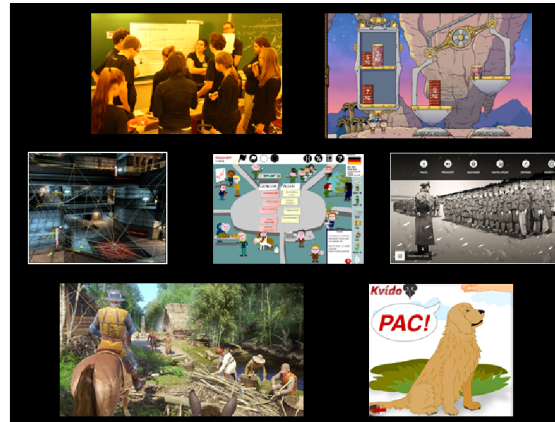


**Emotional design  
in multimedia learning for children:  
a saga of null results?**

Cyril Brom  
Charles University, Prague  
Advanced Multimedia Learning Laboratory



**Outline**

1. Kick off examples: learning games
2. Multimedia learning
3. Emotional design
4. Emotional design with 6–12-year-olds

**1. Two examples  
of game-based learning**

**Core “motivational” idea in multimedia learning**

Something nice  
↓  
Higher motivational variables  
↓  
Better learning outcomes

### Games are motivating

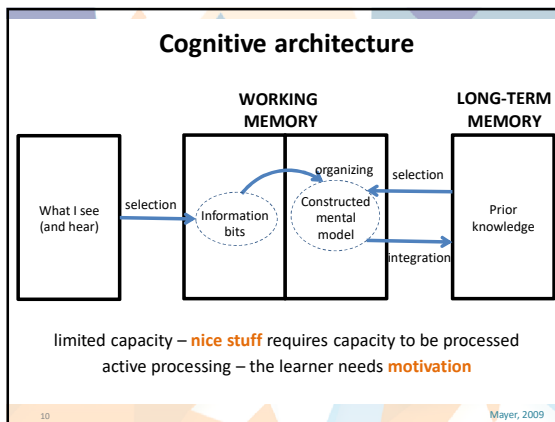
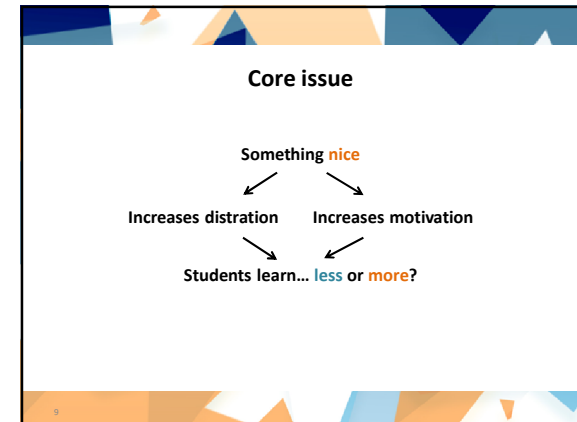
Zombie Division: a math game  
Grade 2

Hagood & Ainsworth 2011 | Learn Sci

### Games are motivating

physical principles  
Grade 8

Schraeder & Bastiens 2012 Comp Hum Beh



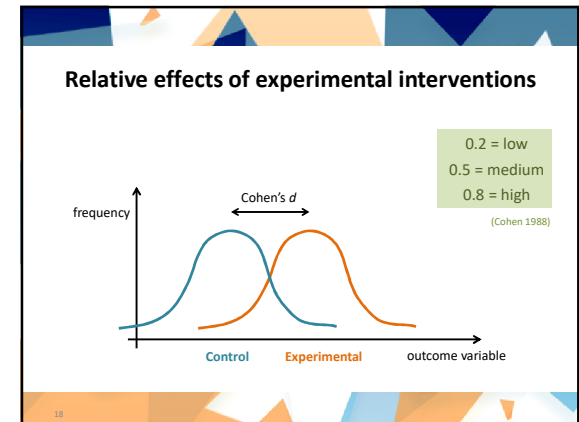
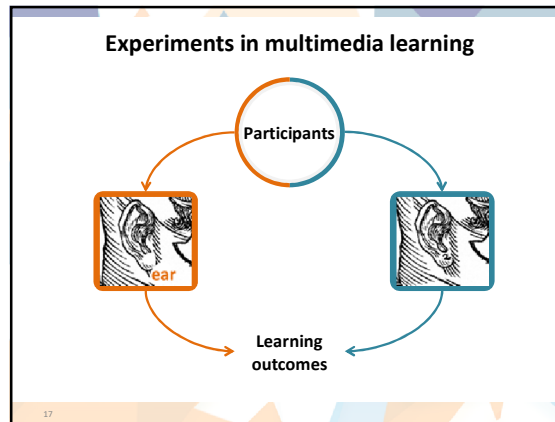
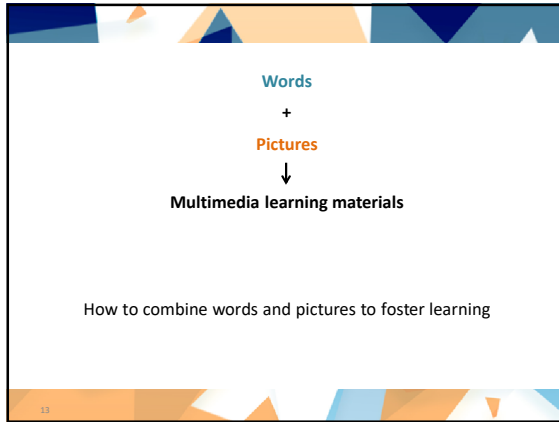
### Mental models

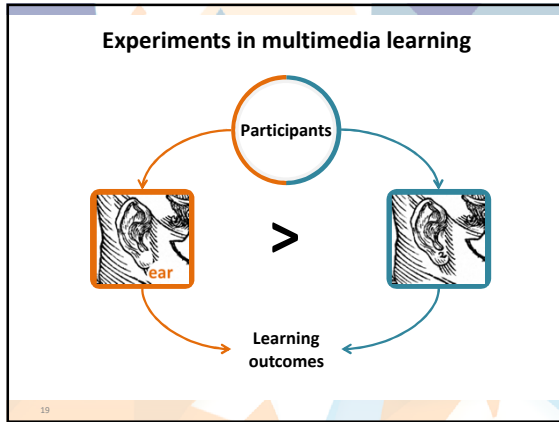
Internal “what – when” representations  
Enable making predictions

Internet

Brom et al., 2023 Educ Inform Technol; Babari et al., 2023 Inf J Child-Comp Interact

## 2. Multimedia learning





### Principles of multimedia learning

Position corresponding text and picture **near** each other  
 $d \sim 0.7$

**Highlight** key information  
 $d \sim 0.4$

...

20 Noetel et al., 2021, Rev Educ Res

### More generally: Principles of instructional design

Take a **test** after an instruction rather than re-study  
 $d \sim 0.4$

Use **guided discovery** rather than unguided discovery or direct instruction  
 $d \sim 0.3$

...

21 Adesope et al., 2017, Rev Educ Res; Yang et al., 2021, Psychol Bull; Affleck et al., 2011, J Educ Psychol; de Jong et al., 2023, Educ Res Rev

## 3. Emotional design

### Seductive details example

Something nice  
↓  
Increases situational interest  
↓  
Students learn **more**

seductive detail      normal design

Adding extraneous, but interesting elements

23 Park et al., 2011, Comp Hum Behav

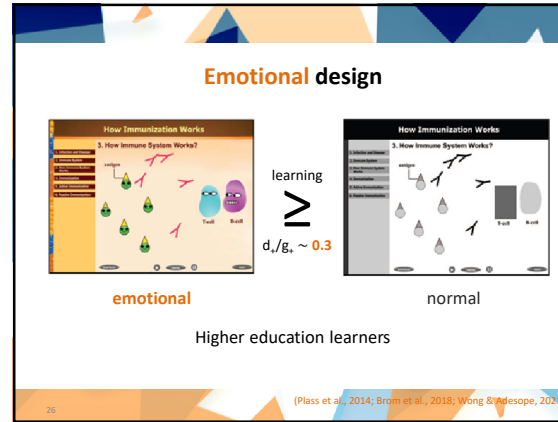
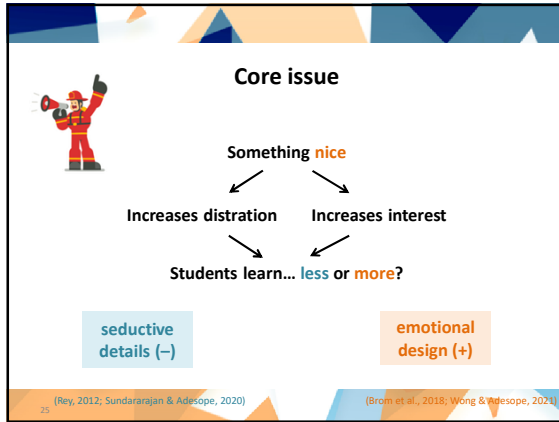
### Emotional design example

Something nice  
↓  
Increases situational interest  
↓  
Students learn **more**

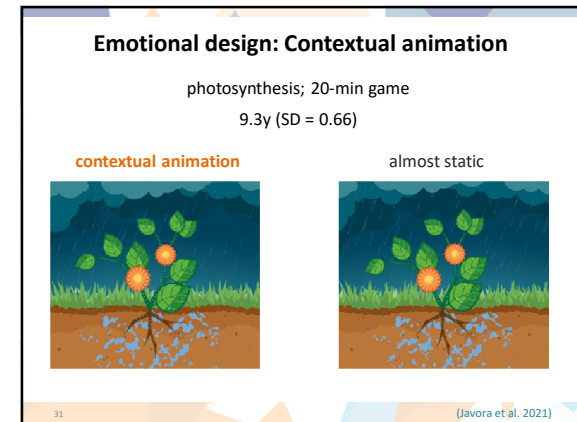
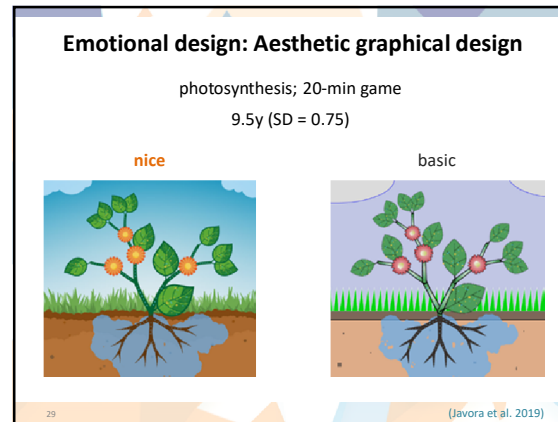
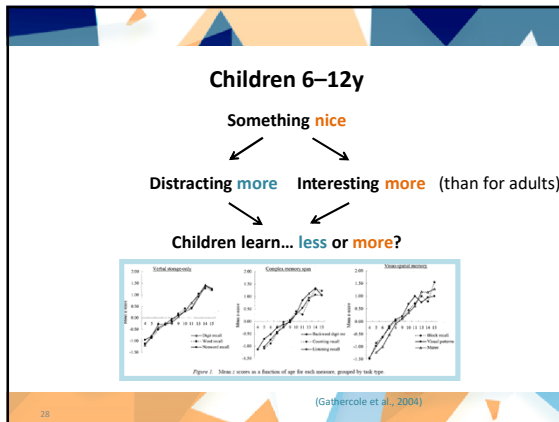
emotional design      normal design

Minimalistic redesign of already existing elements

24 Plass et al., 2014; Brom et al., 2018; Wong & Adesope, 2021



**4. The case of children 6–12y**



**Emotional design: Anthropomorphized scaffolds**

math; game  
11.5y (SD = 0.73)

anthropo scaffolds      schematic scaffolds

32 (Koskinen et al. 2022)

**Emotional design: Colors + anthropomorphisms**

math; slides on a tablet  
Grade 6 (11–12y)

colors + anthropo      basic

33 (Slabbert et al. 2022)

**Emotional design: Anthropomorphisms**

blood cell types; web pages, up to 20 min  
11.4y (SD = 0.75)

anthropo      basic

34 (Schneider et al. 2019; Exp. 3)

**Video examples**

Opinion polls  
Grades 4–5: 9–11 y

**Emotional design: Results**

learning =

35

**Maybe:**

**weak manipulation?**



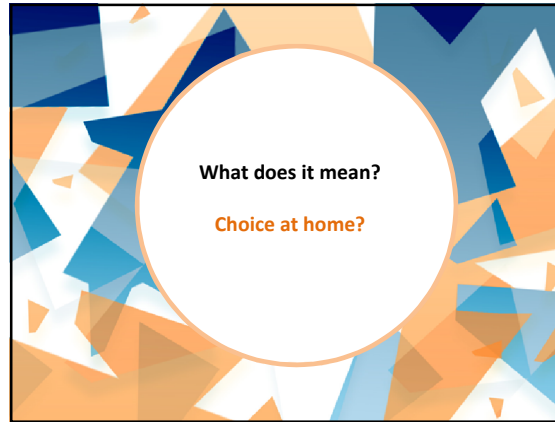
### Shooting game (extrinsic)

facts: space, human body, nature, geology  
children (Age: 10 – 12; N = 69; within-subject)

**game with a quiz** vs **quiz only**

preference >>  
immediate learning >  
delayed learning =

38 (Jicinska et al. 2021 FIP; Czech Television ©)



### Narrative framing

math  
children (Age: 7 – 9; N = 95; 2 weeks at home)

**game + narrative** vs **game**

"preference" (time-on-task) =  
learning =

40 (Sykora et al. 2021 BJET; TechSophia ©)

### Shooting game (intrinsic)

grammar rule: native language  
age: ~7 – 11; N = 11,949; 6 wks on the web

**shooting game** vs **quiz**

catching attention >  
sustain attention >  
correct answers >

41 (Brom et al. 2022 FIP; Czech Television ©)



### Anthropomorphisms

blood cell types; web pages, up to 20 min  
11.4y (SD = 0.75)

high anthro < low anthro > basic

learning < learning

43 (Schneider et al 2019; Exp. 1)

**Colors + anthropomorphisms**

math; video  
5-8y

colors + anthro

learning

schematic

44 (Ng & Chiu, 2017; Chiu et al., 2020)

**5. Discussion**

**Take home message**

Emotional design for children  
Saga of null results...  
...when baseline version is fine

**Emotional design does not do much harm**

emotional design > seductive details

45

**Take home message**

Emotional design for children  
Saga of null results...  
...when baseline version is fine

**Emotional design does not do much harm**

design features with **expository or attention-guiding functions** >  
emotional design > seductive details

47

**Practical future avenues – children**

**1. Emotional design with other functions**  
e.g., animations guiding attention in children storybooks  
e.g., improving intelligibility

(e.g., Bus et al., 2019; Chuang & Jamiat, 2023)  
(Ng & Chiu, 2017; Chiu et al., 2020)

48

**Other functions...**

the U.S. < Czechia =

Attention guiding  
Scene recognition


(Mayer & Estrella, 2014; Learn Instr; Starkova et al., 2019; J Comb-Assist Learn)

49



### Practical future avenues – children

2. **More motivation** than distraction



3. Very **boring** baseline interventions  
or long ones...

10 Schneider et al., 2019, J Educ Psychol  
Endres et al., 2020, J Comp-Assist Learn

## Thanks!

## Questions?

Funding: GA CR project  
"Internet4Kids" (22- 20771S)