

The Playground Game: Inquiry-based Learning About Research Methods and Statistics

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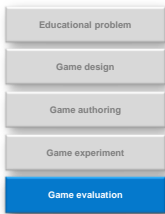
The playground game

Games are fun?

Hard fun!

(Seymour Papert)

Overview



Playground game evaluation

Quantitative results

Test score before 0.515 (SD=0.00...)

Test score after 0.571 (SD=0.00...)

Effect size 0.65

$t(111) = -5.670, p < 0.01$

Proportionality principle

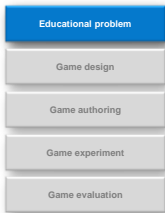
Marking your own paper

Playground game evaluation

Qualitative results

- "...highly motivating"
- "...completely absorbed in the game and part of the story"
- "...highly realistic."
- "...it makes statistics concrete".
- "...the game amplifies a critical attitude toward proclaimed pros and cons in research"
- "...great quality of tutor feedback."
- Inquiry-based: "...I would like more concrete instructions what to do".

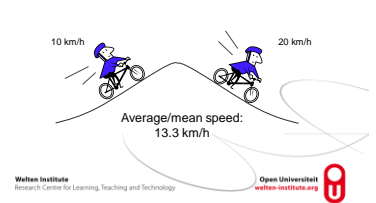
Overview



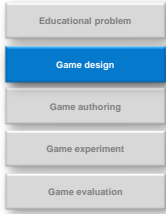
The problem

- Professionals need statistical and methodological knowledge
- *"There are lies, damned lies and statistics"*
- *British Prime Minister Benjamin Disraeli (1804-1881)*
- *Statistics and methods are complex and abstract*
- Statistical processing is taught as highly mechanical operation

Statistics....



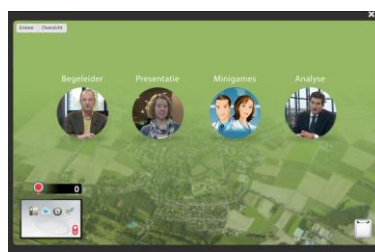
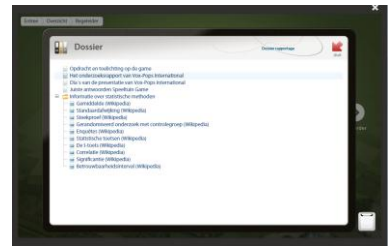
Overview

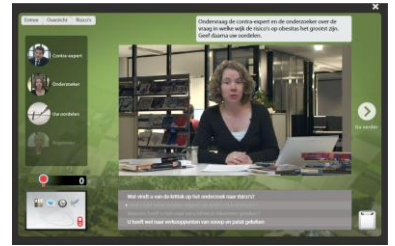
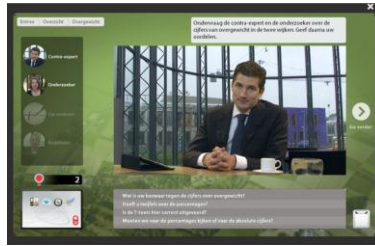


The playground problem case

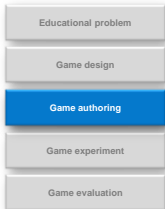
In what district should the Playground be best located for maximum reduction of obesity?

Spektrum	2008	2009	2010	2011
Bevolking	1286	1288	1290	1292
Bevolking met 12 jaar of jonger	232	232	232	232
Bevolking met 65 jaar of ouder	356	356	356	356
Bevolking met 15-64 jaar	702	704	702	708
Bevolking met 15-64 jaar met laag opleidingsniveau	104	104	104	104
Bevolking met 15-64 jaar met laag opleidingsniveau met laag inkomensniveau	104	104	104	104
Bevolking met 15-64 jaar met laag opleidingsniveau met laag inkomensniveau met laag gezondheidsniveau	104	104	104	104
Bevolking met 15-64 jaar met laag opleidingsniveau met laag inkomensniveau met laag gezondheidsniveau met laag gezondheidsniveau	104	104	104	104
Bevolking met 15-64 jaar met laag opleidingsniveau met laag inkomensniveau met laag gezondheidsniveau met laag gezondheidsniveau met laag gezondheidsniveau	104	104	104	104
Bevolking met 15-64 jaar met laag opleidingsniveau met laag inkomensniveau met laag gezondheidsniveau met laag gezondheidsniveau met laag gezondheidsniveau met laag gezondheidsniveau	104	104	104	104





Overview



Game creation

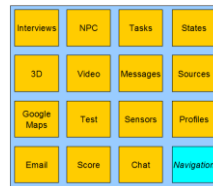
- Game platform → EMERGO
- Game content → Game content
- Game scenes → Wireframe
- Programming → Rule composer
- User interface → CSS
- User management → User management

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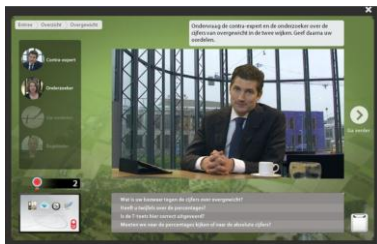
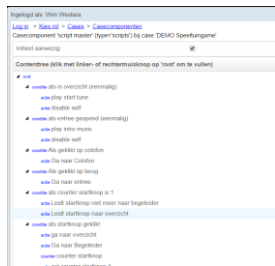
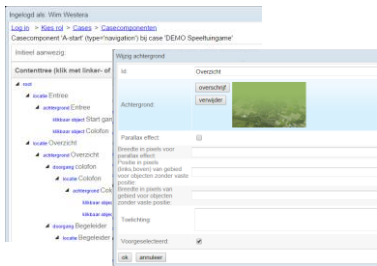
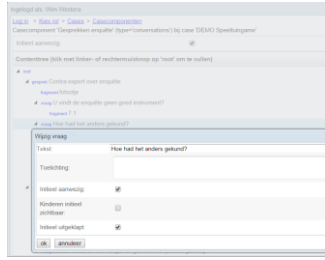
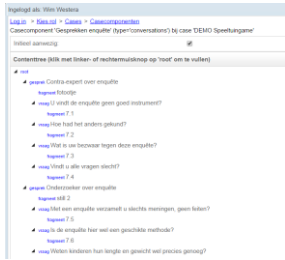


COMPONENTS

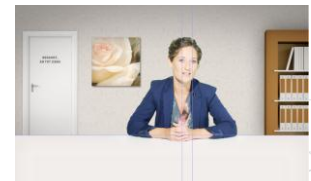


EMERGO





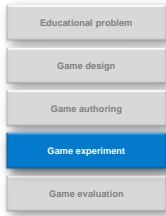
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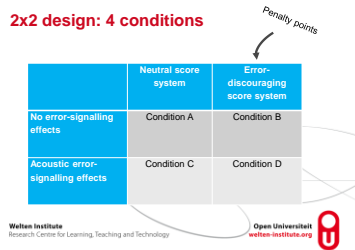
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Overview



2x2 design: 4 conditions



Trial-and-error indicators

Indicator	Expression	Description
Error rate	$TE_1 = \frac{N_{errors}}{N_{decisions} / (1 - K_{prior})}$	N_{errors} is the number of errors taken $N_{decisions}$ is the number of decisions taken K_{prior} is the player's prior knowledge ratio
Speed of action	$TE_2 = \frac{(1 - K_{prior})}{T_{decisions}}$	$T_{decisions}$ is the time required for all decisions
Speed of action	$TE_3 = \frac{(1 - K_{prior})}{T_{total}}$	T_{total} is the total time required for the game

Outcomes

- Error-discouraging score: no effect observed
- User characteristics: no effect observed
- *Learning gains in all conditions*
- *Acoustic cueing: more trial-and-error*



Summary Playground game

- Content-based game
- Component-based engine, rule composer
- Browser-based
- Quick authoring
- Easy adjustment
- Cascaded stylesheet /templates



Thank you for your attention!

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