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GLOBAL

Future Faculty Development Program

Video for DAY 1
The science of learning

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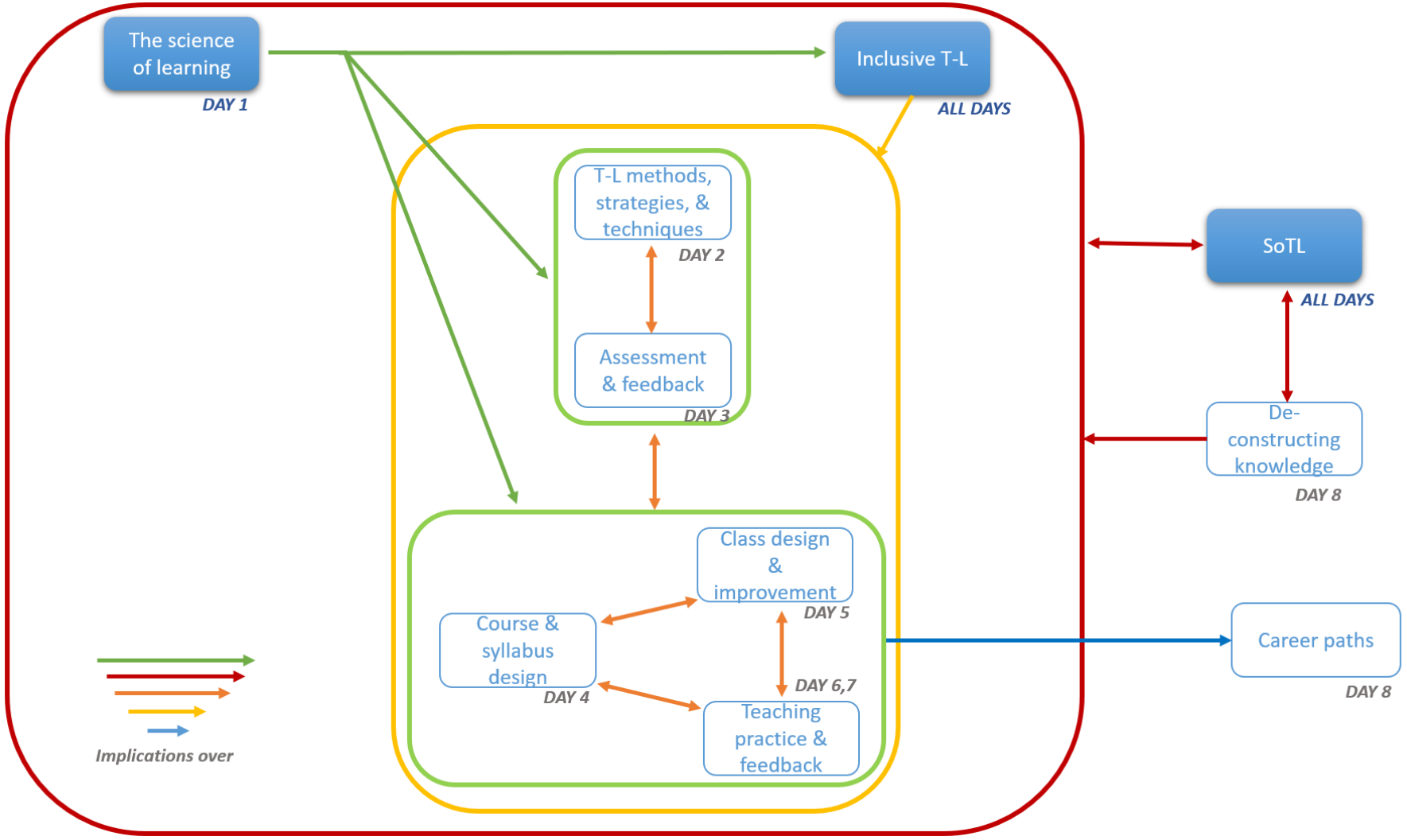
Syllabus of UTokyo Global FFDP



Defining learning

Pleiad of definitions (Dehane, 2020; Murphy & Knight, 2016)

"Multidimensional **process** that results in a relatively **enduring change** (…), and consequently [in] how that person (…) will **perceive** the world and reciprocally **respond** to its affordances (…) learning has as its foundation the systemic, **dynamic**, and **interactive** relation between (…) the **learner** and the **object of the learning** as ecologically situated" (Alexander et al., 2009; p. 186)

Process that leads to **change**, occurs as a result of experience and increases the potential for improved **performance** and future learning (Ambrosse et al., 2010)

1. Process
2. Change
3. Dynamic & interactive

See references at the end

Elements with an impact on learning

We are **active agents** in our learning. Still, learning is continuously influenced by biological, affective, cognitive, socio-contextual and emotional processes.

Research highlights different **interrelated elements:**

1. Connecting knowledge.
2. Use of memories.
3. Activating and strengthening knowledge. Practice and retrieving.
4. Beliefs, emotions and social engagement.
5. Motivation, self-monitoring and self-regulating.
6. Effective feedback (*will be explicitly addressed during Day 3*).

Some fundamental principles for/about learning I

1. Connecting knowledge

a. New knowledge is learnt **in association/building over** previous knowledge.

b. Expertise reversal effect: the **more we know**, the **less guidance** we need (Chen et al., 2017)

c. **Examples & analogies** can help learning (amusing ones too), if inferences are clear.

d. Learning involves **individual non-linear** trajectories from simple to complex.

Some fundamental principles for/about learning II

2. Use of memories

a. Learning involves transferring information from working to **long-term memory.**

b. **Cognitive load:** too much **diverse** inputs and cognitive **demands** can impede learning.

c. Memories tend to move from episodic (context-based) to semantic **(context-free).**

d. Long-term memory can shift and encode **misinformation**.

e. **Breaks** help the **consolidation** of memories.

Some fundamental principles for/about learning III

3. Activating & strengthening. Retrieving & practicing

a. **Retrieving** knowledge, a most impactful strategy for learning (Karpicke & Blunt, 2011)

b. By practicing, students **retrieve** knowledge and **use** it for new situations.

c. Proper transfer of knowledge to practice requires **context** knowledge and clear **goals**.

d. Practice is more effective when:

   a. **Increasingly varied** (variability effect & differentiating) (Likourezos et al., 2019).

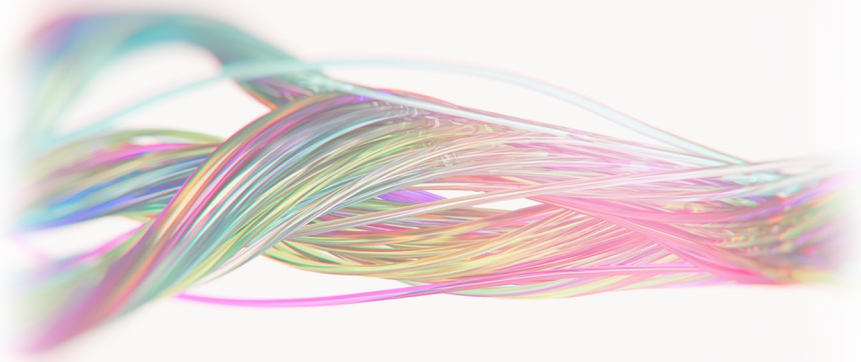
   b. **Spaced** in time.

   c. Perceived as **meaningful and authentic.**

   d. Perceived as **challenging** at a "desirable sense of difficulty" (Bjork, 2018).

      Zone of proximal development (Vygotski, 1978)

See references at the end



Some fundamental principles for/about learning…

Comments, ideas, & doubts so far…

Take note of them, stop the video when needed.

Remember to take a break

Some fundamental principles for/about learning IV

4. Beliefs, emotions and social engagement

a. Inputs, **first**, cross through an ***emotional area*** in our brain.

b. Students' **beliefs** about learning are affected by the teachers' approach.

c. **Self-beliefs** about ability to learn or hard work impact motivation and achievement.

d. Learning is more effective when there is a **sense of purpose.**

e. **Self-efficacy beliefs:** linked to **tolerance to error**, **commitment** & challenge appreciation.

f. Feeling of **belonging** and sense of a **cooperative environment and acceptance** reinforce motivation and have an impact on success.

g. **Peer modelling** is more effective than teacher modelling.

Some fundamental principles for/about learning V

5. Motivation, self-monitoring and regulating

a. Motivation impacts the **approach** to & the **sustainability** of learning. It is affected by multiple factors (**beliefs**, **interests**, **expectations**, **value** granted, **challenges, environment,** etc.).

b. **Intrinsic** motivation leads to better long-term learning than extrinsic.

c. **Unexpected (surprise) and close in time rewards** enhance learning.

d. **Breaks** contribute to **consolidation** and help avoiding procrastination.

e. **Self-monitoring/regulating** help learning, although "self-" processes are challenging.

f. **Autonomy**, **resilience** and a **sense of agency** contribute to self-efficacy and self-direction and to build goal-oriented and effective learning processes,

Some fundamental principles for/about learning VI

6. Effective feedback

Ideas, features and pedagogical implications will be addressed during day 3.

Yes, on May the 24th!

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Also, take a look at

- Key Findings and Implications of the Science of Learning and Development. Retrieved from https://turnaroundusa.org/wp-content/uploads/2018/02/Key-Findings-and-Implications-of-the-Science-of-Learning-Development.pdf
- Johns Hopkins Science of Learning Institute http://scienceoflearning.jhu.edu/science-to-practice/resources/
- The Education Hub https://theeducationhub.org.nz/category/school-resources/science-of-learning/

Thank you

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