

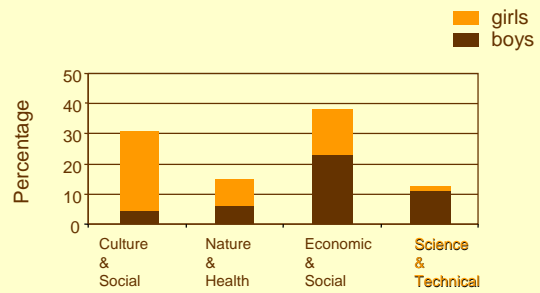
Example based education,
a bridge to abstract thinking,
especially for girls.



Elise Boltjes

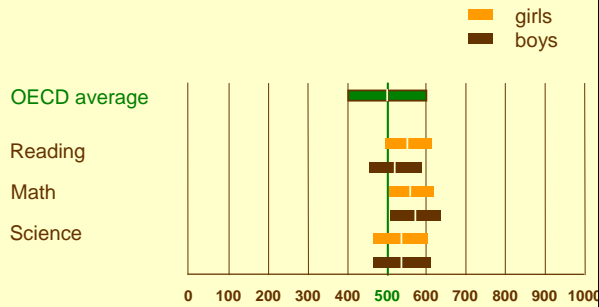
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Profile-choice of 15 year old students in NL 2001/2002 (OECD, 2003)



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Percentile score of 15-year old students in NL (OECD, 2003)



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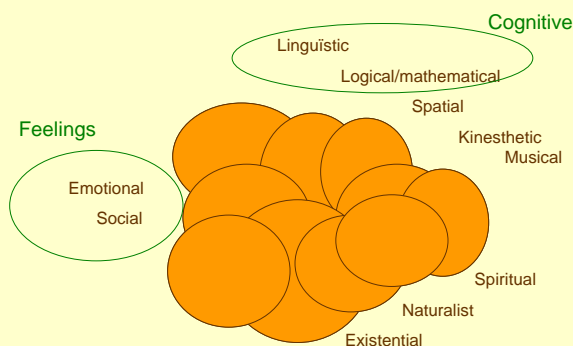
Cross curricular competencies

Indices of self-image with respect to their scores
(OECD, 2003)

		average boys	average girls
Reading	OECD	-0,08	0,08
	NL	0,08	0,20
	difference	+0,16	+0,12
Math	OECD	0,12	-0,13
	NL	0,29	-0,36
	difference	+0,17	-0,23

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Multiple Intelligences



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The "new mode" of knowledge production

- using more emotional and social intelligences
- using more experiences from daily life
- affiliating by diversity

From "the teacher tells" to "the student asks":

- ✓ Project-education
- ✓ Problem-based education
- ✓ Competence-based education

Applicable in class setting:

From "teaching teachers' certainty"
to "teaching from students' uncertainty".

- ✓ Example-based education

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The next statement is true:

"I learned to play the cello quickly, because I can row well."



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"One of the most important things about rowing is to touch the oar into the water. A very special moment. The oar moves in one direction, and without decreasing the speed of the boat, you have to change the direction for touching the water precisely and quickly. When moving forward, in your head you are already preparing the movement in the other direction. A very special experience. And you must not "slip". To slip means that your oar touches the water just halfway, in stead of gripping fully. When you slip you don't get the maximum speed you want. And when you row in a team you have to follow the person in front of you. When you touch the water seeing that person touches, then you are too late. Without hesitating you have to copy the movement of the person in front of you.

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"One of the most important things about playing the cello is to touch the bow onto the string. A very special moment. The bow moves in one direction, and without decreasing the sound of the cello, you have to change the direction for touching the string precisely well and quickly. When moving forward, in your head you are already preparing the movement in the other direction. A very special experience. And you must not "slip". To slip means that your bow touches the string just halfway, in stead of gripping fully. When you slip you don't get the maximum sound you want. And when you play in a team you have to follow the person beside you. When you touch the string seeing that person touches, then you are too late. Without hesitating you have to copy the movement of the person beside you."

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examples

One of the most important things about **rowing** is to touch the **oar** into the **water**. A very special moment...

One of the most important things about **playing the cello** is to touch the **bow** onto the **string**. A very special moment...

outlines

- to touch the water
- to follow the stroke-rower
- to touch the string
- to follow the 1st cellist

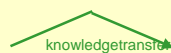
facts



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examples

One of the most important things about **playing the cello** is to touch the **bow** into the **string**. A very special moment...



outlines

- to touch the **water**
- to follow **stroke-rower**
- to touch the **string**
- to follow **1st cellist**

facts



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Step 1: define the Universe of Discourse

A child asks: "What does this traffic sign mean?"



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Step 2: show a relevant example



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Step 3: put the information into words



"The traffic sign has two arrows",
the child answers.
"A white and a red arrow;
the white arrow points up and
the red one points down."

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Step 4: link the example to the words



Red light has to stop.
The traffic in the direction of the red arrow
has to stop.

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Step 5: obtain the outlines

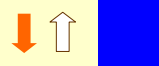
examples

"The traffic
in the direction of
the red arrow
has to stop."

outlines

. An arrow has a direction:
the **direction** of the traffic
. An arrow has a color:
red has to stop

facts



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Step 6: show at least two examples



You don't have
The right of way
even from this side
on your skelter.

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Step 7: discuss similarities and differences



A big bus
takes the right of way
from the other side
even though he
doesn't have it.

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Step 8: compare the outlines with daily life experiences



Entering passengers have to stop.

The traffic in the direction of the red arrow has to stop.

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A bridge to abstract thinking

2) recognize the outlines in new situations



examples

"If you come from this side of the bridge, then you have the right of way."

"If you drive in the direction of the red arrow, then you have to stop."

1) find the outlines

"You have the right of way from this side of the bridge."

. An arrow has a direction: the direction of the traffic
. An arrow has a color: red has to stop

facts



traditional teaching with examples

example-based: teaching from examples

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**Stepping-stone action plan
(reformulation information analysis methodology)**

- Step 1: define the Universe of Discourse,
- Step 2: show a relevant example from daily life,
- Step 3: put the information into words,
- Step 4: link the example with the words,
- Step 5: obtain the outlines,
- Step 6: show at least two examples,
- Step 7: discuss similarities en differences,
- Step 8: compare outlines with daily-life experiences.

1) Analyse the outlines

2) Recognize the outlines in new situations

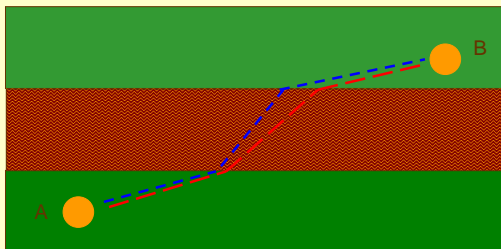
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Step 1: define the Universe of Discourse

"Diffraction of light in a plate of glass."

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Step 2: show a relevant example



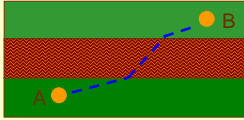
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Step 3: put the information into words

"I choose the fastest way by refraction."

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Step 4: link the example with the words



"I choose the fastest way by diffraction."
"I diffract, because it's more difficult to walk through loose sand than over grass."

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Step 5: obtain the outlines

example



outlines

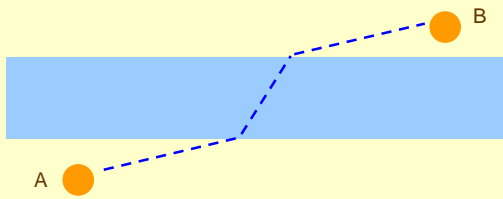
facts



I diffract, because I choose the fastest way.

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Step 6: show at least two relevant examples

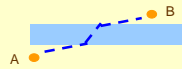


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Step 7: discuss similarities and differences



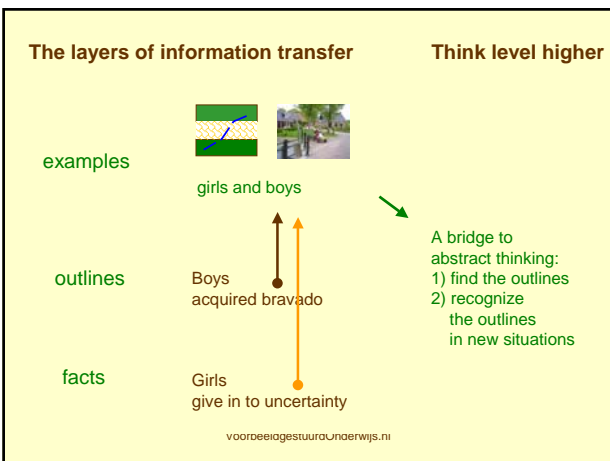
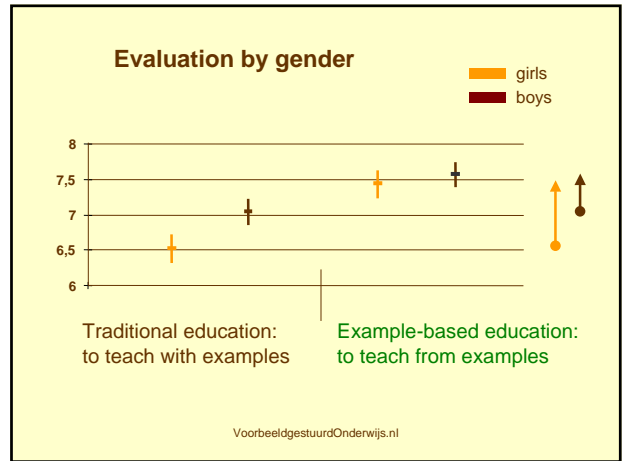
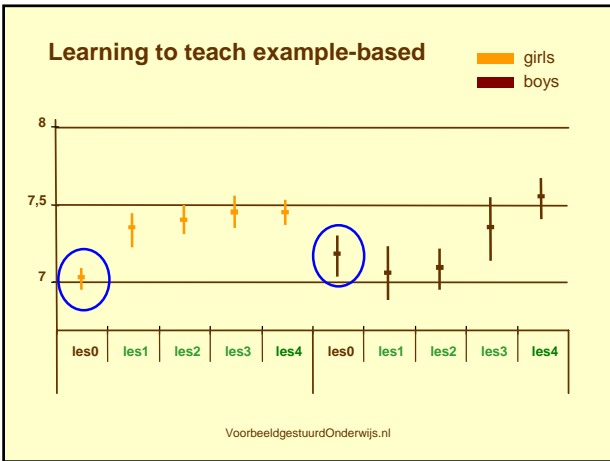
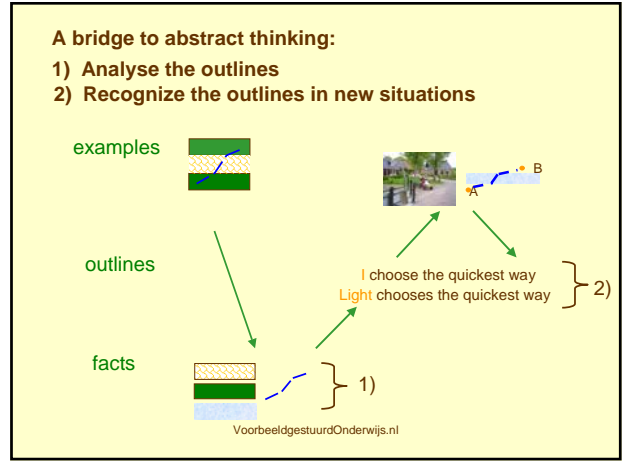
I diffract, because I choose the quickest way.



Light diffracts, Because it chooses the quickest way.

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Results

- In traditional education girls resort to a reproductive learning style because of their uncertainty.
- The findings show that students evaluate example-based teaching significantly higher than traditional class teaching. The difference in gender socialisation is compensated.
- The teachers experience example-based teaching as a natural way of teaching. To them it requires only a minor, yet fundamental, adjustment to present their lessons "backward to forward".

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Conclusion

Example-based education offers a form of general didactics, applicable in a traditional frontal class setting, which connects with the way who girls learn, as well as boys.

From “teaching teachers' certainty”
to “teaching from students' uncertainty”.



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**Example-based education,
a bridge to abstract thinking.**

Elise Boltjes



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