

המחלקה להוראת המדעים



קרן קיסריה  
אדמונד בנימין דה רוטשילד

# The Rothschild-Weizmann Program for Excellence in Science Teaching

## A Ten-year Perspective

**Bat-Sheva Eylon**

**Miriam Carmeli**

**The Science Teaching Department Celebrates 50 Years of Activity, 7.1.2019**

# Three partners carried out the program



המחלקה להוראת המדעים

**ACADEMY**



קרן קיסריה  
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**PHILANTROPY**

**THE RW PROGRAM**



משרד החינוך

**EDUCATIONAL SYSTEM**

# The Goal

**To develop a cadre of lead-teachers who would promote mathematics and science education in Israel**

# The Program

- **2 tracks for Acting High School Teachers** in mathematics, biology, chemistry, physics.
  - **A 2-year MSc program** -without thesis (253 graduates, 70% women, 20% from the non-Hebrew sector)
  - **A track for excellent teachers with MSc or PhD degrees** -initiatives and special projects (150 teachers)
- **Emphasis on disciplinary scientific knowledge and pedagogical content knowledge**
- **On-going research and evaluation** on the operation and outcomes of the program (e.g. teachers' and students' learning)

**400 RW Ambassadors in 10 years**

<b>Discipline</b>	<b>Scientific Head</b>	<b>Science Education Head</b>
<b>Biology</b>	<b>Prof. Adi Kimchi</b>	<b>Prof. Anat Yarden</b>
<b>Chemistry</b>	<b>Prof. Ron Naaman</b> <b>Prof. Gilad Haran</b>	<b>Prof. Avi Hofstein</b> <b>Dr. Rachel Mamlok-Naaman</b>
<b>Physics</b>	<b>Prof. Shimon Levit</b>	<b>Prof. Bat Sheva Eylon</b>
<b>Mathematics</b>	<b>Prof. Zvi Artstein</b> <b>Prof. Sergei Yakovenko</b>	<b>Prof. Ruhama Even</b>



# Possible Dilemmas

The three partners had different backgrounds, views, interests and norms leading to possible dilemmas.



**Knowledge and curriculum** needed for excellence in teaching



From the academic studies to **teachers' practice**



Program's **requirements** versus teachers' **professional commitments**



Criteria for program's **"success"**

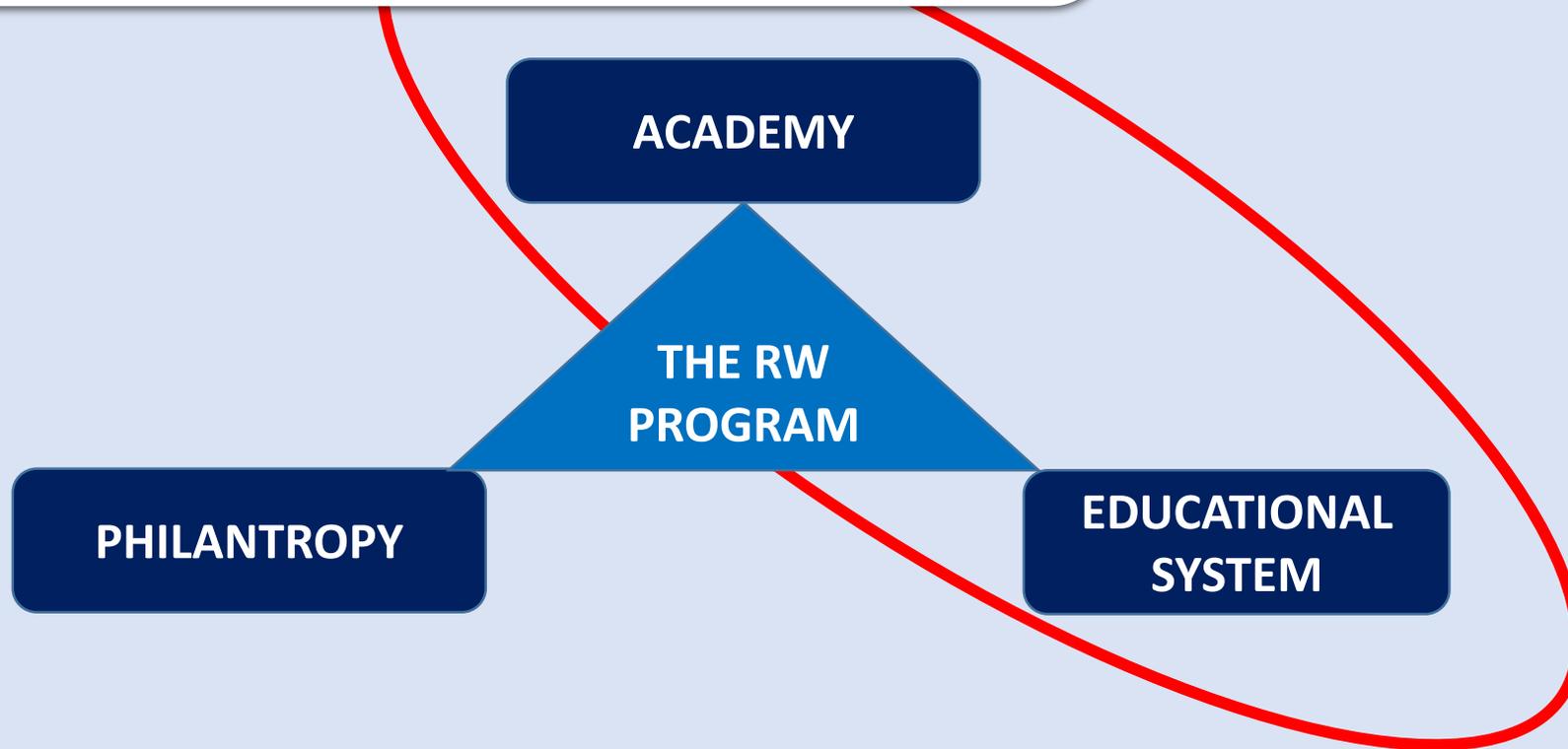
# Mechanisms

Scientists and science educators defined **together** a unique set of goals, rationale and curriculum for each discipline.



# Mechanisms

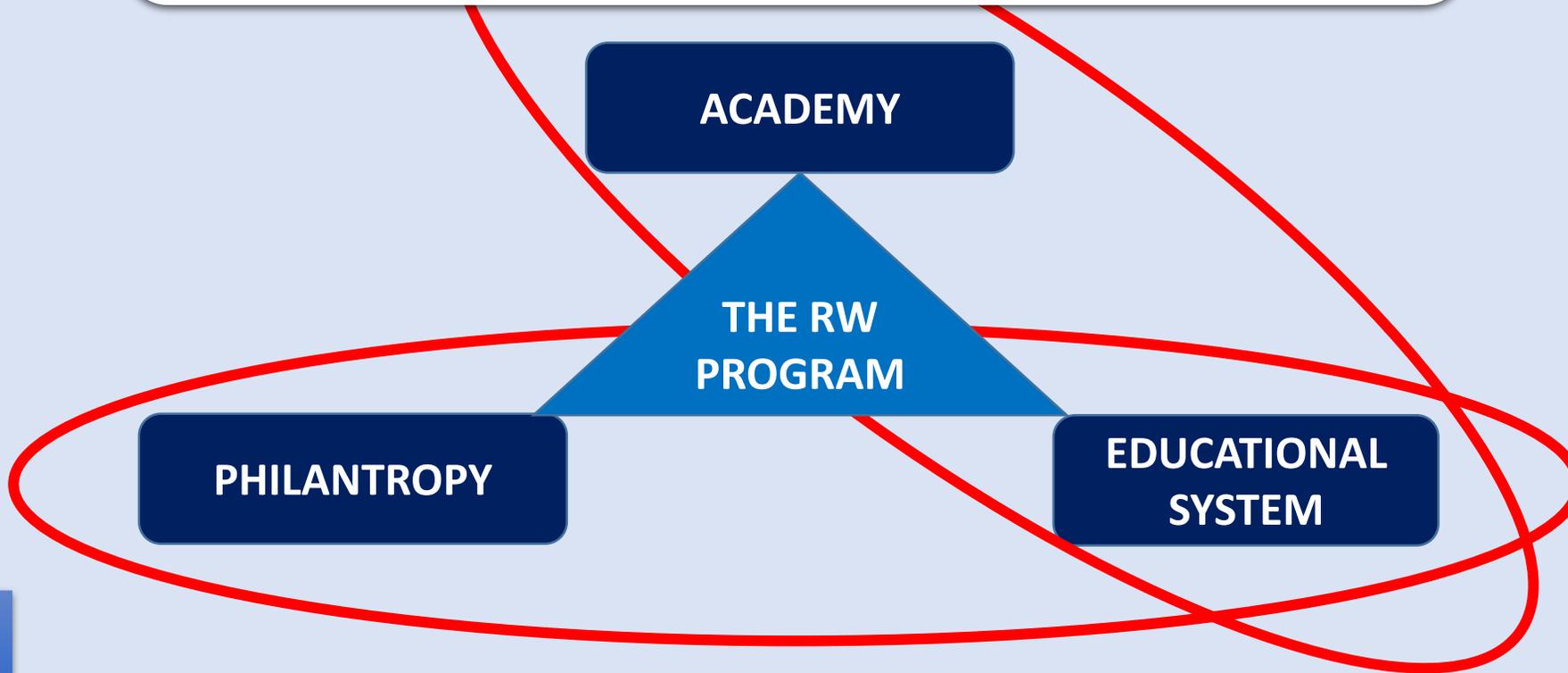
**An evidence based approach:** Students systematically explored new experiences and brought data on teaching and learning for collaborative and reflective discussions with their peers.



(Hutchings and Shulman, 1999)

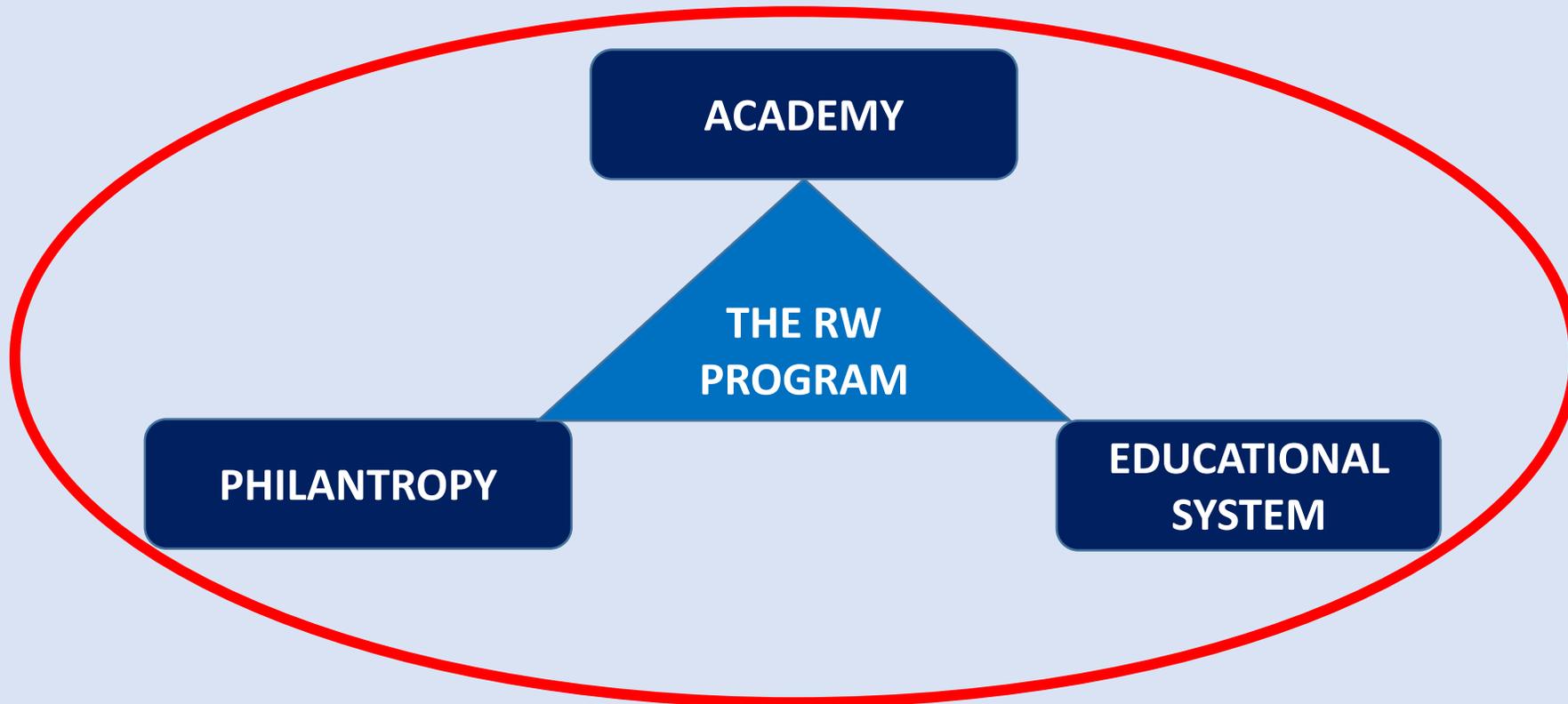
# Mechanisms

**Two complementary tracks:** Graduates of the MSc program continued their professional development and implemented innovations in the second track



# Mechanisms

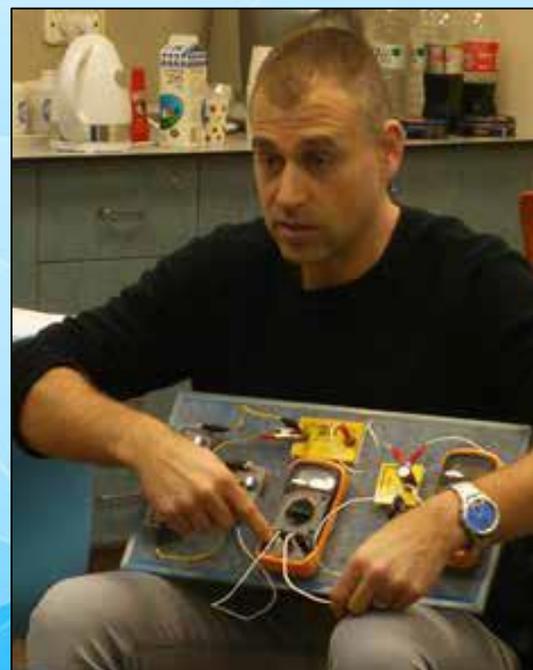
**A steering committee (headed by Prof. Israel Bar-Joseph)** –scientists, science educators, representatives from the graduate school and the foundation discussed different aspects of the program



# Boundary crossing perspective\*

How people from different backgrounds learn to work productively with each other?

\*(Penuel, Allen, Coburn, & Farrell, 2015), (Akkerman & Bakker, 2011)



Such dilemmas exist in many partnerships of academy and practice (we call them Research Practice Partnerships).

The question is:

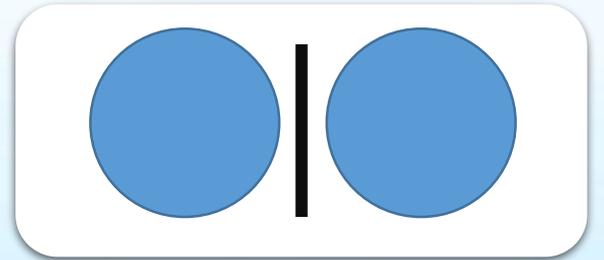
**How people from different backgrounds learn to work productively with each other?**

- Extensive studies of such partnerships, and in particular "successful" ones, identified the need to "cross boundaries" between partners. These studies led to the formulation of the "multilevel boundary crossing" perspective.
- We found that this perspective resonates with many of the experiences and research findings in our program.

# Boundary Crossing Processes

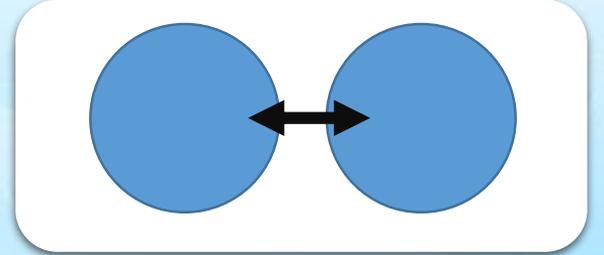
## 1. IDENTIFICATION:

Recognizing others' points of view



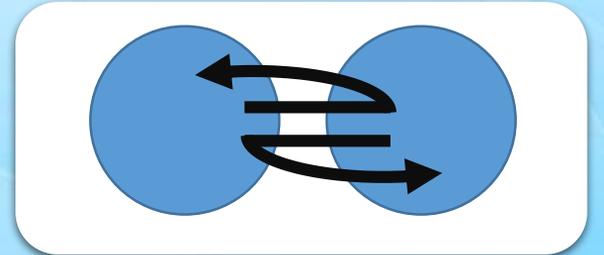
## 2. COORDINATION:

Looking for ways to cooperate with others



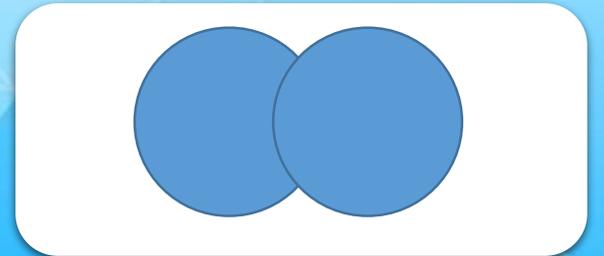
## 3. REFLECTION:

Taking the others' perspective into account



## 4. TRANSFORMATION:

Transforming one's point of view.

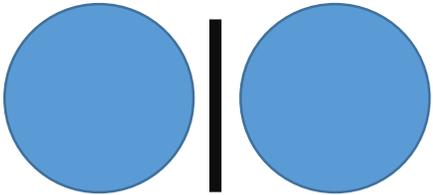


# Multilevel Boundary Crossing

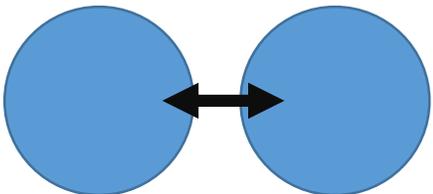
Institutional

Interpersonal

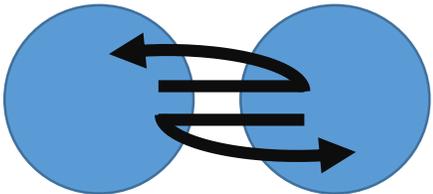
Intrapersonal



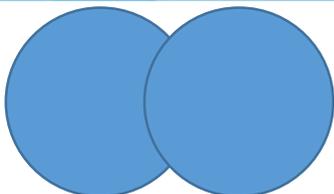
IDENTIFICATION



COORDINATION



REFLECTION



TRANSFORMATION

(Akkerman and Bruining ,2016)

# Conclusion

## 1. The mechanisms which acted along the 10-year operation

- Trust and Productive interactions
- Smooth running and on-going improvement

## 2. Some results from research

- **Teachers:** Professional development and change of teaching practice
- **School students** reported on profound changes in teaching and learning
- **System:** The graduates contributed to the system (e.g. as lead-teachers, curriculum developers)

## 3. The theoretical framework

- Insights into strategies that can be used in similar partnerships (Coburn and Penuel, 2016)

## 4. Open issues

- sustainability of the program's outcomes
- keeping the spirit, vision and relevance of the program in light of changes
- Attracting high quality teachers in light of less demanding frameworks

# FINALE



**In recognition of the program's value, the WIS decided to continue the program via the Feinberg Graduate School.**

**This is an opportunity to thank the Caesarea Edmond-de Rothschild foundation for their friendship, support and trust.**

Thank you!



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לבוגרי תכנית רוטשילד-ויצמן  
למצוינות בהוראת המדעים  
2013

Rothschild-Weizmann Program  
for Excellence  
in Science Teaching  
MSc conferment ceremony

  
מכון ויצמן למדע  
WEIZMANN INSTITUTE OF SCIENCE

