Transformative Learning in Design Research: The Story Behind the Scenes

Yael Kali
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
Outcomes of design research
(Students’ transformations; Rational means of exploration)
Process of design research
(Researchers & teachers’
Transformative learning)

Outcomes of design research
(Students’ transformations;
Rational means of exploration)
The methodological Journey
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
In this talk:

- Introduction
- Design Researchers’ Transformative Learning (DRTL): An initial framework
- Reflections on two case-studies using DRTL lenses
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
Transformative learning

Existing framework for understanding the world → Transformative learning process → New framework for understanding the world
Existing framework for understanding the world

Physics

New framework for understanding the world
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)

- Blending analytical and creative mindsets in DR (McKenney & Reeves, 2012)

Boundary crossing (e.g., Akkerman & Bakker, 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:
The Design Researchers’ Transformative Learning (DRTL) framework:

Existing framework for understanding learning

DRTL

New framework for understanding learning

- Analytical
- Creative
- Boundary Crossing
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

Blending analytical and creative mindsets in design research

Blending analytical and creative mindsets in design research

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

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

Existing framework for understanding learning

DRTL

Analytical
Creative

Boundary Crossing

New framework for understanding learning
Boundary Crossing within teacher-researcher partnerships

Model based on studies such as:

Boundary Crossing within teacher-researcher partnerships

Teacher–researcher partnerships in design research

- Cooperative
- Collaborative

Degree of Collaboration

Responsibility

DR Practices

RTT
Boundary Crossing within teacher-researcher partnerships

Data extraction agreement

Clinical partnership

Co-learning agreement


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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Boundary Crossing within teacher-researcher partnerships

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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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The **Design Researchers’ Transformative Learning (DRTL)** framework:
CASE 1

DRTL via blending analytical and creative mindsets
The methodological Journey

- Solution
- Transformation
- Initial assumptions
- Dilemma
- Reality

CONFIDENTIAL
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<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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<td>Level 3 (Year 3)</td>
<td>1) Replace lectures</td>
<td>“Mini conference”</td>
<td>Modeling and</td>
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<td>Advanced</td>
<td>2) teamwork</td>
<td>(~30 students) X 10 times</td>
<td>coaching while leading discussion</td>
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<td>Level 2 (Year 2)</td>
<td>Prepare for lectures</td>
<td>Lectures focusing on complex topics (~300 students)</td>
<td>Lecturing: Delving into complex topics</td>
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<td>Review lectures</td>
<td>Traditional lectures</td>
<td>Lecturing: Covering all topics</td>
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<tr>
<td>Basic</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
The story behind the scenes

Within each level:
Use of website ↔ Learning outcomes
(understanding, retention, attitudes)

Between levels:
Improvement in learning outcomes

• First assumption was refuted
The story behind the scenes

- First assumption was refuted

Within each level:
- Use of website \( \leftrightarrow \) Learning outcomes (understanding, retention, attitudes)
- Between levels:
  - Improvement in learning outcomes

- What were the processes that supported learning?
- How can we measure them?
Gap between the values that guided students in their learning process, and instructors’ perceptions about these values.
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

Gaps 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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**Evaluation**
- Learner builds tight lenses and executes a plan.
- Learner deduces and induces to form a plan.
- Learner judges what was and ascertains meaning.

**Task**
- Learner frames the inquiry and collects data.
- Learner analyzes the findings and considers processes.
- Learner considers the findings and reflects on the meaning.

**Inventor**
- Learner is open to be surprised and seizes unplanned opportunities.
- Learner questions why this is so and asks what if.
- Learner connects to other ideas and reflects on the findings.
### Blending Mindsets!

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Examples of analytical and creative perspectives during evaluation and reflection (adapted from McKenney & Reeves, 2012).
### Blending Mindsets!

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**Reflection:**
- Connects to other ideas
- Considers findings
- Considers processes
- Asks what if
- Questions why this is so
- Seizes unplanned opportunities
- Is open to be surprised
- Frame the inquiry
- Collect the data
- Analyze the findings
- Deduces and induces
- Executes a plan
- Builds tight lenses

---

**Blending Mindsets!**

**Inventor:**
- Connects to other ideas
- Considers findings
- Considers processes
- Asks what if

**Detective:**
- Deduces and induces
- Executes a plan
- Builds tight lenses

**Task:**
- Frame the inquiry
- Collect the data
- Analyze the findings

---

**INTRO**

**FRAMEWORK**

**CASE 1**

**CASE 2**

**CONCLUSIONS**
CASE 1:
DRTL via blending analytical and creative mindsets

Existing framework for understanding learning

DRTL

Blending mindsets!

New framework for understanding learning

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 professional development (teachers as designers)
- Comparison of pre-post artifacts
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
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
Cooperative

Collaborative

INTRO

FRAMEWORK

CASE 1

CASE 2

CONCLUSIONS
• Teachers more involved in planning intervention, and evaluation
• Researchers more involved in redefining school policies and practices
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• 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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- New shared practice: Revising the professional development program

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- School vision and criteria for use of technology developed

### Learning Mechanisms

**Institutional Level**

- Identification
- Coordination
- Reflection
- Transformation

**Interpersonal Level**

**Intrapersonal Level**

- Researchers: Revise research focus
- Teachers: Adopt pedagogical approaches

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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
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)
Existing framework for understanding learning

DRTL

Analytical
Creative

Boundary Crossing

New framework for understanding learning
“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

Existing framework for understanding learning

New framework for understanding learning

DRTL

Analytical

Creative

Boundary Crossing
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
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.