

Digital Education, why and how?

Marcus Specht,
Professor Digital Education, TU Delft, Faculty of EEMCS
4TU.Center for Engineering Education lead TU Delft,
Scientific Director, LDE Centre for Education and Learning





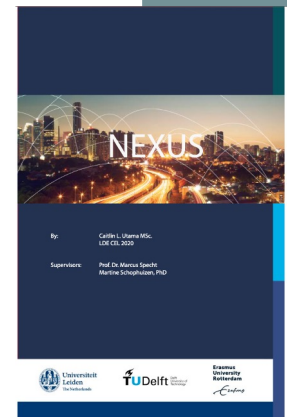
TOWARDS DIGITAL EDUCATION ?

Digital Education

- Datafication, Learning Analytics, AI for Education, Scalable Feedback
- Virtualisation, Augmented and Virtual Reality for collaborative learning
- Digital Skills and Computer Science Education (Digital, Data & AI Literacy)

NEXUS project

- Building a database of Educational Innovation Hubs in the Netherlands
 - 25 Centers at all 14 Universities
 - All teaching and learning fellows
 - All Lab Teams, 2000 persons
 - All topic maps to joint structure
- Main issues for educational innovation
 - **Resources: When to do it?**
 - **Vision: What to do?**
 - **Need: Redesign innovation from ground up**



Enabling educational innovation

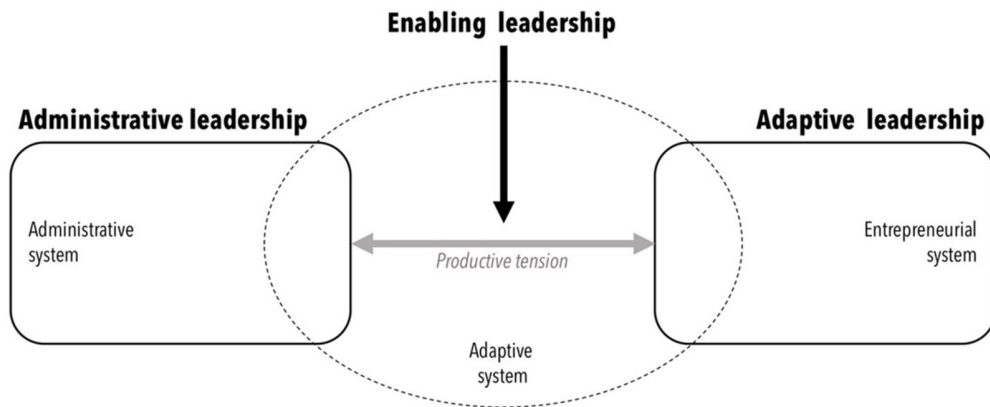


Fig. 1 The relatedness of the three leadership roles of complexity leadership theory (adapted from: Uhl-Bien et al., 2007)



Schophuizen, M., Kelly, A., Utama, C., Specht, M., & Kalz, M. (2022). Enabling educational innovation through complexity leadership? Perspectives from four Dutch universities. *Tertiary Education and Management*, 1-20.

Table 1 The three leadership roles of complexity leadership theory (adapted from: Uhl-Bien et al., 2007)

Leadership role	Description
Administrative leadership	<ul style="list-style-type: none"> – Top-down oriented – Formal with set patterns – Planning and coordination towards outcomes – Efficiency and effectiveness – Focuses on alignment and control – Represented by hierarchical and bureaucratic functions
Adaptive leadership	<ul style="list-style-type: none"> – Bottom-up oriented – Informal and emergent – Adaptive, creative learning actions that emerge from the actions of multiple agents in the organisation
Enabling leadership	<ul style="list-style-type: none"> – Top-down catalyst for optimal conditions for bottom-up adaptive capacity – Leads entanglement between bureaucratic (i.e. administrative) and emergent (i.e. adaptive) forms of leadership

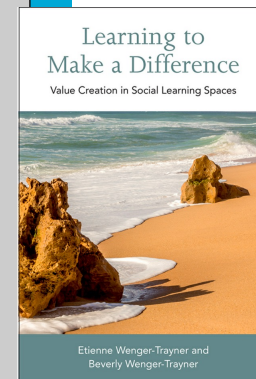
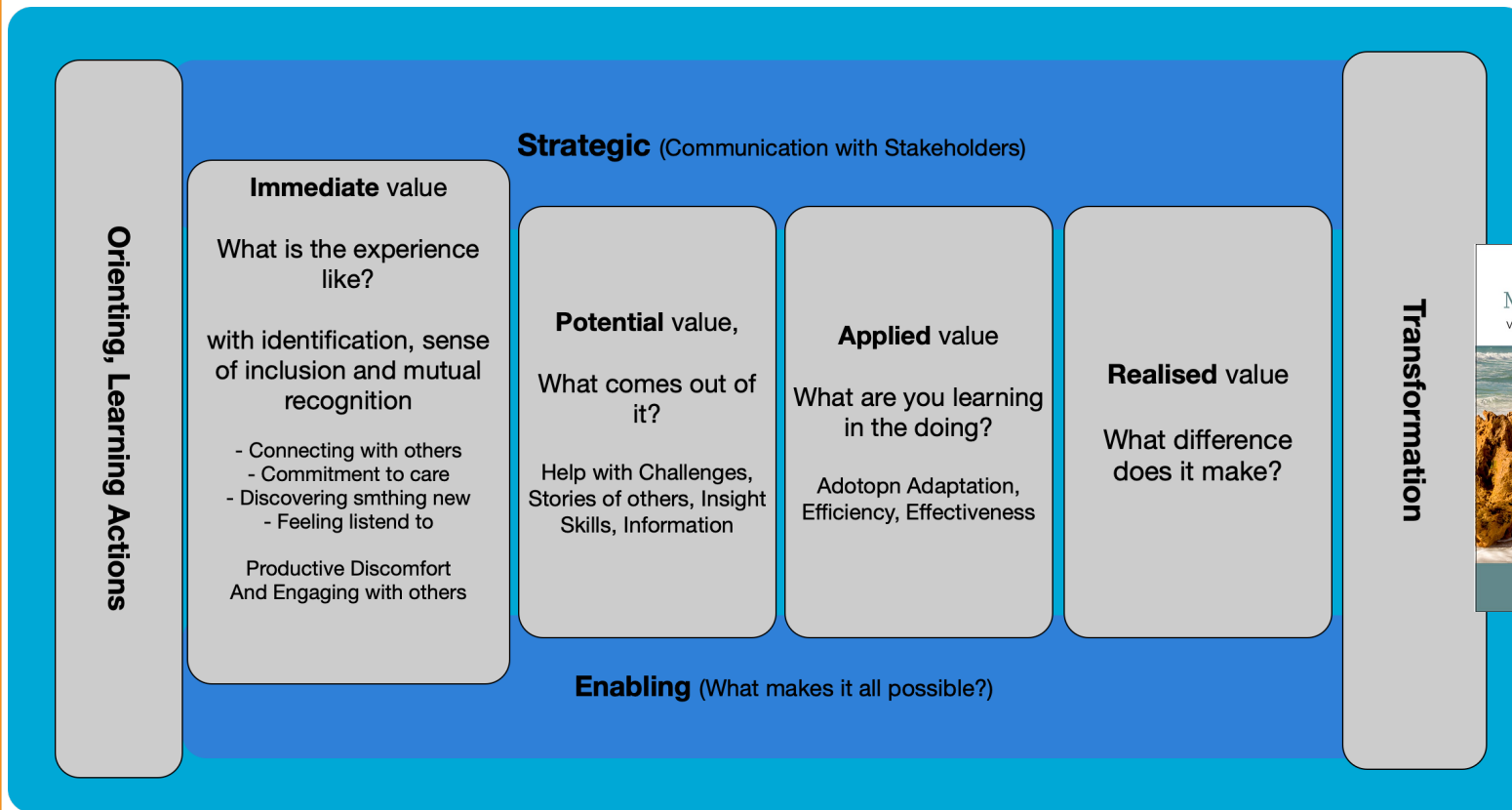
Leadership strategies

- *simultaneous and **sustained interventions** needed in order to gain momentum for change.*
- *a **need for action** is essential to initiate change and to work towards set goals.*
- *the notion of **enabling leadership** offers potential to **deepen understanding** of the entanglement of bottom-up and top-down processes*

Professional Learning Networks

- Learning Communities and CoP (Wenger, 1998)
- Professional Learning Networks (Koper & Specht, 2010, De Laat 2012)
- CoCreation, Participation, Transformation (Boud & Hager 2012)
- Value Creation in Learning Networks (Wenger-Trayner, 2021)

Learning creates value ?

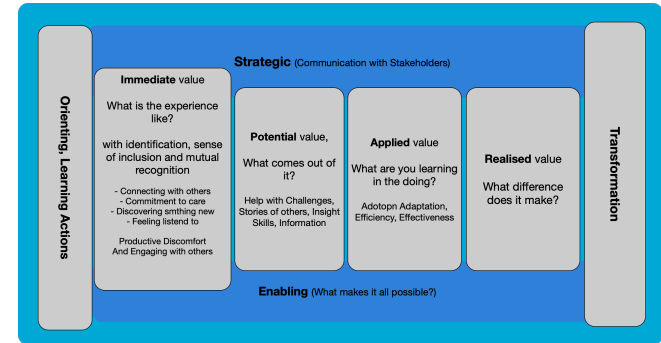
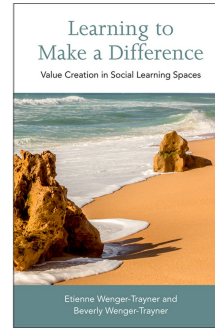


The lecturer: “Why ? ...

- Participation changed **me as a professional** *
(change in skills, attitudes, identity)
- Participation affected my **social connections** *
(change in the number, quality, frequency)
- Participation helped my **professional practice** *
(get new ideas, insights, materials, procedures)
- Participation changed my **ability to influence**
my world as a professional * (enhance my voice,
contribution, status, recognition, etc.)

Steps towards shared value ...

- Transparency and visibility of practices
- Self-regulation of professionals
- Value creation in a social network
- Problems embedded in daily practice
- Evidence-informed decisions in education
 - > Learning Science



“For transforming organisations the people in them need to change. We need models and processes **how people get and create value in transformation.**”

TOWARDS DIGITAL EDUCATION ...

Transformation towards ...

HYBRID, BLENDED, DIGITAL EDUCATION

[This Photo](#) by Unknown Author is licensed under [CC BY-NC](#)

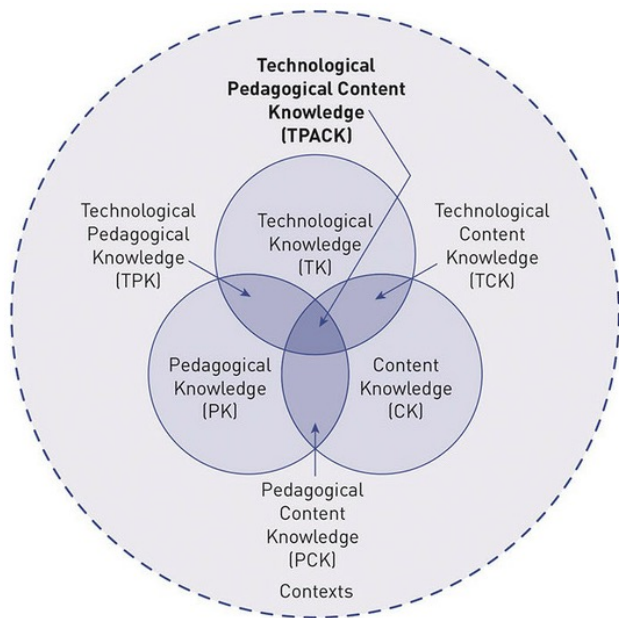
Transforming Education “It’s a wicked problem because there are, and will continue to be, too many variables to consider, too many digital tools to juggle, and too much evidence-free propaganda confounding our thinking about technology in education.”

Magana, Sonny. Disruptive Classroom Technologies (p. xxiii). SAGE Publications. Kindle Edition.

... Technology Enhanced Learning

- Good teaching and good lecturers are the “conditio sine qua non”
- EdTech enhancing at Primary and Secondary Processes
 - Effectiveness, Efficiency, Enjoyability
 - Scalability, Automation, Distribution

Frameworks of EdTech use



S

SUBSTITUTION

Technology acts as a direct substitute, with no functional change

A

AUGMENTATION

Technology acts as a direct substitute, with functional improvement

M

MODIFICATION

Technology allows for significant task redesign

R

REDEFINITION

Technology allows for the creation of new tasks, previously inconceivable

ENHANCEMENT

TRANSFORMATION



T3 Model Stages or EdTech

Indicators

Translation : Efficiency, Accuracy, Quality, Quantity

Transformation : Mastery Goals, Visualisation of Growth, Multiple Representations

Transcendence : Real-Life Problems, Ideation: "What if?", Iteration to better solution

AIED Chatbots for Goal-Setting

- Support students in goal setting has an important impact on setting mastery goals and monitoring.
- Supporting personalised goal setting and developing strategies

The screenshot displays the GoalKeeper chatbot interface. At the top, the chatbot's name 'GoalKeeper' is shown with a 'Start Again' button. The chatbot's profile picture is a speech bubble with a target icon. The chatbot's greeting is: 'Hello! My name is GoalKeeper, and I'm a goal setting assistant. I can help you set goals, monitor goals you set in previous conversations, or learn more about goal setting. What would you like to do today?'. A user response is shown in a pink bubble: 'Set a goal' (22:47). The chatbot responds: 'I can definitely help you set some goals!'. The chatbot then asks: 'Before we get started, I just need a few quick pieces of information!'. The chatbot asks: 'First things first, please enter your student number:'. A user response is shown in a pink bubble: '12345' (22:48). The chatbot responds: 'I remember we've spoken before. Welcome back Marcus!'. The chatbot then asks: 'Please type your 4-digit passcode to access your information from the last time you spoke!'. A green box with the word 'Transformation' is overlaid on the bottom right of the chatbot interface.

Revision Coach, AI for Essay Feedback

- Support students in developing quality understanding and rubrics for good text
- Using different functions of LLM in text creation and understanding

< 1 / 12 > Score Formality Sort by Importance

Essay

Censorship, @CAPS1 or @CAPS2? I can understand why libraries would decide to keep certain books off their shelves. Libraries are a place for learning and work. **If you were sitting near someone at a public library who was reading smut you could feel awkward.** Although some people @MONTH1 find certain items unoffensive, other @MONTH1 disagree. Imagine you are a mother with a young child who decided to wonder through the library. Your child finds a magazine. It's '@CAPS3'. Not something that you are going to want to explain to your child. If the library were to have not kept the magazine, it never would have happened. Libraries are a public place that should be taken seriously. If people really want to find something that is inappropriate they can find it somewhere else. The modern world today makes it easy for people to find just about anything without a large hassle. Therefore it should be fine to keep certain materials out of our libraries. How can people take libraries seriously if there are dirty books, or books with rude language, and scandalous themes. If you are trying to get work done or learn and there are distracting items on the shelves then it @MONTH1 make things more difficult. Libraries are serious places and should be treated as such.

Improve the Highlighted Sentence

You can improve the formality by rephrasing the sentence.

- **Formality:** Formality is defined as the word-use in text. We follow the definition of [this paper](#).
- **Rephrasing:** Try to rephrase this sentence

If you were sitting near someone at a public library who was reading **offensive material** you could feel awkward.

✓ Check Save Improvement Suggestion Undo

[13:00:48] You improved by 14%

Networked and Peer Feedback

- Build course related support communities of different levels
- Implementing immediate, potential and applied value
- Transferable to different course structures and learning contexts

TU Delft | Answers EWI Users Search

Computer Science Meta

Computer Science Posts Tags Edits Ask a question

Signed in successfully.

Ask your questions about the bachelor Computer Science & Engineering, master Computer Science, minor Computer Science, or minor Artificial Intelligence here!

5.8k posts · [Subscribe](#) Age Activity Score

Questions about Exercise 6 from chapter 2.2 from the book

Question 1: How would a sufficient explanation for $\lim_{x \rightarrow 5} h(x) = 0$ look like? (see the graph of $h(x)$ below) Question 2: Is it true that $\lim_{x \rightarrow 0} h(x) = 0$...

1 answer · posted 11h ago by David Ghertug · last activity 8h ago by Wouter Breedveld

[cse1200](#) [limits](#)

In the exams, can we use the expression of e in limit calculations without proving it?

In the exams, can we use the expression of e in limit calculations without proving it? $\lim_{x \rightarrow \infty} (1 + \frac{1}{x})^x = \lim_{x \rightarrow 0} (1 + x)^{\frac{1}{x}}$...

0 answers · posted 12h ago by David Ghertug · edited 12h ago by David Ghertug

[cse1200](#) [22-23](#) [limits](#)

Dynamic array increasing by quadratic factor

What if when a dynamic array runs out of space it grows by $2n^2$? I can't get around to obtaining a mathematical formula for the amortized runtime complexity of the array in this case.

0 answers · posted 13h ago by Andrei Ionescu

[cse1305](#)

Are we allowed to sort using streams in the exam?

In order to use streams, we need to include `util.stream`, which is not added by default. Is this allowed? And as a more general question, are we allowed to include other packages in the exam?

1 answer · posted 1d ago by Codrin OGREANU · last activity 20h ago by Wouter Breedveld

[cse2310](#)

Featured

- [How do you register for the midterm exams?](#)
- [Exporting Brightspace deadlines to another calendar](#)

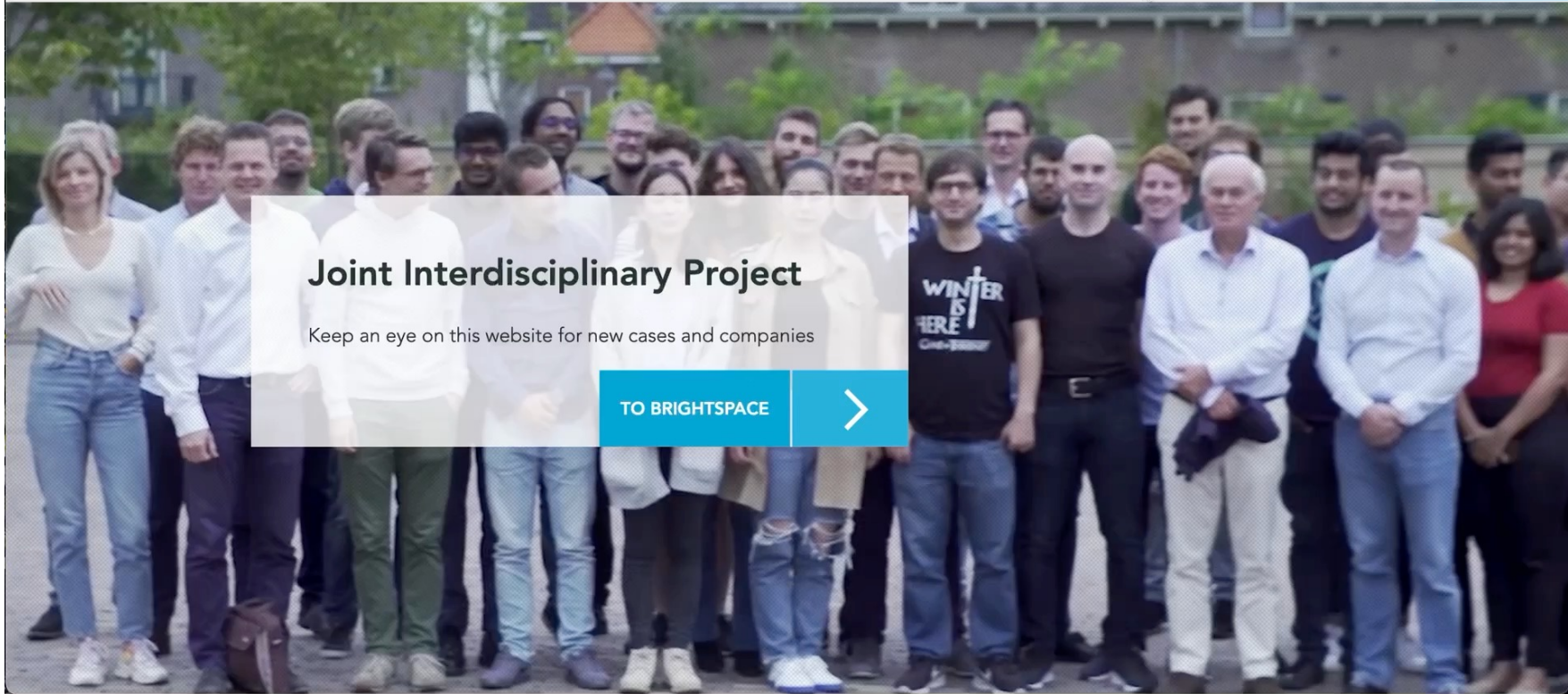
Hot Posts

- Computer Science – [How can I improve my algorithmic skills and prepare for the resit?](#)
- Computer Science – [Help with optimal caching proof](#)
- Computer Science – [What exactly counts as a tree when considering directed graphs?](#)
- Computer Science – [Union-Rank Compression Algorithm](#)
- Computer Science – [Strongly connected graph with a vertex without incoming edges](#)

Subscribe to Questions [edit](#)

You can subscribe to [all new questions](#) (from all categories) or to [interesting questions](#).

Transformation

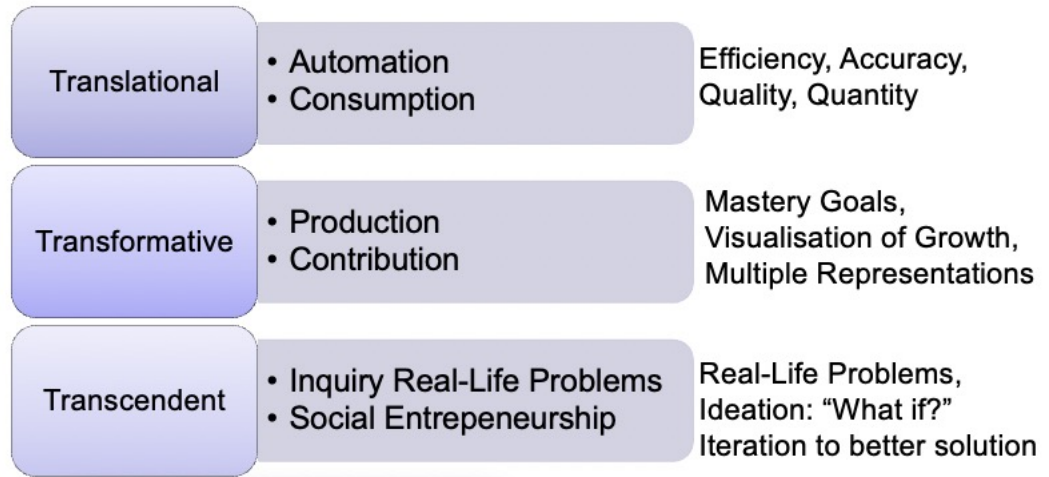


Joint Interdisciplinary Project

Keep an eye on this website for new cases and companies

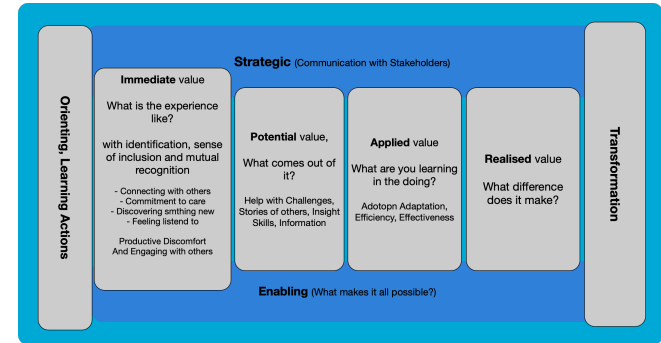
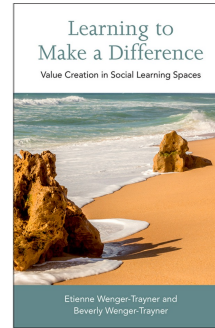
TO BRIGHTSPACE





“For developing the digital transformation for education we need to understand what steps can and need to be done and how analog, human and digital means work together.”

FROM TRANSLATION TOWARDS TRANSCENDENCE ...



“For transforming organisations the people in them need to change. We need models and processes **how people get and create value in transformation.**”

ENABLING VALUE CREATION IN TRANSFORMATION ...

Summary

- We need to enable value creation and recognition in education and professional development !
- We need to embrace the power of technology to transform education and not to translate it !