Transformative Learning in Design Research: The Story Behind the Scenes

Yael Kali
Designing transformative learning experiences: Long history

Plato in his academy 4th century B.C. (Carl Wahlbom 1879)
Designing transformative learning experiences: Long history

Plato in his academy 4th century B.C. (Carl Wahlbom 1879)

Current learning TEL environments e.g., Slotta’s ENCORE lab
Unplanned **transformative learning** experiences among **those** who conduct design research
Process of design research
(Researchers & teachers’
Transformative learning)

Outcomes of design research
(Students’ transformations;
Rational means of exploration)
The methodological Journey
Transformative learning among researchers – inherent to design research

Exploring the mechanism and sharing is crucial for our field
In this talk:

- Introduction
- **Design Researchers’ Transformative Learning (DRTL):** An initial framework
- Reflections on two case-studies using DRTL lenses
- Sharing DRTL stories: Opportunities and challenges for the Learning Sciences
FRAMEWORK

DRTL
Design Researchers’ Transformative Learning
Transformative learning

Transformative learning = a change in ways of thinking / frameworks for understanding the world and for acting in it

Transformative learning is for the learner what Kuhn's (1962) paradigmatic shift is for a scientific community
Existing framework for understanding the world

Transformative learning process

New framework for understanding the world

Transformative learning
Existing framework for understanding the world

Physics

New framework for understanding the world
Transformative learning process

Existing framework for understanding the world

New framework for understanding the world

Existing framework for understanding learning

New framework for understanding learning
Combining different kinds of knowledge and knowing (e.g., Markauskaite and Goodyear, 2016)

Boundary crossing (e.g., Akkerman & Bakker, 2012)

- Blending analytical and creative mindsets in DR (McKenney & Reeves, 2012)
- Boundary crossing within teacher-researcher partnerships in DR (e.g., Akkerman & Buining, 2016; Penuel et al., 2015)

Existing framework for understanding learning

New framework for understanding learning

DRTL
The **Design Researchers’ Transformative Learning (DRTL)** framework:

- **Existing framework for understanding learning**
- **New framework for understanding learning**
The **Design Researchers’ Transformative Learning (DRTL)** framework:

Good design researchers are able to blend analytical and creative mindsets, shifting fluidly between rational, empirically driven reasoning and creative innovation...  
(McKenney 2016, p. 166)
Blending analytical and creative mindsets in design research

Boundary Crossing within teacher-researcher partnerships

There are several desiderata that we think are critical in developing such a methodology:

1. **Teachers as co-investigators.** To be successful, the experiments must work within the constraints defined by the teachers and must address their questions. Hence, it is critical that teachers take on the role of co-investigators, helping to formulate the questions to be addressed and the designs to be tested, making refinements in the designs as the experiment progresses, evaluating the effects of the different aspects of the experiment, and reporting the results of the experiment to other teachers and researchers.

Boundary Crossing within teacher-researcher partnerships

Teacher–researcher partnerships in design research

Model based on studies such as:

Boundary Crossing within teacher-researcher partnerships

Teacher–researcher partnerships in design research

Responsibility

Cooperative

Collaborative

Degree of Collaboration

Degree of Collaboration

Teacher – researcher partnerships in design research

Responsibility

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Teacher – researcher partnerships in design research

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Boundary Crossing within teacher-researcher partnerships


Boundary Crossing within teacher-researcher partnerships

Boundary crossing processes occur when people from different communities of practice interact with each other, and experience what the practices of the other profession entail. As a result, they may change their own understandings and practices.
Boundary Crossing within teacher-researcher partnerships

Learning mechanisms in the “boundary crossing” literature

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People change their existing practices or develop new practices at the boundary between the two communities of practice.

Boundary Crossing within teacher-researcher partnerships

Boundary crossing at multiple levels

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**Boundary Crossing within teacher-researcher partnerships**

### Boundary crossing at multiple levels

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Boundary Crossing within teacher-researcher partnerships

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CASE 1:
DRTL via blending analytical and creative mindsets

Existing framework for understanding learning

New framework for understanding learning
CASE 1

DRTL via blending analytical and creative mindsets
The methodological Journey

- Solution
- Transformation
- Dilemma
- Initial assumptions
- Reality

CONFIDENTIAL
INTRO

FRAMEWORK

CASE 1

CASE 2

CONCLUSIONS

<table>
<thead>
<tr>
<th>Level of intervention</th>
<th>Use of the course website</th>
<th>Face to face meetings</th>
<th>Instructor’s role</th>
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<tbody>
<tr>
<td>Level 3 (Year 3)</td>
<td>1) Replace lectures</td>
<td>“Mini conference”</td>
<td>Modeling and</td>
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<tr>
<td>Advanced</td>
<td>2) teamwork</td>
<td>(~30 students) X 10</td>
<td>coaching while</td>
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<td></td>
<td></td>
<td>times</td>
<td>leading discussion</td>
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<tr>
<td>Level 2 (Year 2)</td>
<td>Prepare for lectures</td>
<td>Lectures focusing on</td>
<td>Lecturing: Delving</td>
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<tr>
<td>Intermediate</td>
<td>(background for lectures)</td>
<td>complex topics</td>
<td>into complex topics</td>
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<td></td>
<td></td>
<td>(~300 students)</td>
<td></td>
</tr>
<tr>
<td>Level 1 (Year 1)</td>
<td>Review lectures</td>
<td>Traditional lectures</td>
<td>Lecturing: Covering</td>
</tr>
<tr>
<td>Basic</td>
<td>(similar to lectures)</td>
<td>(~300 students)</td>
<td>all topics</td>
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Level 1 Intervention

Level 3 Intervention
The story behind the scenes

Within each level:
- Use of website \(\rightarrow\) Learning outcomes (understanding, retention, attitudes)

Between levels:
- Improvement in learning outcomes

- First assumption was refuted

- What were the processes that supported learning?
- How can we measure them?
The story behind the scenes

- Gap between the values that guided students in their learning process, and instructors’ perceptions about these values

- Change focus to *culture of learning*
Students were more likely to:
- Seek personal growth,
- Appreciate formative nature of assessment
- Make efforts to learn
- Negotiate meaning with peers
- Seek ownership of learning

Findings using the Culture of Learning Continuum framework

Gap between students’ learning culture (calculated), and instructors’ perceptions of a typical student learning culture

Sagy, O., Kali, Y. (2013). Learning and teaching cultures in higher education: The role of technology in turning the vicious cycle into a virtuous One. Proceedings of the 8th Chais conference on instructional technologies research, 2013. (pp. 75-82). Raanana: The Open University.
Analysis of case 1 in terms of blending analytical and creative mindsets

### Blending Mindsets!

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<th>Task</th>
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**Evaluation**
- **Detective**
  - Builds tight lenses
  - Executes a plan
  - Deduces and induces

**Reflection**
- **Detective**
  - Judges what was
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- **Inventor**
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**Diagram:**
- **Plot 1:** Inventor
  - Frame the inquiry
  - Is open to be surprised
- **Plot 2:** Detective
  - Builds tight lenses
  - Collect the data
  - Analyze the findings
- **Plot 3:** Inventor
  - Seizes unplanned opportunities
  - Questions why this is so
- **Plot 4:** Detective
  - Executes a plan
  - Deduces and induces
  - Judges what was
- **Plot 5:** Inventor
  - Asks what if
  - Connects to other ideas

**Notes:**
- **Inventor**
  - Frame the inquiry
  - Is open to be surprised
- **Detective**
  - Builds tight lenses
  - Collect the data
  - Analyze the findings
- **Evaluation**
  - Seizes unplanned opportunities
  - Questions why this is so
- **Reflection**
  - Asks what if
  - Connects to other ideas

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**Legend:**
- Green arrow: **Connects to other ideas**
- Orange arrow: **Asks what if**
- Yellow arrow: **Seizes unplanned opportunities**
CASE 2

DRTL via boundary crossing within teacher-research partnerships

Existing framework for understanding learning

New framework for understanding learning

DRTL

Analytical
Creative

Boundary Crossing
CASE 2
DRTL via boundary crossing within teacher-research partnerships
The story behind the scenes

- 3 iterations X 1-year program
- Focus on teacher learning (teachers as designers) through analyzing artifacts

- Change to 3 year program
- Dynamic ecology: Varied participation

- Whose learning to analyze?
- WHAT IS DATA AND WHAT IS NOISE?
The story behind the scenes

- The unit of analysis should be the school rather than the teacher
Told story

- Teachers more involved in planning intervention, and evaluation
- Researchers more involved in redefining school policies and practices
- Teachers began to acknowledge new pedagogical approach
- Researchers began to take into account local affordances and constraints
- Team decides to change intervention

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Learning Mechanisms | Institutional Level | Intrapersonal Level | Interpersonal Level
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- New shared practice: Revising the professional development program

### Learning Mechanisms

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- **School vision and criteria for use of technology developed**

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- Researchers: Revise research focus
- Teachers: Adopt pedagogical approaches
### Learning Mechanisms

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CONCLUSIONS

Sharing DRTL studies: Opportunities and challenges for the Learning Sciences
...the book provides the reader with ... unpublished material that lays out... issues... that Cobb has confronted in his work, that... required theoretical and methodological shifts... and provides insight into how he has achieved the shifts ... (from book cover)
Documenting design decisions and rationales is one way for the field to produce an “argumentative grammar” for design-based research... Ours is but one example of such a case study; many more are needed to develop such a grammar for design-based research. (p. 87)

McKenney & Reeves (2012); McKenney (2016)
DRTL as a third focus in design research

Based on McKenney & Reeves (2012) and McKenney (2016)
“Such (design) deliberations, (rather than the ultimate design rationale), are rarely reported, and are rarely embodied in the final designed artifact or its documentation. Thus, much design knowledge is lost.”

Tabak & Radisky “Editors note”, 2014
I think that it’s more than design knowledge that is lost – I think that by **underestimating** the **adventurous** and the **creative** nature of the process of design research, we **transgress** the goals of design research.

Learning about each other’s DRTL stories will help us direct ourselves to be more inventive and adventurous in our research.
The Design Researchers’ Transformative Learning (DRTL) framework:
DRTL studies cannot be standalone reports
- Process & outcomes: Careful balancing of spotlights on stage and behind the scenes of design research

Unsuitable forms of publication
- Establish alternative forms of publication (e.g., allow reprinted material)

Quality assurance
- Publish only DRTL studies on earlier published peer-reviewed DR studies
Transformative learning of all participants in design research, (students, teachers, and researchers) is inherent to this genre of research, After more than two decades of design research, I think that it is time we pay more attention to exploring, and reporting about the mechanisms of such learning, that occur not only among students and teachers, but also among ourselves.
Acknowledgments
This keynote presentation was a transformative learning experience for me. I have been very lucky to have wonderful colleagues, friends and students who walked with me during different parts of the journey as I put this talk together. I’d like to especially thank Anna Sfard, Susan McKenney, Lina Markauskaite, Marcia Linn, Chris Hoadley, Iris Tabak, the TEL-Design and COOL-CONNECTIONS research groups, and my colleagues at the University of Haifa Faculty of Education.