

This report of the **Georgia Tech Commission on Creating the Next in Education (CNE)** is an effort to draw with broad strokes the nature of education that defines the technological research university of the year 2040 and beyond. The Commission was formed because many within the institution are convinced that by the second half of this century Georgia Tech will be different from the university that matured and prospered in the nineteenth and twentieth centuries. Georgia Tech's mission seems to demand that the Institute examine the choices that lie ahead and make plans for a future that, however uncertain, is bound to present opportunities and challenges that cannot be understood as incremental changes in the status quo.

Drivers of Change

In a prior report titled *Discovering the Drivers of Change in Higher Education* (Georgia Tech 2016), the Commission outlined the forces likely to affect Georgia Tech, including a new and accelerating revolution characterized by technology-driven disruptive change throughout society, shifting public attitudes about the role of public universities, and demographic trends that challenge long-held assumptions about

Recommend: Commitment to a Lifetime Education

- Redefine approach: eliminate artificial barriers college-precollege, flexible pathways and credentials, reinvent physical presence, **provide advising and coaching networks**

- Some Initiatives
  - Whole-person Education: need cognitive skills, interpersonal skills, intrapersonal skills
  - Technology-enhanced, personalised advising for a New Era

Simple information transfer is not working

Krugazor flickr.com

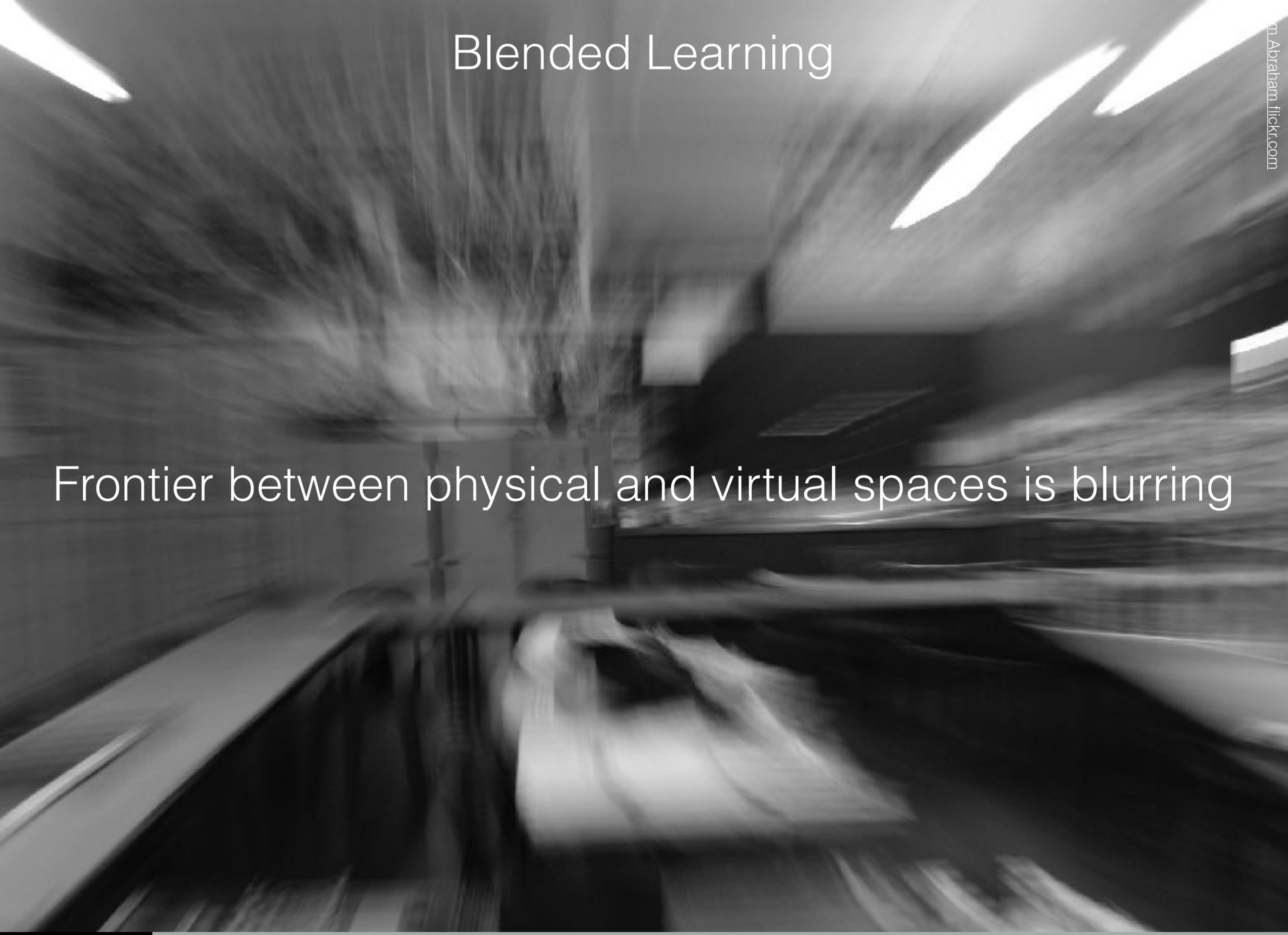
Mazur, E. (2009). Farewell, lecture. Science, 323(5910), 50-51.

"… robust correlations between **student involvement** in a subset of 'educationally purposive activities', and **positive outcomes of student success and development**, including satisfaction, persistence, academic achievement and social engagement"

Trowler, V. (2010). Student engagement literature review. York, UK: The Higher Education Academy.

Joshua Ganderson flickr.com

Blended Learning



Frontier between physical and virtual spaces is blurring

n Abraham flickr.com

"… teaching in higher education will necessarily **shift the balance of its efforts towards a greater investment in design** as a way of coping with otherwise intolerable pressures on staff and resources."

Goodyear, P. (2015). Teaching as Design. HERDSA Review of Higher Education, 2, 27-50.

Jackson Lavarnway

"People make good choices in contexts in which they have experience, good information, and **prompt feedback**"

Derek Bruff flickr.com

Thaler, R. H., & Sunstein, C. R. (2008). *Nudge*. Great Britain: Yale University Press.

"There is no such thing as a neutral design"

Thaler, R. H., & Sunstein, C. R. (2008). *Nudge*. Great Britain: Yale University Press.

- Understand human memory and learning
- Know useful techniques to study
- Know how to monitor
- Understand existing biases

Israeli Defense Forces flickr.com

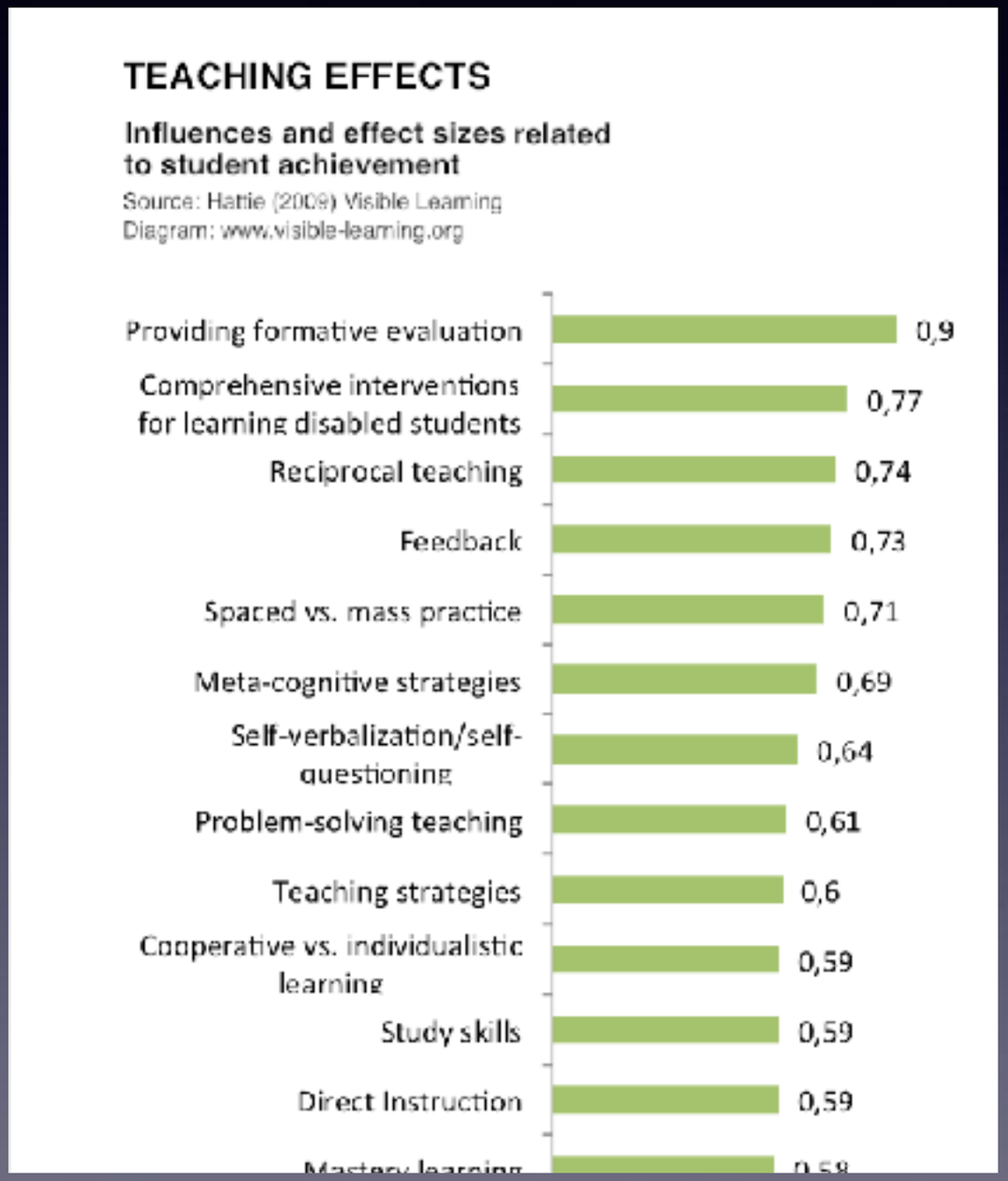
Bjork, R. A., Dunlosky, J., & Kornell, N. (2013). Self-regulated learning: beliefs, techniques, and illusions. *Annu Rev Psychol, 64*, 417-444. doi:10.1146/annurev-psych-113011-143823

The student experience

Feedback

If You Could Choose One…

- More than 500 meta-analyses of student achievements
- 100 factors with potential influence
- Feedback in top five
- (74 meta-analyses) Most effective form: video, audio, **computer-assisted** instructional feedback, and/or related goals



Hattie, J. A. (1999). Influences on student learning. Inaugural professorial address, University of Auckland, New Zealand

Feedback Levels

1. Task Level (understanding, performance)

2. Process Level (what to do to understand, perform)

3. Self-regulation level (detecting and directing effort)

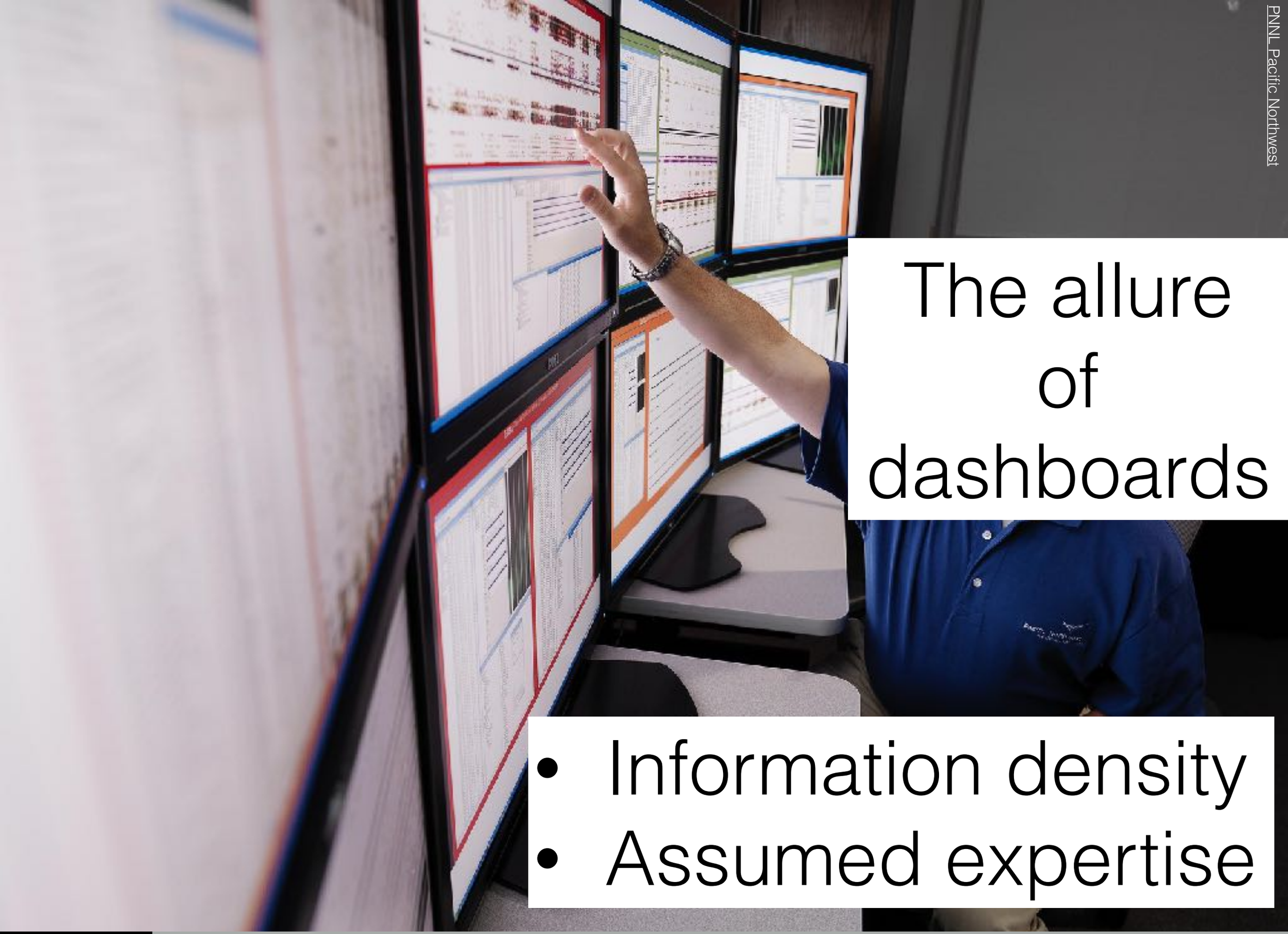
4. Self level (personal evaluation and affect)

Hattie, J., & Timperley, H. (2007). The Power of Feedback. *Review of Educational Research, 77*(1), 81-112. doi:10.3102/003465430298487

“Feedback is a **process** to positively **influence** how students engage with their work in a learning experience so that they can **improve** its overall quality with respect to an appropriate reference and **increase** their self-evaluative capacity”

Faruk Ateş flickr.com

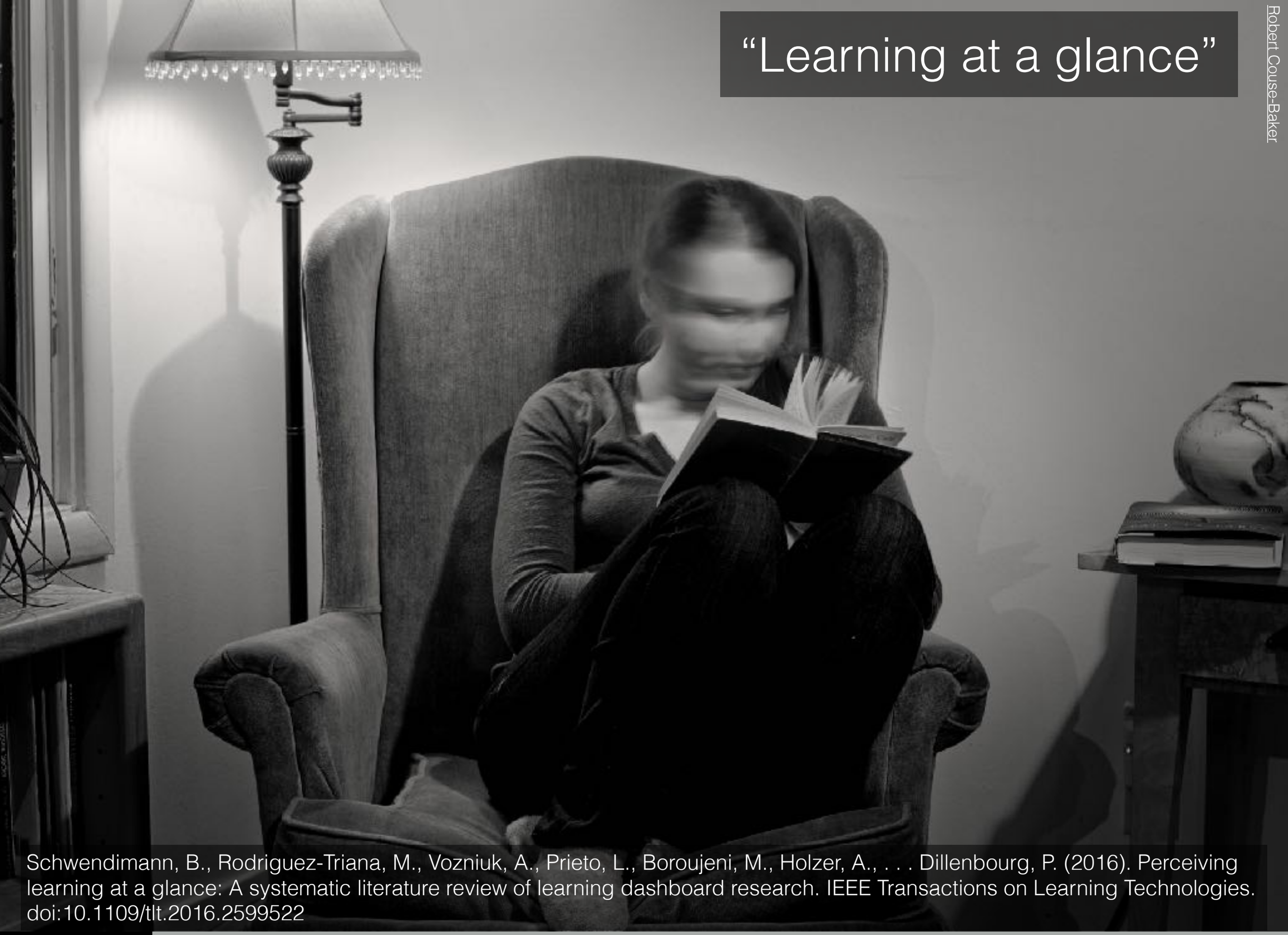
Pardo, A. (2017). A feedback model for data-rich learning experiences. Assessment & Evaluation in Higher Education, 1-11. doi: 10.1080/02602938.2017.1356905



The allure of dashboards

- Information density
- Assumed expertise

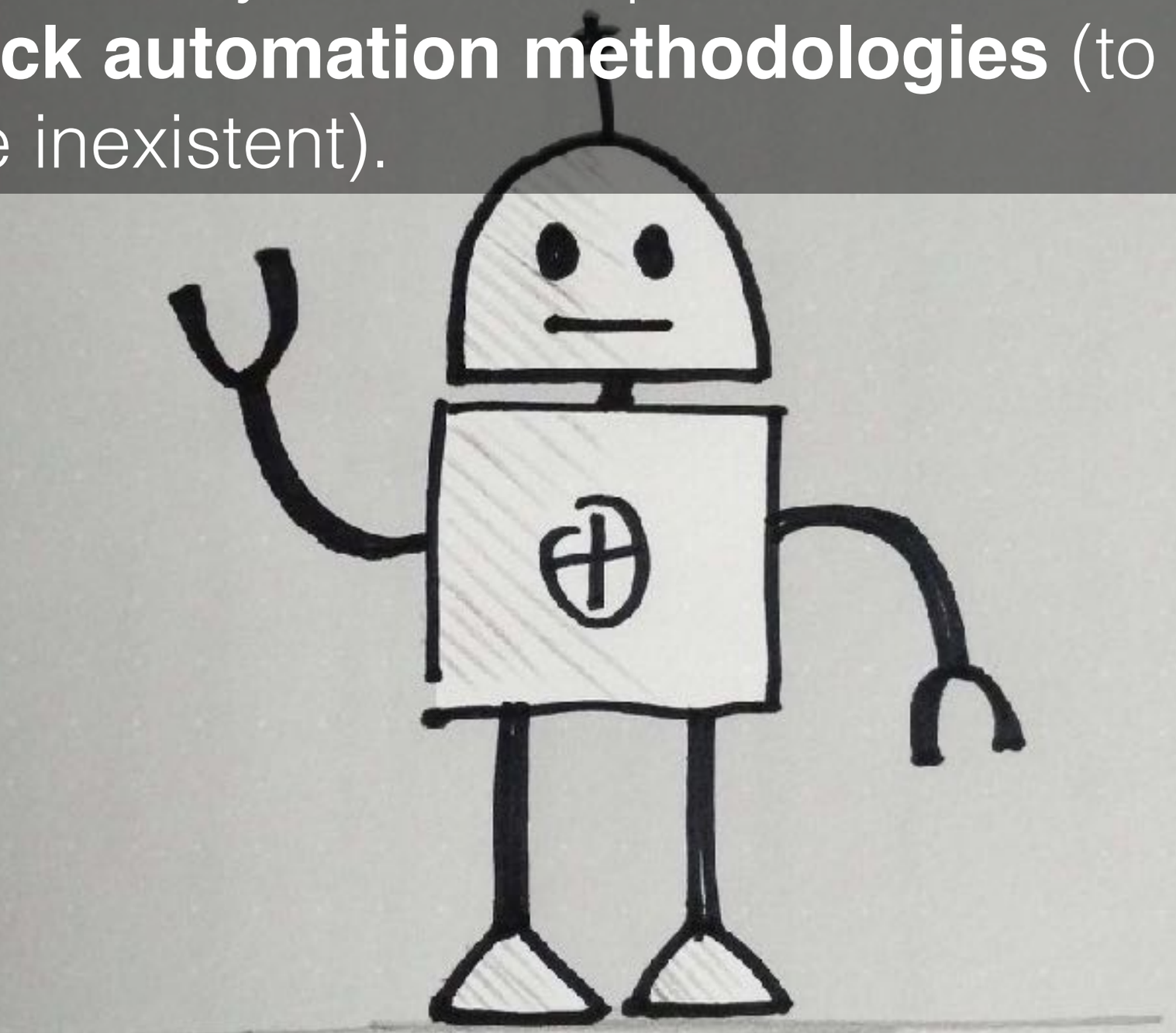
“Learning at a glance”



Robert Couse-Baker

Schwendimann, B., Rodriguez-Triana, M., Vozniuk, A., Prieto, L., Boroujeni, M., Holzer, A., . . . Dillenbourg, P. (2016). Perceiving learning at a glance: A systematic literature review of learning dashboard research. IEEE Transactions on Learning Technologies. doi:10.1109/tlt.2016.2599522

(1) methodologies for learning analytics dashboards feedback currently based on performance indicators only, (2) **feedback automation methodologies** (to our knowledge inexistent).



Sedrakyan, G., Järvelä, S., & Kirschner, P. (2017). Conceptual Framework for Feedback Automation and Personalization for Designing Learning Analytics Dashboards. Paper presented at the EARLI Conference, Tampere, Finland.

They do engage with feedback when properly deployed

Zimbardi, K., Colthorpe, K., Dekker, A., Engstrom, C., Bugarcic, A., Worthy, P., . . . Long, P. (2016). Are they using my feedback? The extent of students' feedback use has a large impact on subsequent academic performance. Assessment & Evaluation in Higher Education, 42(4), 625-644. doi:10.1080/02602938.2016.1174187

Salzburg Global Seminar

Feedback as dialogue

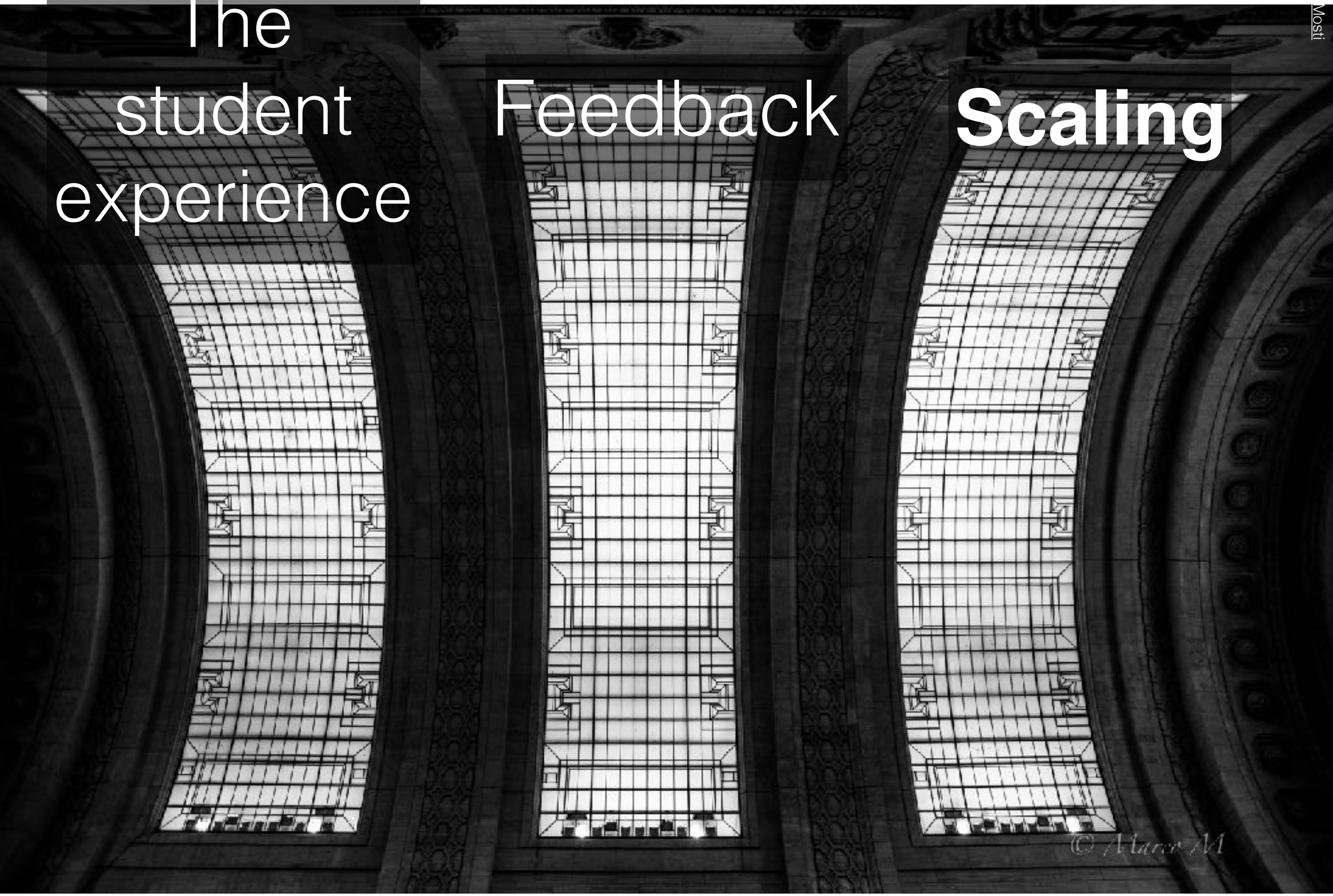
PP Pilch

Carless, D. (2016). Feedback as Dialogue Encyclopedia of Educational Philosophy and Theory (pp. 1-6): Springer. doi: 10.1007/978-981-287-532-7_389-1

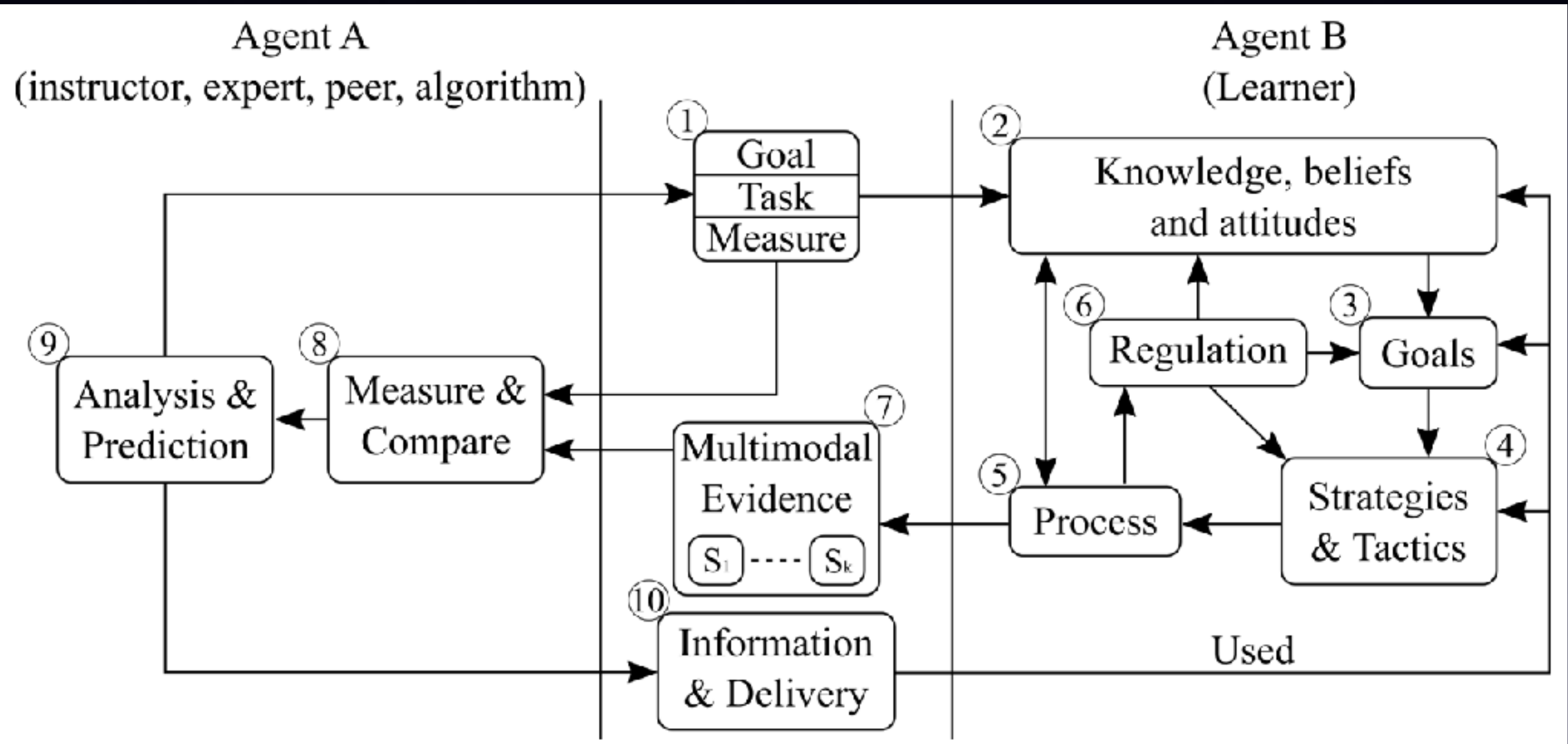
The student experience

Feedback

Scaling



Feedback in technology-mediated scenarios



Pardo, A. (2017). A feedback model for data-rich learning experiences. Assessment & Evaluation in Higher Education, 1-11. doi: 10.1080/02602938.2017.1356905

Large number of events per user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Combine logs with design

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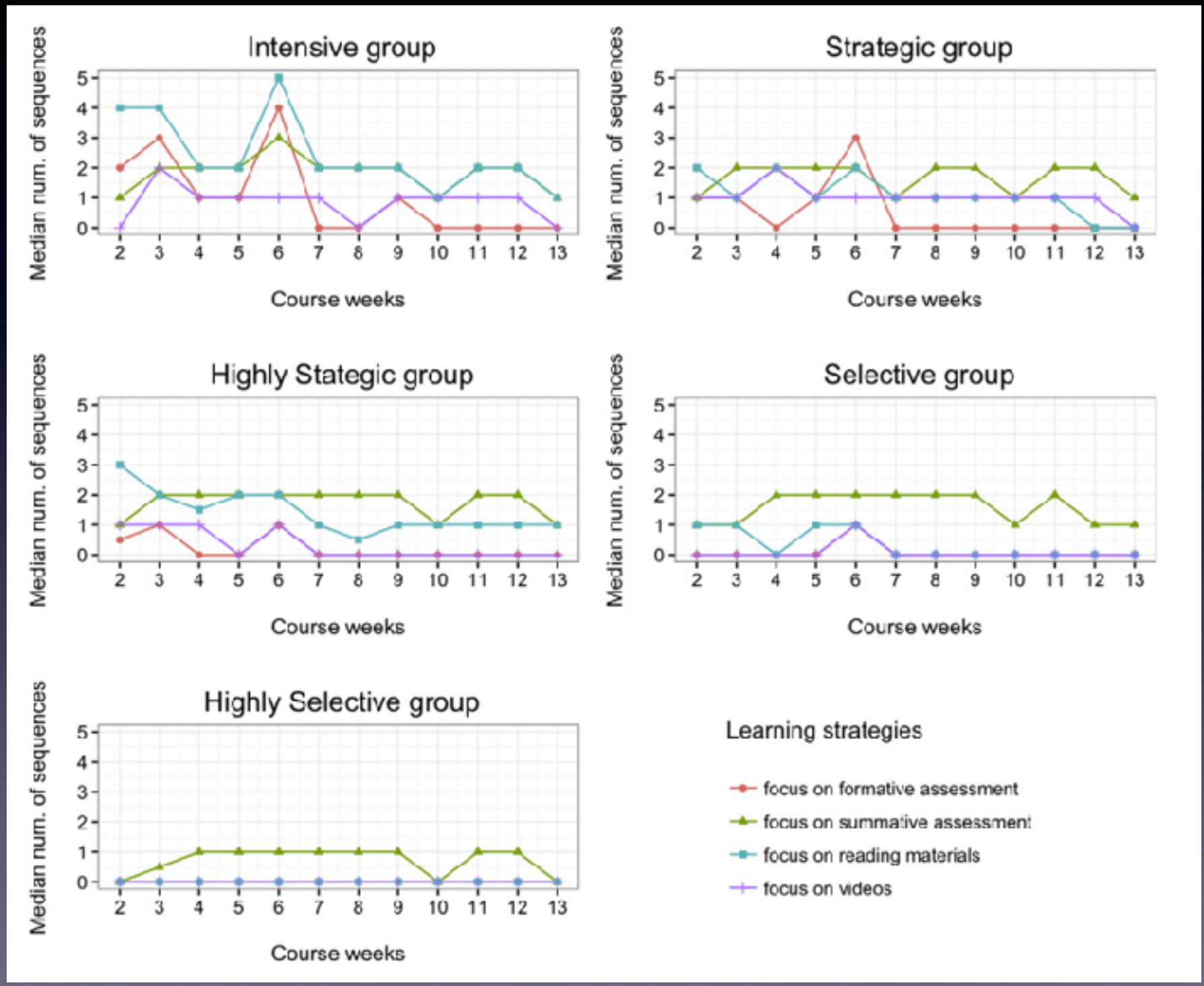
Learner played a video about topic COD during Week 2

Unveiling learning strategies

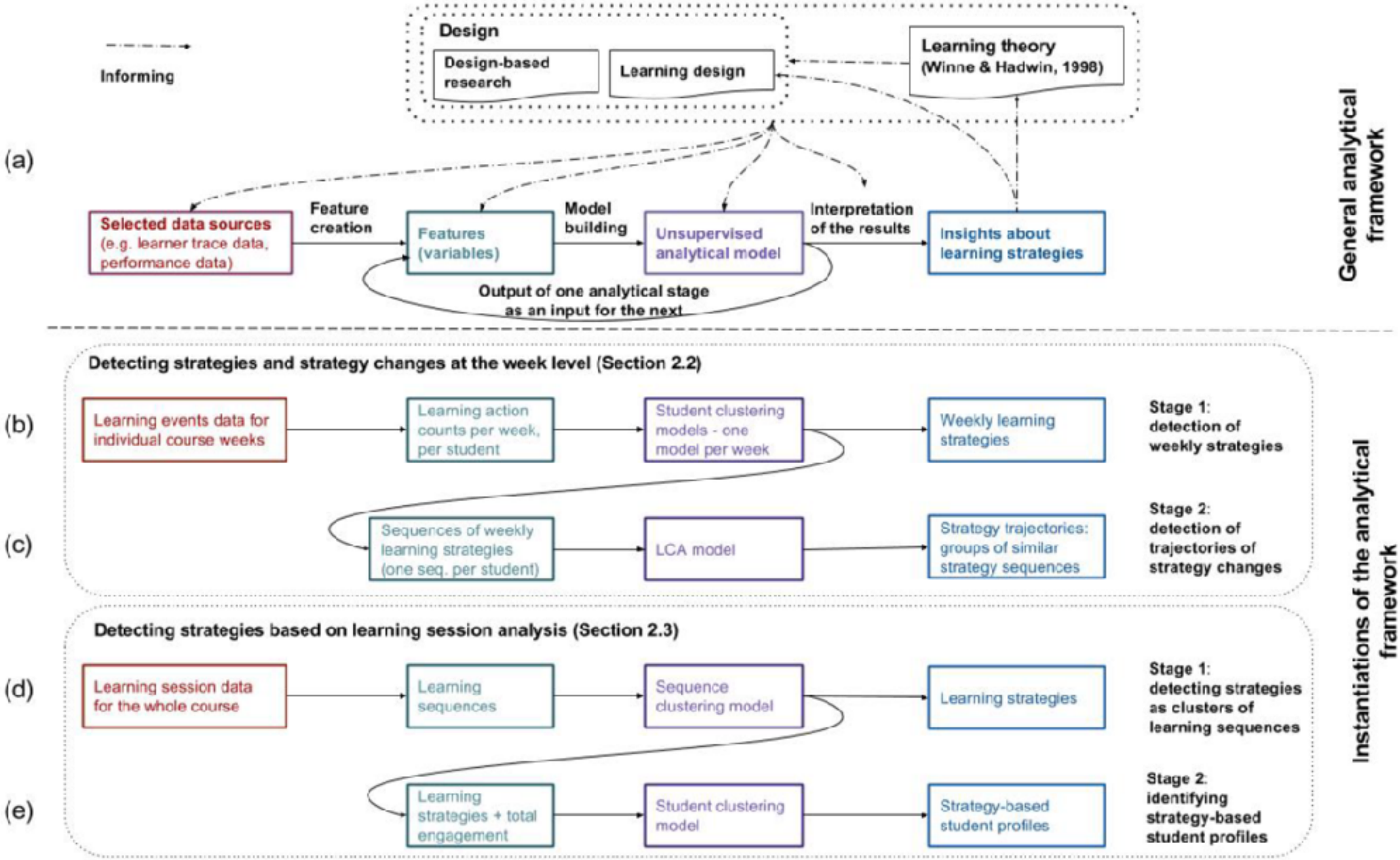


Jovanovic, J., Gašević, D., Pardo, A., Dawson, S., & Mirriahi, N. (2017). Learning Analytics to Unveil Learning Strategies in a Flipped Classroom. The Internet and Higher Education, 23(April), 74-85. doi:10.1016/j.iheduc.2017.02.001

Combining Observations with Self Reports

Ellis, R. A., Han, F., & Pardo, A. (2017). Improving insights from learning analytics - the value of combining observational and self-report data on university student learning. Educational Technology & Society, 20(3), 158-169.

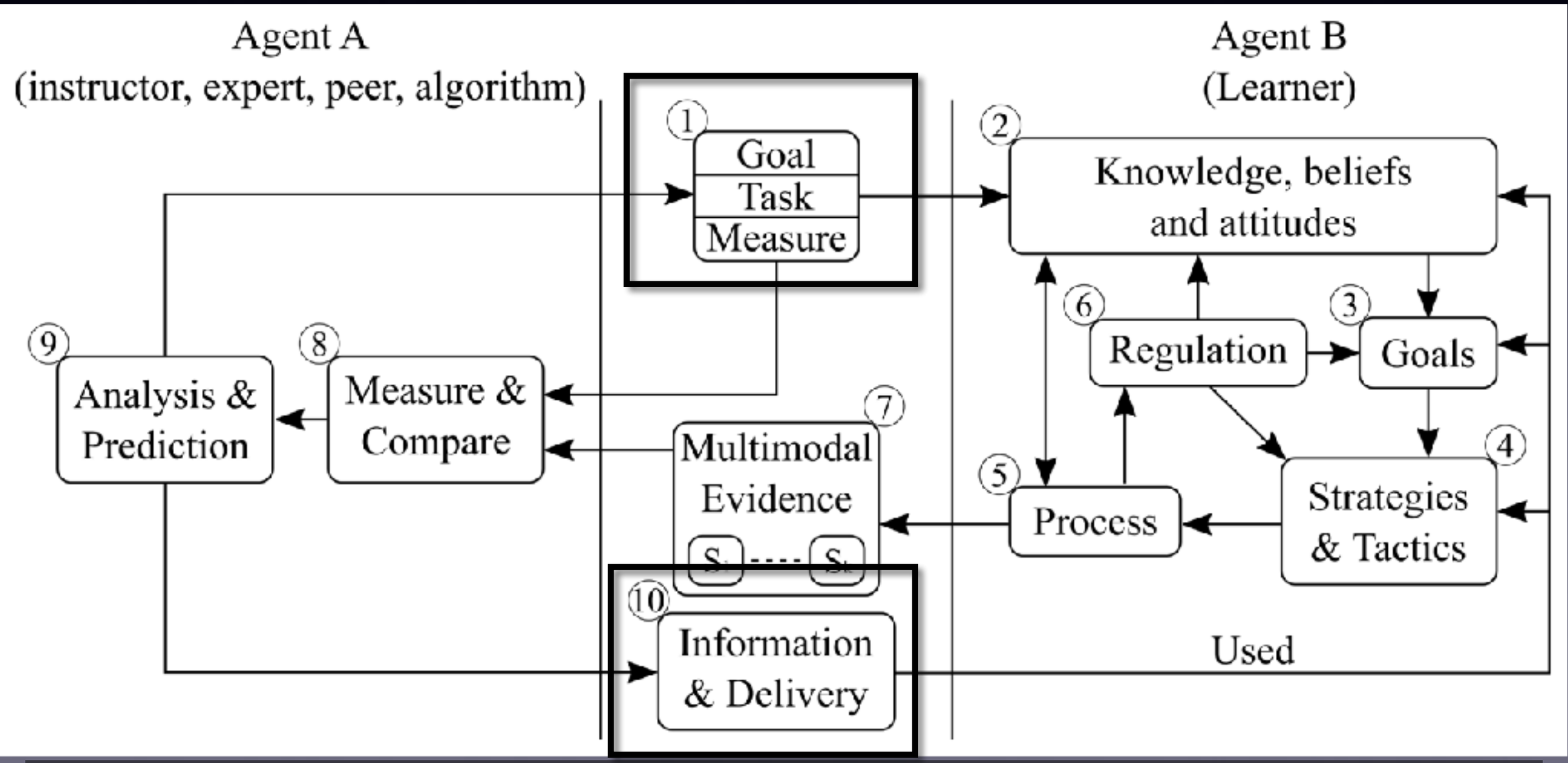
Support teaching and learning in active learning



Jovanović, J., Gašević, D., Pardo, A., Mirriahi, N., & Dawson, S. (In Press). An analytics-based framework to support teaching and learning in a flipped classroom. In J. M. Lodge, J. Cooney Horvath, & L. Corrin (Eds.), Learning analytics in the classroom: translating learning analytics research for teachers. United Kingdom: Taylor & Francis.

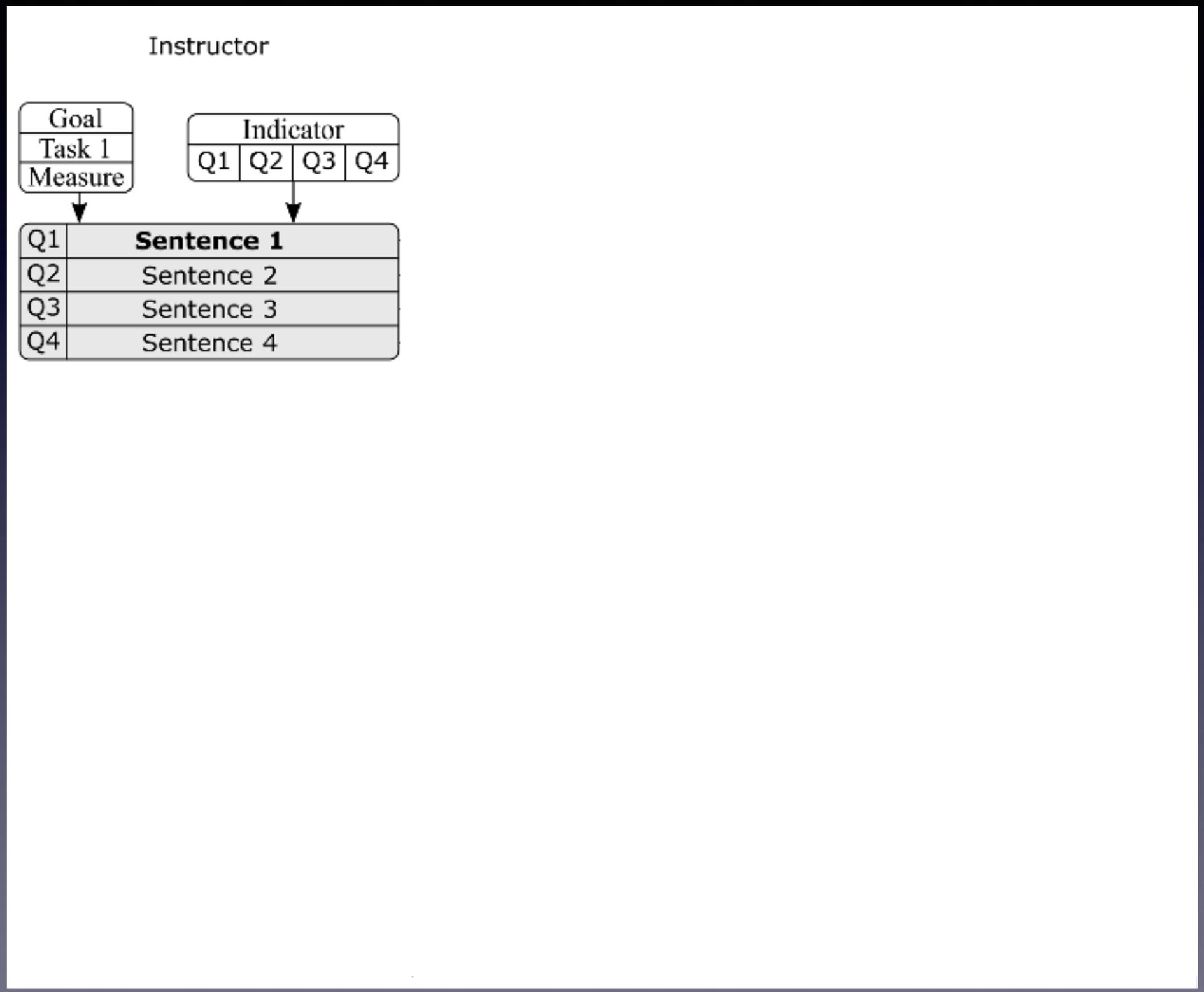
ABC Bildungs und Tagungszentrum

Feedback in technology-mediated scenarios

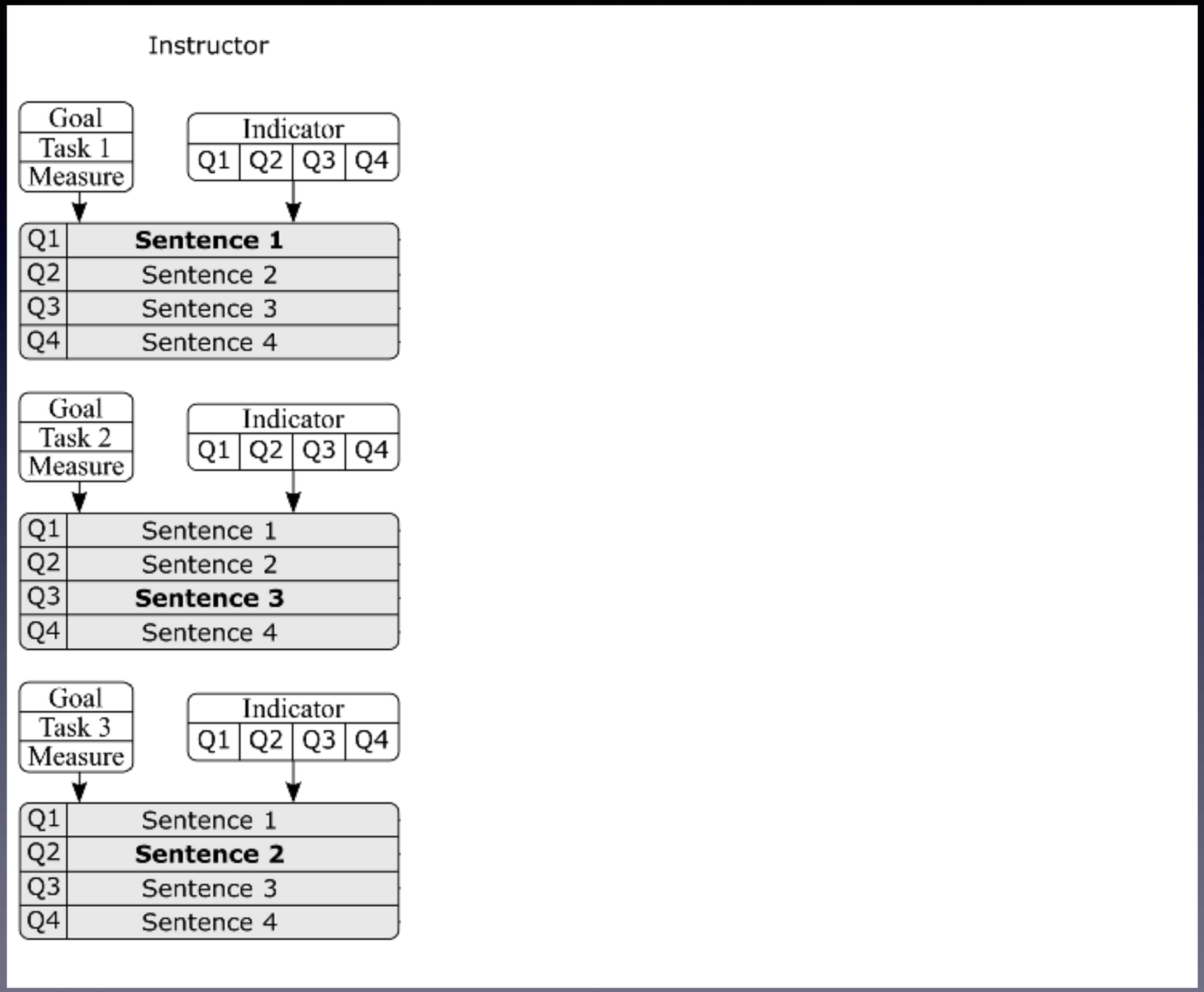


Pardo, A. (2017). A feedback model for data-rich learning experiences. Assessment & Evaluation in Higher Education, 1-11. doi: 10.1080/02602938.2017.1356905

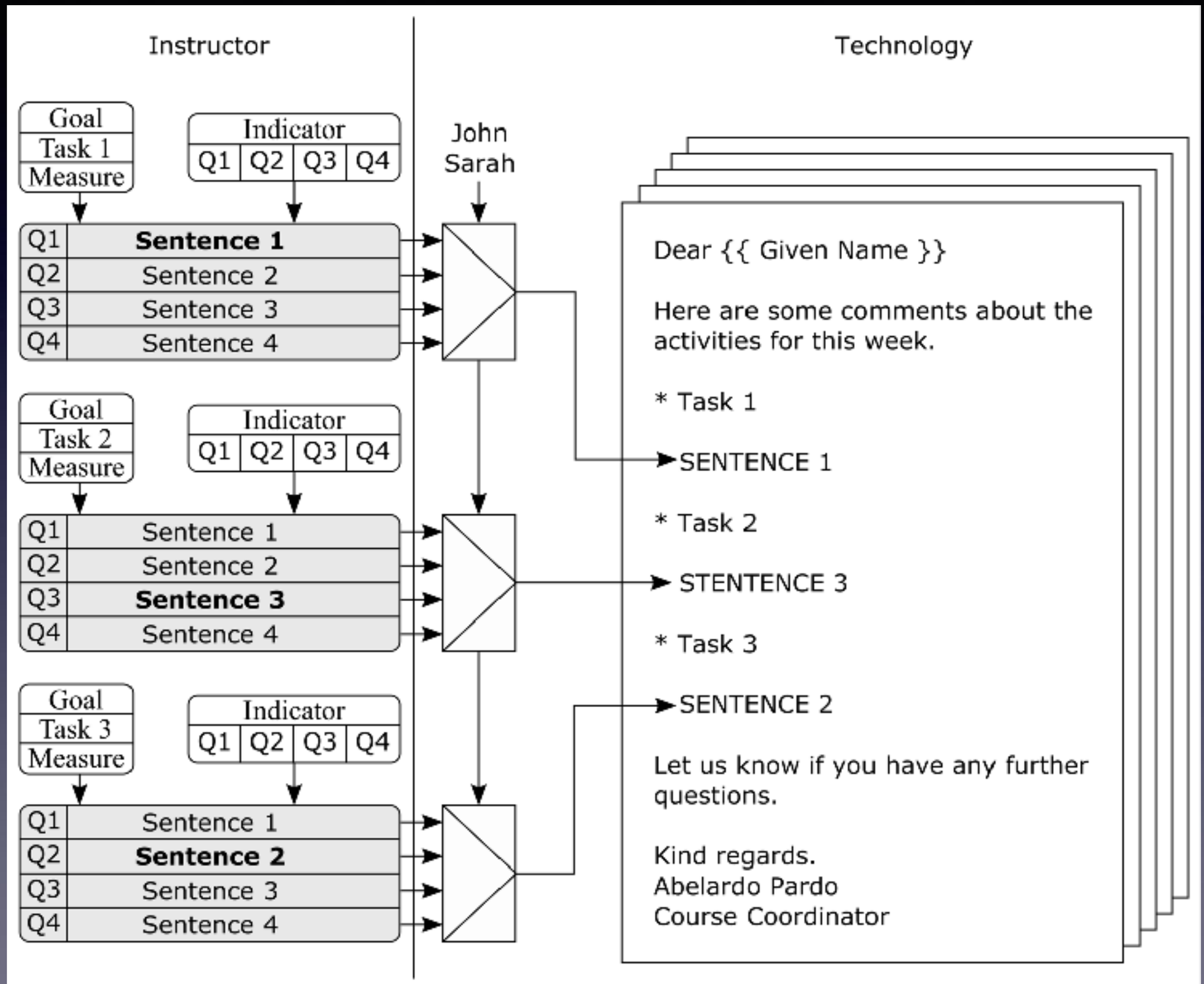
Instructor — per task
Technology — per student



Instructor — per task
Technology — per student



Instructor — per task
Technology — per student



Hi [redacted]

Here are some comments and feedback about your lecture preparation in ELEC1601 during Week 2.

Automatic Email

Activity VIDEO: Encoding in base 2, 8 and 16

- Make sure you review again the whole content explained in the video of the activity. You could use a piece of paper and try to replicate the developments that are explained in the video.
- Give another round to the questions next to the video in this activity until you answer all of them correctly at the first attempt and without looking at the solutions.

VIDEO: Review of natural and integer number encoding

- Make sure you review again the whole content explained in the video in the activity. Encoding naturals is a procedure that you will be using very frequently in the following weeks.

VIDEO: Encoding Integers

- Review again the 2s complement encoding explained in the video in the activity. Repeat the procedure until you are able to do it very fast.
- You should give it another try to the questions next to the video in this activity. Try to work in the encoding until you have no incorrect answers in a full round.

Read about the floating point representation

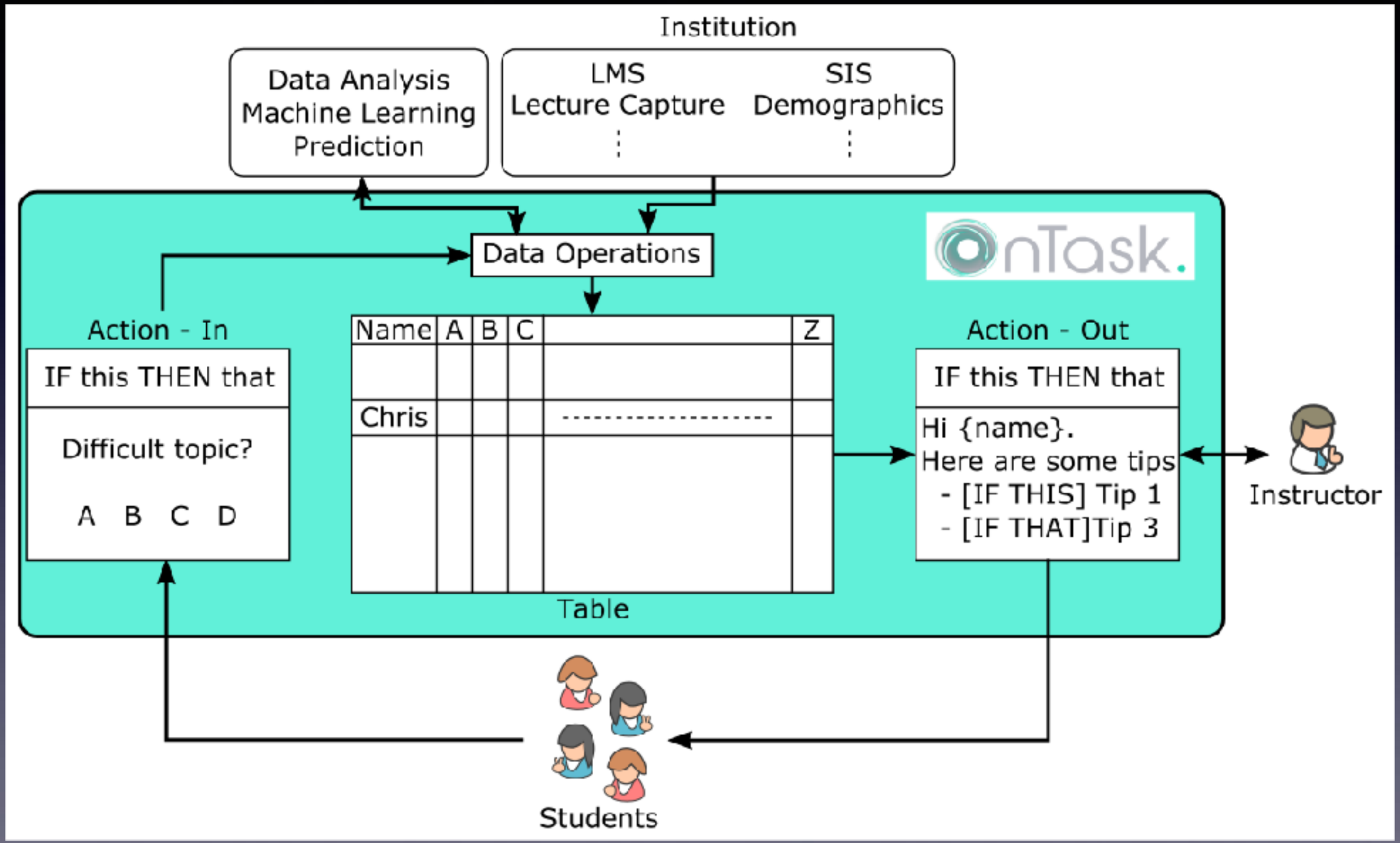
- Good work with the questions in the section. You may take some of them and create variations (change number of bits for example) to make sure you fully understand the concepts.
- You should give it another try to the questions about range, accuracy and precision in section 2.7.2.
- Good work with the questions in section 2.7.3.

Sequence of problems about information encoding

- Good work with the exercises in the sequence. You may want to review it in a few days, or perhaps before the midterm.

Regards

ontasklearning.org



Pardo et al. OnTask: Delivering Data-Informed, Personalised Learning Support Actions. Journal of Learning Analytics. Manuscript under review, 2018

Comment lecture preparation activities

Filter learners Only those with one video missing (10 learners of 12)

- Select a subset of learners
- Arbitrary expression on any column value

Text Conditions + New

No_Video_1 (4 learners) | No_Video_2 (5 learners) | No_Video_3 (6 learners)

Conditions to include/ignore text

Insert: - Attribute - | - Column Value -

Helvetica Neue | 14

Dear {{ first_name }}

Here are some comments abo… or this week.

{% if No_Video_1 %}

Genes and Proteins Activity

This video explains the role of the genes to synthesise proteins in the cell. It is very important to see the connection between the proteins and the rest of processes occurring in the cell.

{% endif %}

{% if No_Video_2 %}

STEM Cells

This video show how stem cells a… how cellular organisms evolve. There are very valuable descriptions in this video about the mechanisms that are involved in this specialisation.

{% endif %}

Replace by column value

Text included only if condition No_Video_1 is true

Preview the content for each learner

Preview | Done

© OnTask Project 2018

Details Dataops Table Actions Scheduler Logs

Edit condition

Name

No_Video_1

Description text

Didn't watch Video 1

Formula

NOT AND OR

Add rule Add group

video_1 equal 0 Delete

Cancel Update condition

Dear {{ first_name }}

Here are some comments about the prep

{% if No_Video_1 %}

Genes and Proteins Activity

This video explains the role of the genes to synthesise proteins in the cell. It is very important to see the connection between the proteins and the rest of processes occurring in the cell.

{% endif %}

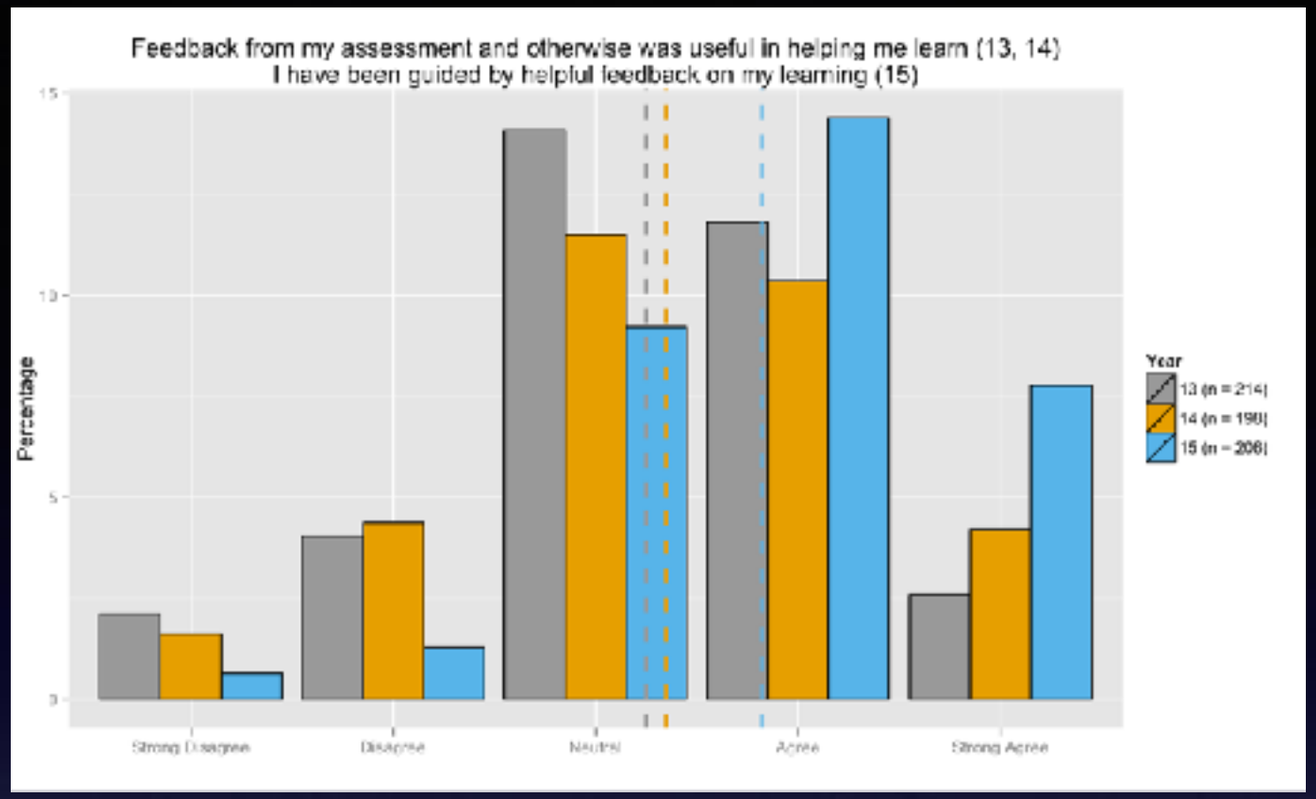
{% if No_Video_2 %}

STEM Cells

This video show how stem cells are a fundamental building block of how cellular organisms evolve. There are very valuable descriptions in this video about the mechanisms that are involved in this specialisation.

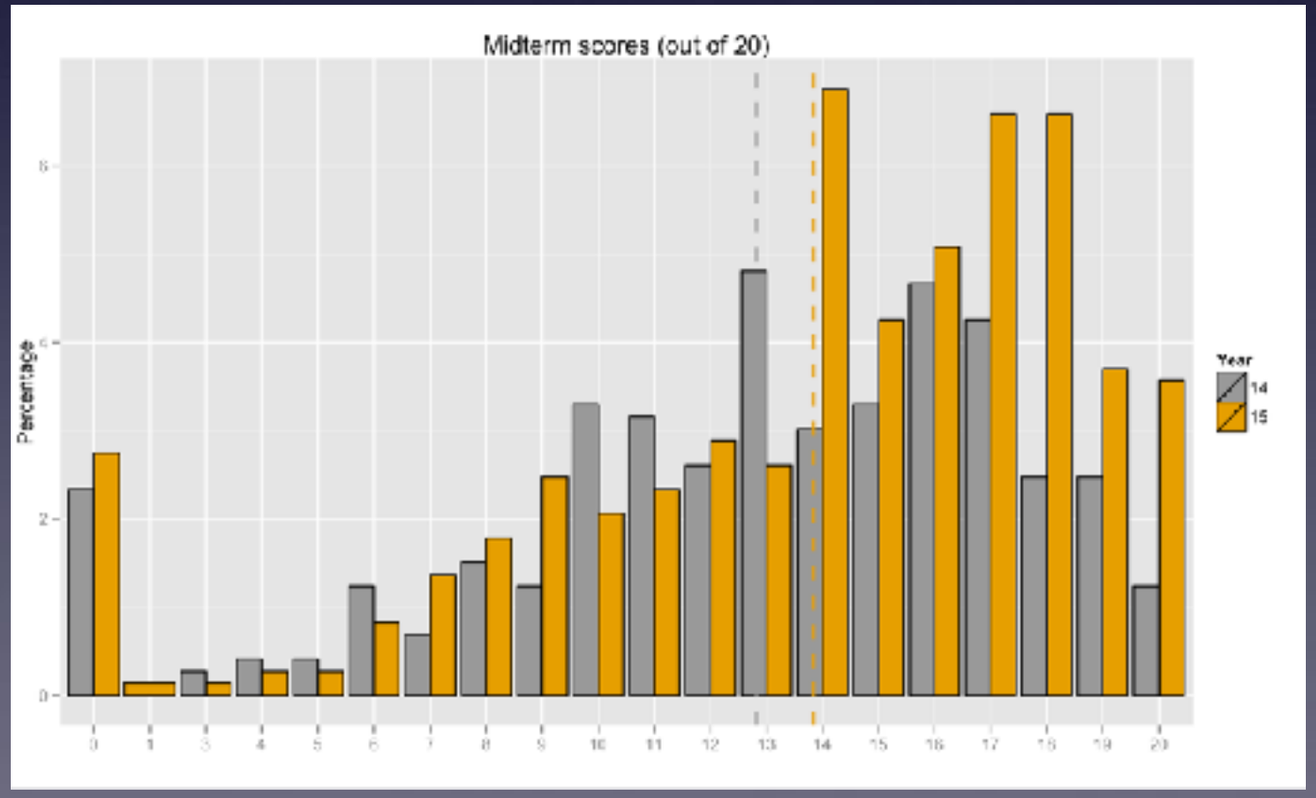
{% endif %}

Preview Done



Helpful feedback

Effect size (Cohen's d) = **0.49**
Medium positive effect



Midterm Scores

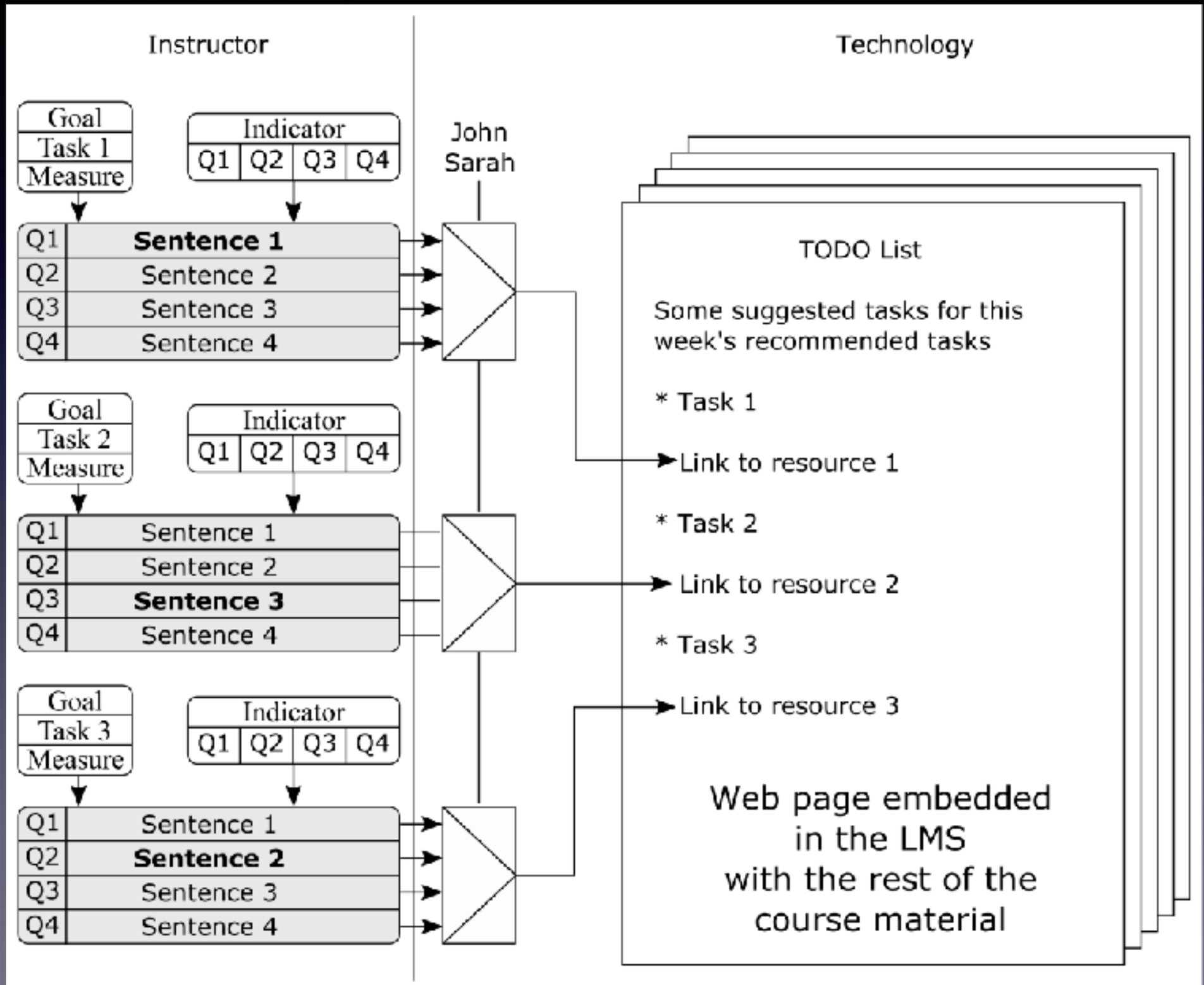
Effect size (Cohen's d) = **0.21**
Small positive effect

Pardo, A., Jovanović, J., Dawson, S., Gašević, D., & Mirriahi, N. (In press). Using Learning Analytics to Scale the Provision of Personalised Feedback. British Journal of Educational Technology. doi:10.1111/bjet.12592

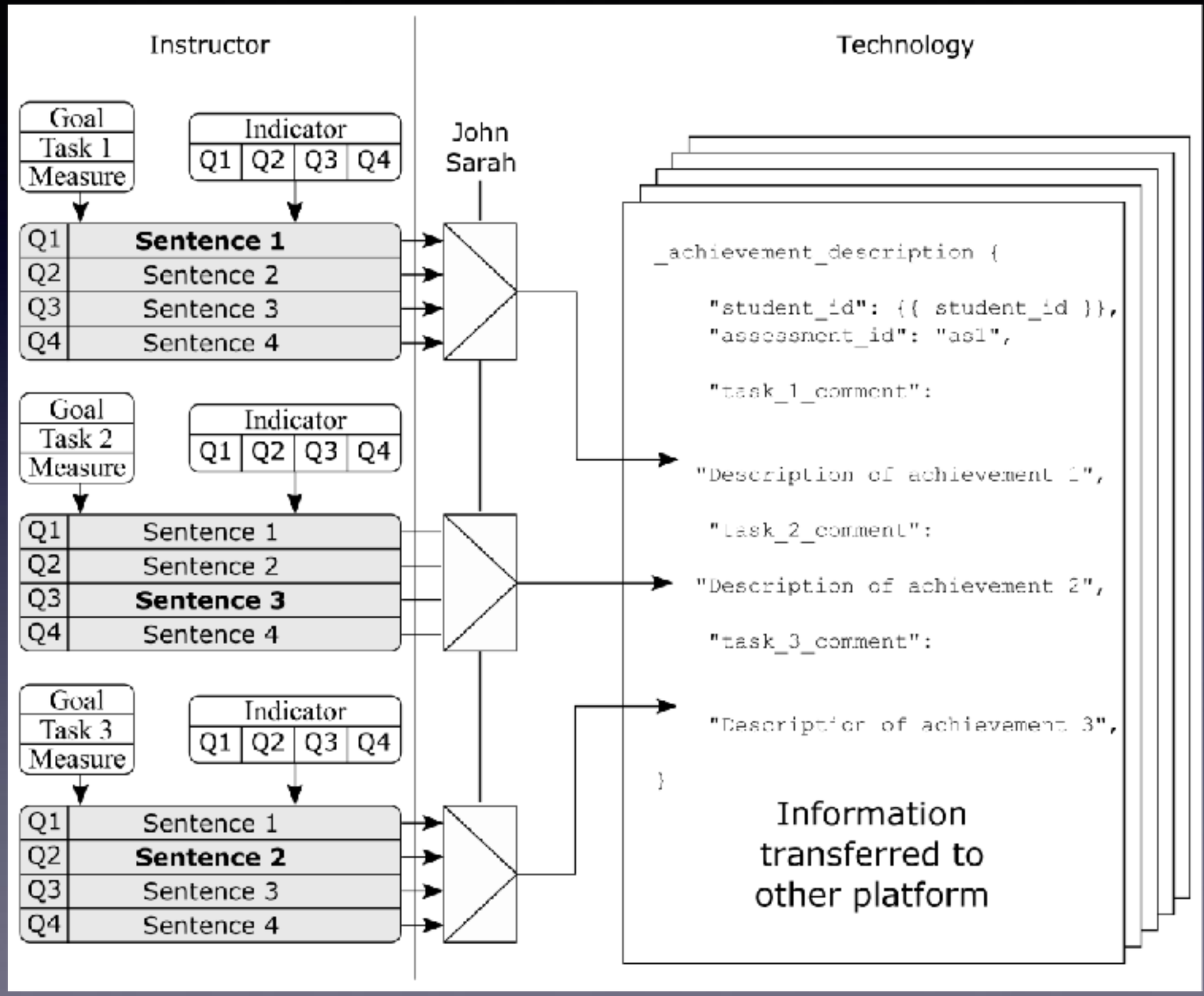
Focus groups

- “It helps me to validate where I am; do I need to freak out right now?”
- “…gives you a nudge — Stop procrastinating and playing games!”
- A reminder to study “across the board” (flow-on effect)
- “The wording makes you want to do it. Like an encouragement.”

Personalised set of suggestions



Propagate actions to other platforms



- Support instructors to manage personalised feedback processes
- Simple rule-base knowledge encoding
- Provide appropriate view of data sources
- Scale to large and highly diverse cohorts
- Open-source project
- Pilots in 2018 running
- Contact us if interested

ontasklearning.org

Conclusions

- Blended Learning calls for new design approaches
- Embrace the *coach* role to support students
- Target decision-making processes
- Feedback is one vehicle to provide effective support
- Technology can help to explore conceptual exoskeletons

Raimond Donk

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