

# Serious Games as a Tool for Enhancing Civic Competencies and Engagement



Deutscher Akademischer Austauschdienst  
German Academic Exchange Service

The University of Hong Kong  
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# Content

- Civic Education in Germany: Aims and Approaches
- Serious Games in Civic Education
- Empirical Study (I): Simulation Games on the European Union
- Empirical Study (II): Digital Puzzle Station on the United Nations
- Empirical Study (III): Serious Games on Fake News
- Outlook

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## Civic Education in the Federal Republic of Germany

- **Historically** rooted in „re-education“ in Western Germany after World War II -> in reaction to failures during the Weimar republic and the Nazi regime
- Overarching aim: to strengthen a **democratic political culture** for a stable democracy post-1945, also after re-unification in 1989
- Theory: a democratic political system relies on a **civic political culture** (-> including citizens` cognitive, attitudinal and volitional orientations towards politics, e.g. *Almond & Verba, 1959*)

## Civic Education in Germany today: Four main pillars

- I. **Civics** as an obligatory school subject in *all* types of schools
- II. Education for democracy as a cross-curricular principle of all school subjects, including a „*democratic classroom climate*“/  
„*classroom climate open for discussion*“
- III. Education for democracy as a whole school approach, incl. *students` participation in decision-making*, service-learning projects etc.
- IV. Additionally, there is a well-established field of **extra-curricular, non-formal civic education** beyond school.

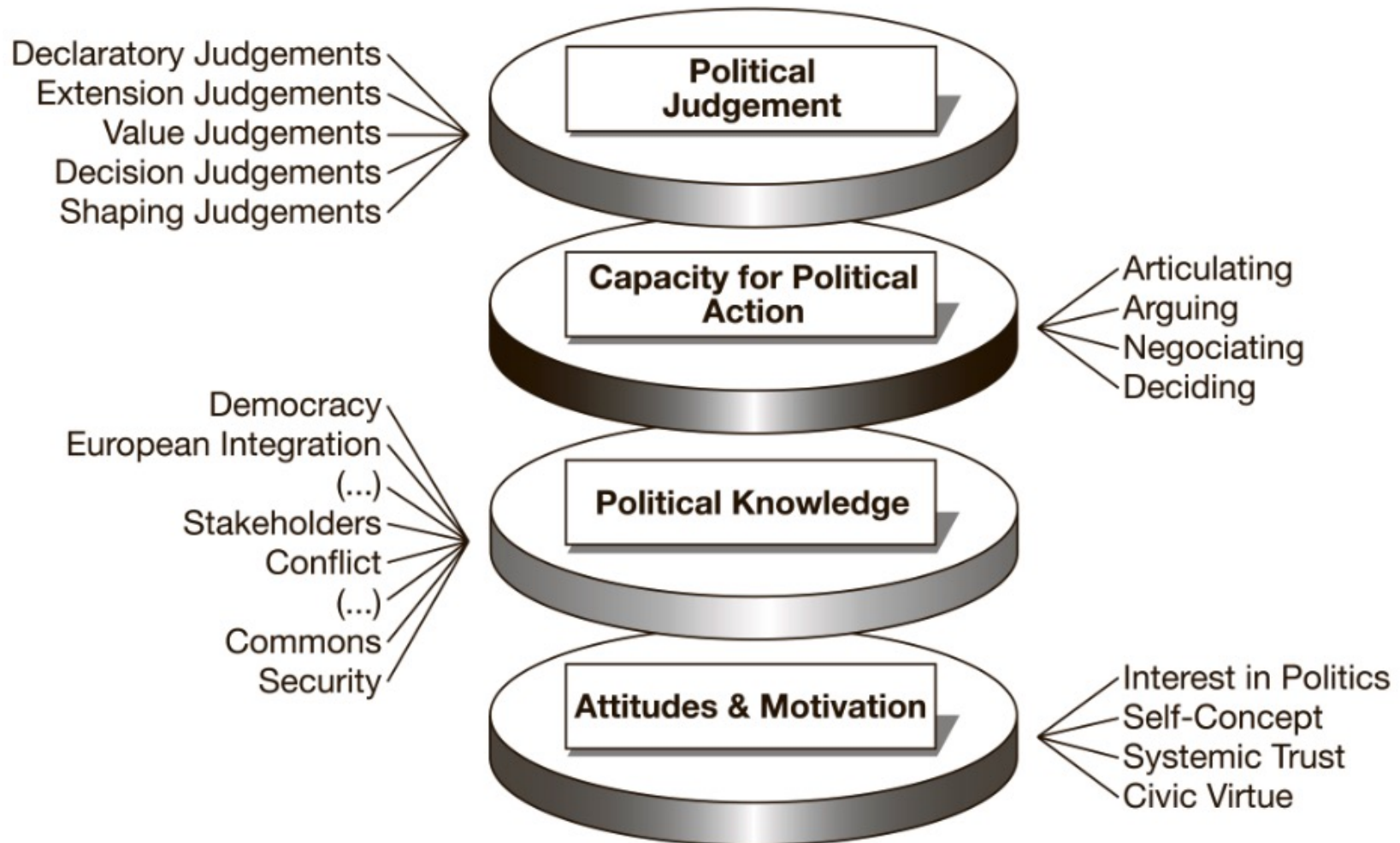
## Civic Education in Germany today: Principles

- *problem-based learning, principle of exemplarity, learner-centred, action orientation, conflict orientation, diversity orientation*
- ***“Consensus of Beutelsbach”** (Wehling 1977; Widmaier & Zorn 2016; Oberle 2020, 2023):*
  - i. prohibition of indoctrination*
  - ii. principle of controversy*
  - iii. student orientation/ empowerment -> enabling students to politically engage in line with their own interests*

## Civic Education in Germany today: Objectives

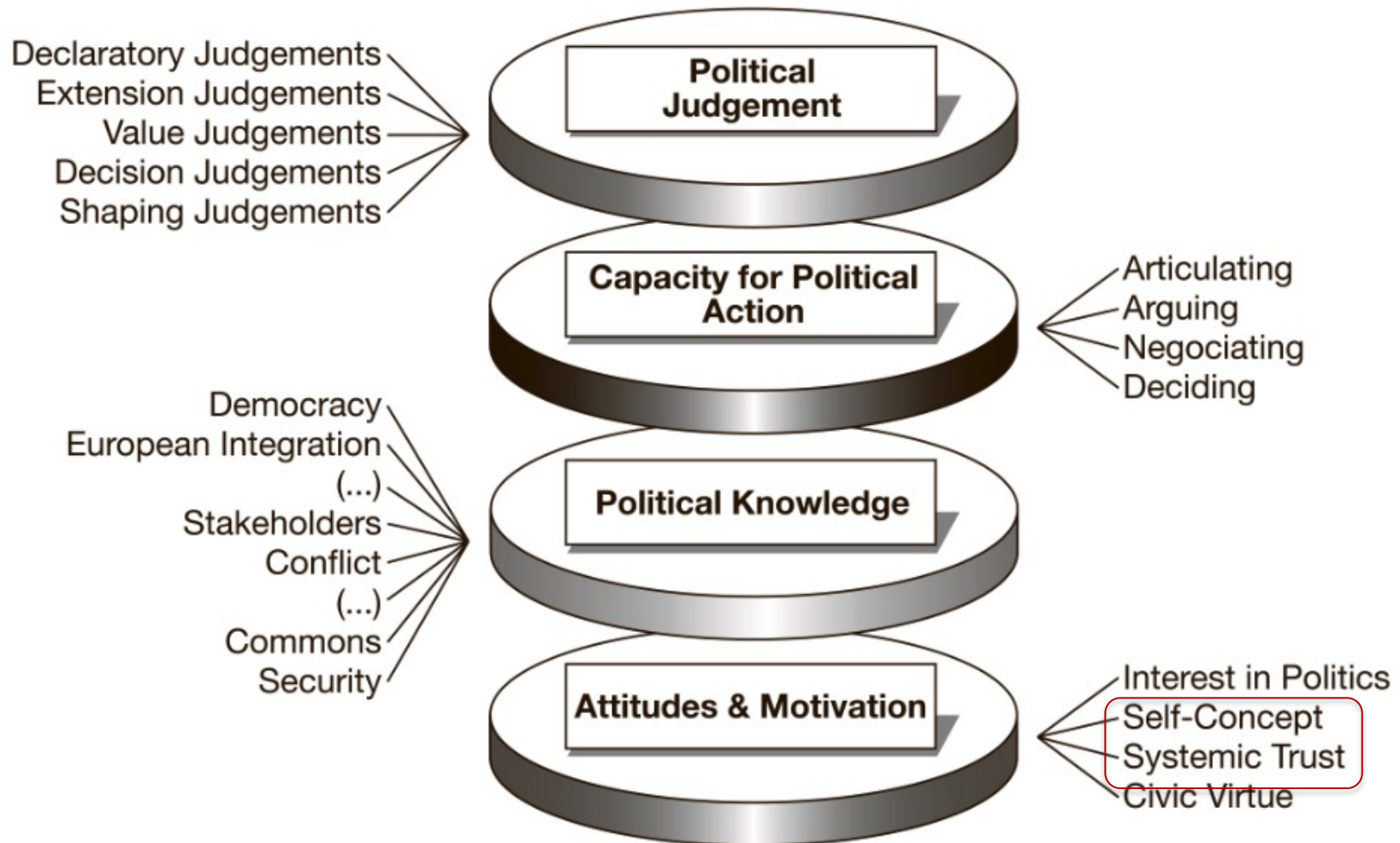
- Overarching aim of civic education: „**Mündigkeit**“
- **Political Competencies** – cognitive, attitudinal, motivational and volitional dispositions (*Weinert 2001*)
- model of **political competency** (*Detjen et al. 2012*): political knowledge, ability for political judgement, ability for political action, political motivations and attitudes
- relevant motivations and attitudes **include internal and external political efficacy** (*Massing 2012; Oberle 2018*)

## Model of Political Competency (*Detjen et al. 2012*)





## Model of Political Competency (*Detjen et al. 2012*)



## **Political Efficacy** als goal of civic education

### **Political Efficacy:**

perception of one`s own potential effectiveness in the field of politics, thus of the potential influence which one expects to be able to have on political decision-making

Differentiation between *internal* and *external political efficacy* (vgl. Lane, 1959, Niemi et al., 1991; Vetter, 1997; Vetter & Maier, 2005; Oberle, 2018):

- **Internal efficacy:** subjective perception of one`s own political knowledge and abilities -> micro level
- **External efficacy:** subjective perception of the responsiveness of the political system towards citizens` demands -> macro level

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# Serious Games as a tool of civic education: potentials

- Promotion of motivation, engagement, and knowledge acquisition through immersive experiences (*e.g., Giang et al., 2018; Fotaris & Mastoras, 2019; Scholz, 2022*)
- More sustainable learning effects as compared to a purely text-based instructional design (*Hauk, 2022; Motyka, 2018*)
- However: profound lack of empirical research regarding implementation and effects of serious games in civic education

# Aims of our empirical accompanying research

- Evaluation of the **suitability of serious games & simulation games in civic education** for target groups, including

- a) assessment of **effects on political competences/ dispositions**,
- b) subjective **participants' contentment**

taking into account various initial dispositions

- **Evidence-based development** and improvement of didactic embedding of serious games into civic education
  - in close cooperation with game developers/educational practice
  - **design-based research**

*(Anderson & Shattuck 2012; Herrington et al. 2007; Lewis et al. 2020)*

# Design of our empirical accompanying research

- **Mixed-Methods design** using both quantitative & qualitative research methods
  - I. Semi-standardized questionnaires
  - II. Interviews with participants (also teachers)
  - III. Participatory observation
- Longitudinal design with **2-3 measurement points**
- Partly with **control groups** (intervention study)

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# Simulation Games as a didactic tool of civic education

**Political simulation games** make pluralism of interests as well as political negotiation and decision-making processes palpable in a game-based fashion (vgl. Massing 2004; Petrik & Rappenglück 2014; Bursens & Usherwood 2018)

**Lack of systematic empirical research**, but recently expanding network of empirical studies, e.g. regarding effects on political knowledge (Lohman 2019; Oberle & Leunig 2016) and political efficacy (Mariani & Glenn 2014; Oberle 2018)



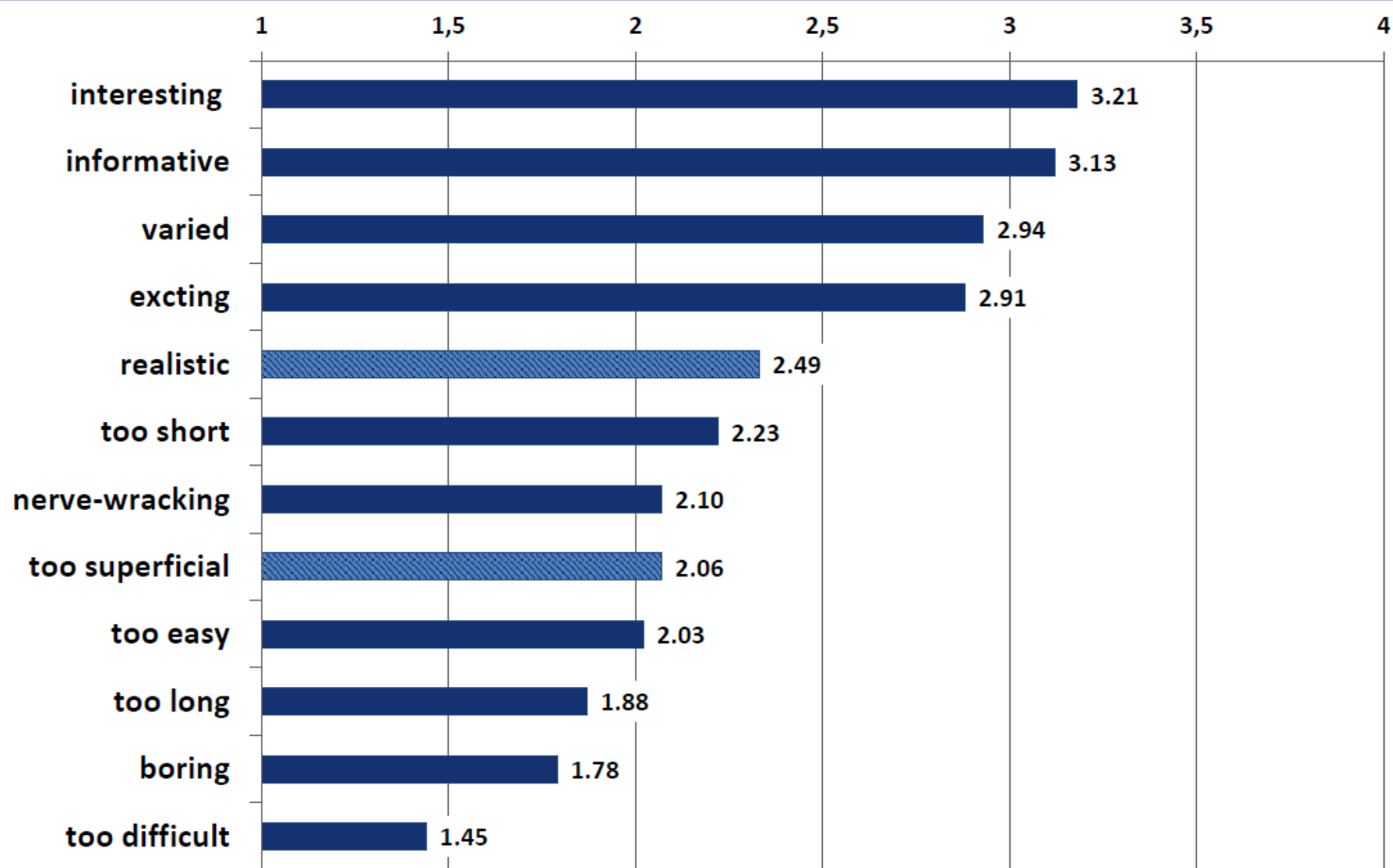
## Design of study

- 3-hour simulation games, focusing on decision-making procedure of European Parliament
- standardized questionnaire, 2 points of measurement; post-interviews with participants
- data collection: 2013-2016, grammar, comprehensive and vocational schools, 15 classes at 12 schools
- Sample: N = 308 students; female = 51.2 %;  $M_{\text{age}}$  : 16.75 years (SD = 1.98)

## Measurement models (latently modelled constructs)

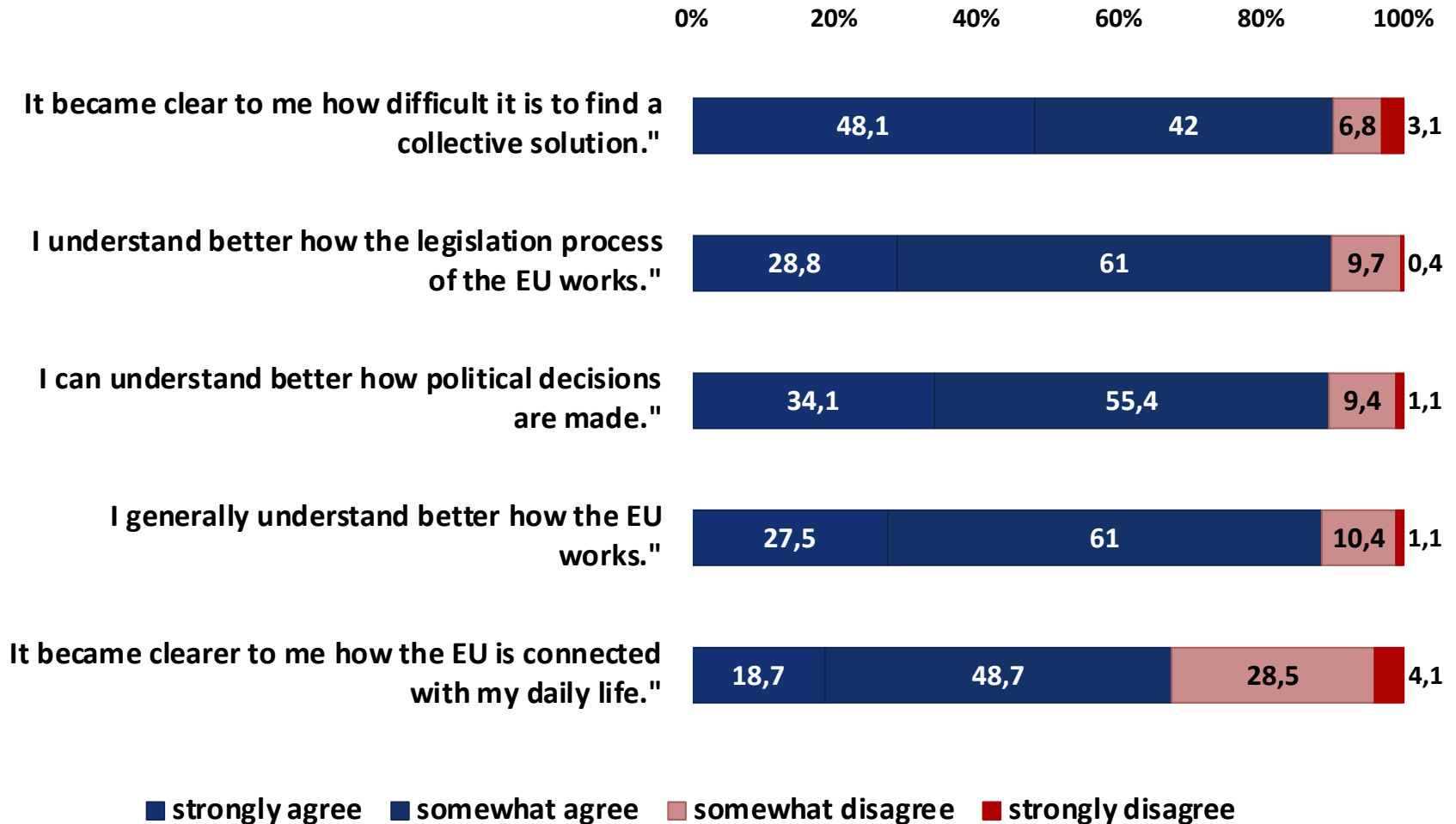
	Items	$\alpha$	$\chi^2$	CFI/TLI	RMSEA
<b>Attitudes towards EU, 5-factorial</b> (I = in general II = performance III = responsiveness IV = relevance of EP-elections V = relevance for everyday life)	I = 4	I = .80/.79	200.14(125)***/ 256.61(125)***	.96/.95// .93/.91	.05//.06
	II = 3	II = .69/.59			
	III = 3	III = .64/.56			
	IV = 3	IV = .72/.70			
	V = 5	V = .80/.80			
<b>EU-related internal efficacy, 2-factorial</b> (I = subjective knowledge; II = discourse-related eff.)	I = 5	I = .82/.74	45.56(19)**/	.99/.99//	.07/.04
	II = 3	II = .82/.77	26.72(19);ns	.99/.99	
<b>Willingness to participate in EU</b> (2-factorial: I = basic; II = further)	I = 2	I = .68//.72	15.64(13);ns//	1.00/.99//	.03/.06
	II = 5	II = .80//.82	26.53(13)*	.99/.98	
<b>Interest in politics</b>	5	.91	6.61(5);ns	1.00/.100	.04
<b>Assessment of simulation, 3-factorial</b> (I = in general; II = learning effect; III = motivation)	I = 11	I = .86	294.42(186)***	.97/.97	.05
	II = 6	II = .82			
	III = 4	III = .89			

## „The simulation game was...” (mean values)

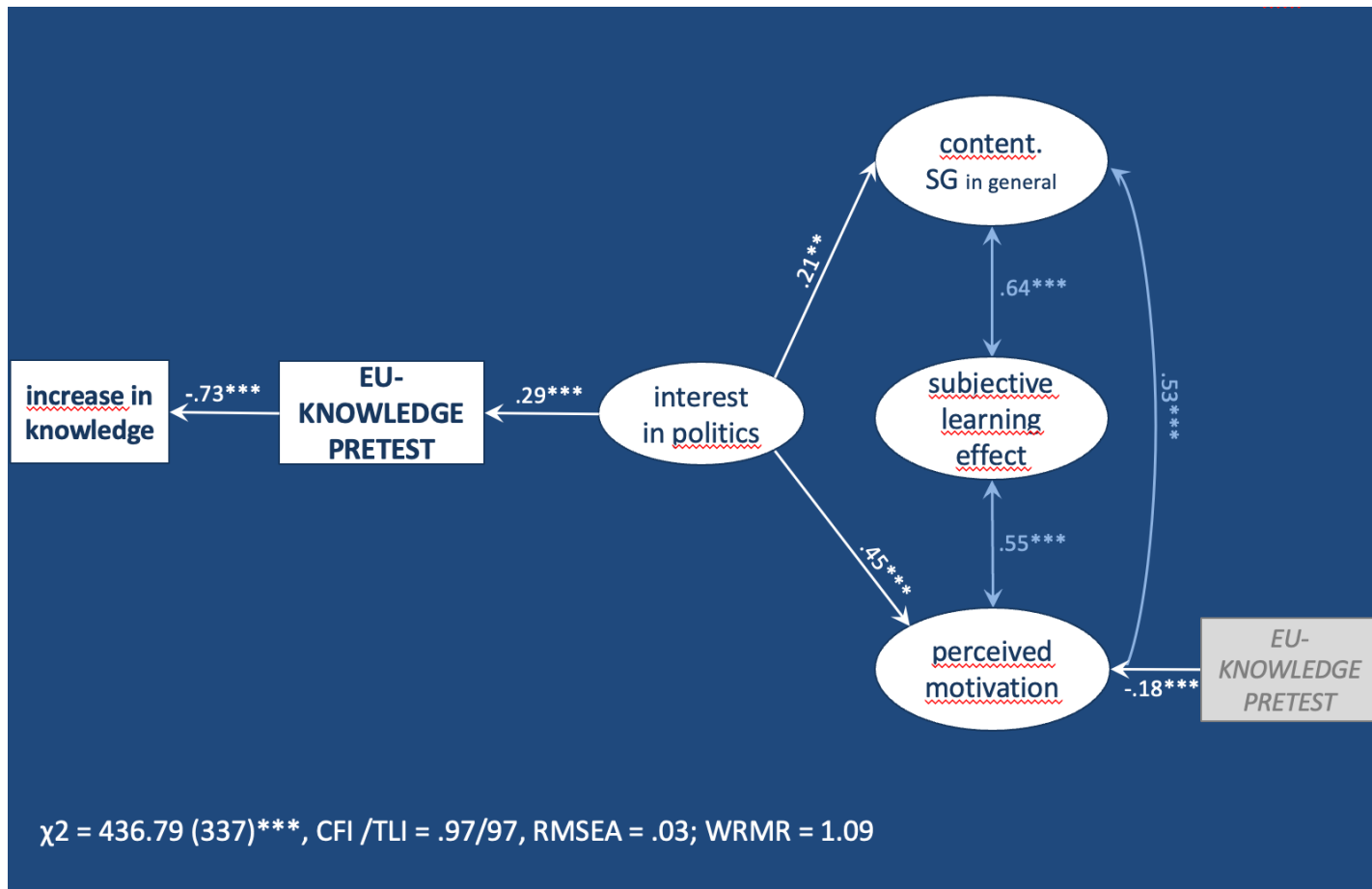


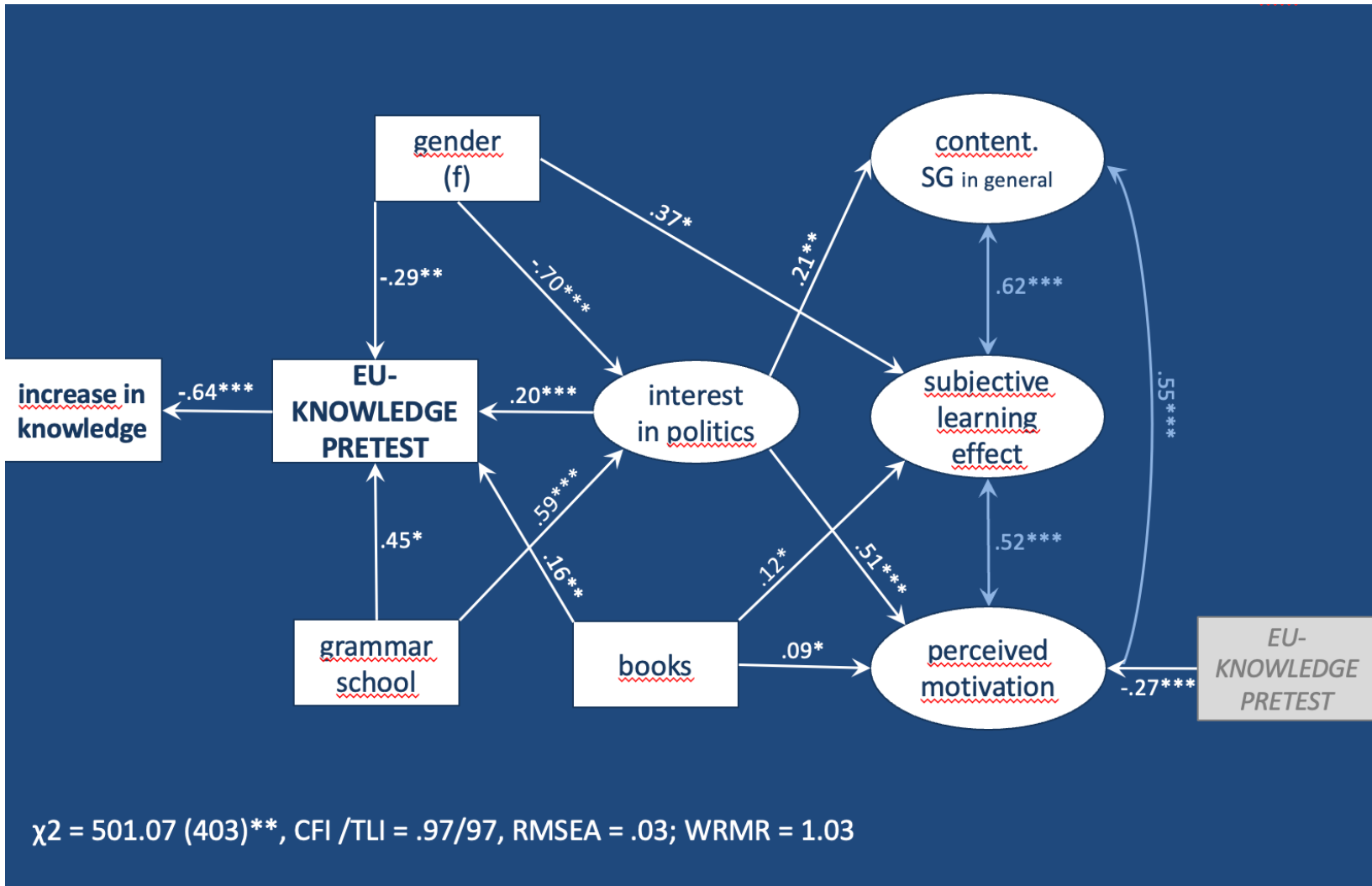
1= strongly disagree, 2= somewhat disagree, 3= somewhat agree, 4= strongly agree

Constructs measured		Pretest		Posttest		Cohens d
		M	SD	M	SD	
attitudes towards EU	interest in EU	2.56	.67	2.67	.61	.17
	EU in general	3.23	.55	3.30	.51	.13
	EU performance	2.77	.57	2.91	.48	.27
	responsiveness of EU	2.34	.53	2.56	.48	.44
	relevance EP-elections	2.71	.62	2.84	.59	.21
	EU relevance for everyday life	2.76	.54	2.93	.52	.32
willingness to participate (EU)	basic	3.08	.72	3.11	.75	.04
	advanced	2.01	.58	2.10	.62	.15
internal efficacy (EU)	discourse-related efficacy	2.30	.73	2.49	.63	.28
	subjective knowledge	2.72	.54	3.00	.42	.58
	objective knowledge (EU)	14.35	4.38	16.01	3.28	.43
-----						
assessment of simulation	interest in politics	2.56	.72			
	in general			3.20	.42	
	subjective learning effects			3.08	.48	
	motivation			2.47	.66	



# Structural Equation Models (latent)





## Means of latent political interest types

<u>types</u>	general <u>political interest</u> (M/SD)	N
<u>low interest</u>	1.31 (.23)	33
medium interest	2.27 (.28)	121
high interest	3.22 (.36)	116

Entropy = .89; low interest= .99, medium interest= .95, high interest = .95



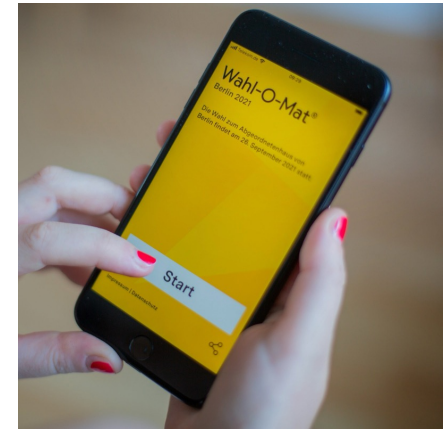
## Assessment of simulation game (for political interest types)

<u>interest types</u>	<u>simulation assessment: in general</u>	<u>simulation assessment: learning effect</u>	<u>simulation assessment: motivation</u>
1 <u>low interest</u>	3.04 (.39)	2.93 (.46)	1.98 (.61)
2 medium interest	3.18 (.44)	3.10 (.47)	2.42 (.58)
3 high interest	3.26 (.39)	3.11 (.49)	2.66 (.68)
<u>Cohen's d 1-2</u>	.34	.37	.74
<u>Cohen's d 2-3</u>	.19	.02	.38
<u>Cohen's d 1-3</u>	.56	.38	1.05

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## Digital teaching unit: Wahl-O-MAT Elections BaWü 2021



# Wahl-O-Mat®

## Baden-Württemberg 2021

# EU Simulation Game for Primary School (<http://pep.uni-goettingen.de>)



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# Digital Puzzle Station on the United Nations

## (Escape) Games in (Civic) Education

- Escape Games offer: interactive learning experiences in which participants work in groups to solve a series of puzzles, find hidden clues, and achieve specific objectives within a predetermined time

*(Klamma et al., 2020).*

- Hardly any systematic empirical research on their implementation in civic education.

## United Nations in Civic Education (in Germany)

- The topic United Nations (UN) is part of the school curriculum including civics classes.
- Challenge in UN education: The organization's activities are not directly tangible in everyday life.
- Limited research on civic education about the UN and students' UN-related political dispositions.
- Few, yet promising, empirical findings on the effects of the *Model United Nations* simulation game (Jesuit & Endless, 2018; Calossi & Coticchia, 2018).



## Digital Puzzle Station „UNgelöst“



## Digital Puzzle Station „UNgelöst“

- Participants take on the role of advisors to the new UN Secretary-General.
- 8 interactive puzzles on core topics of the United Nations:
  - Structure of the UN
  - UN locations worldwide
  - UN peacekeeping mission in Liberia 1989 – 2003
  - Sustainable Development Goals
- Duration: max. 45 minutes
- Teams of up to 7 students

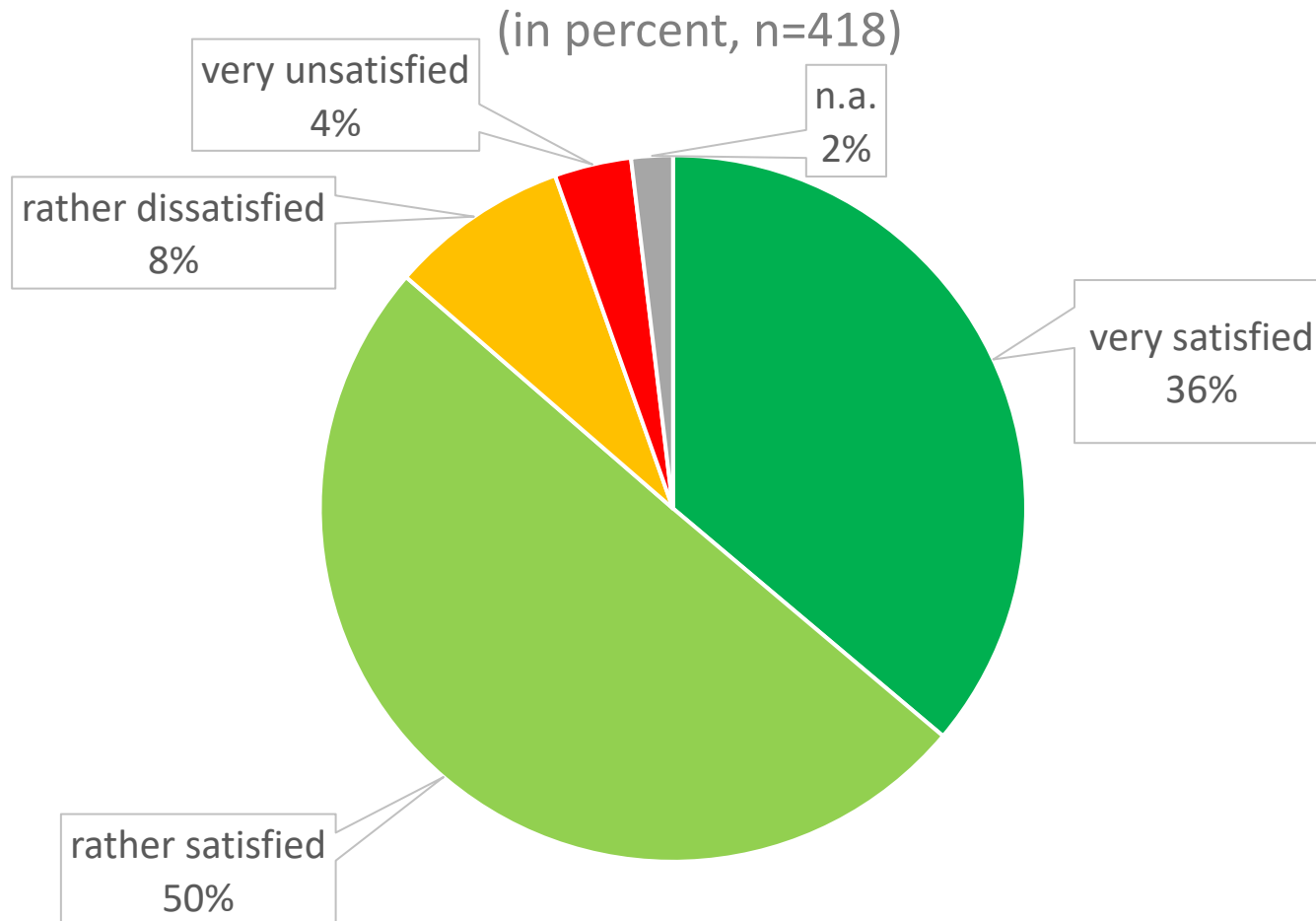
# Design & Sample of the Study

## Mixed-Method/Design-based Study:

- Partially standardized questionnaires (pre-, post-, follow-up surveys)
- Semi-structured individual interviews
- Participatory observation
- **N = 426 students** (*2 measurement points*), 25 classes;  
female = 35,9 %, male = 46,2 %;  $M_{\text{age}} = 15.25 \text{ y.}$  (SD = 2.02)
  - Follow-Up Survey **n=96 Students**
- Ca. **77** game rounds

# Evaluation of the Puzzle Station

*All in all, how satisfied are you with the puzzle station?*



# Pre- and Post-Surveys: Mean Values Comparisons, N = 426

		Pretest		Posttest		Cohen's d
		M	SD	M	SD	Pre-Post
Attitudes towards UN		3.27	.48	3.39	.53	.24
Interest in politics		2.64	.65	2.65	.68	.02
Interest in UN		2.14	.63	2.30	.23	.23
UN everyday relevance		2.69	.76	3.05	.76	.47
UN-related internal efficacy		1.97	.70	2.38	.66	.60
Subjective UN-knowledge		2.08	.69	2.77	.57	1.09
Objected UN-Knowledge		8.54	2.98	9.75	3.30	.38
Game evaluation	Contentment in general			3.26 (.53)		
	Subjective knowledge gain			2.82 (.60)		
	Interest gain			2.39 (.79)		

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## Multiple regression: DV three dimensions of game evaluation

Independent Variable	MOD I			MOD II		
	Contentment in general	Subjective knowledge gain	Interest gain	Contentment in general	Subjective knowledge gain	Interest gain
sex (f)	ns	ns	ns	ns	ns	ns
age	.107	.193***	.225***	.92	.186***	.212***
books	ns	.107	.100	.100	.126*	.159**
migration	ns	ns	ns	ns	ns	ns
previous puzzle game participation	ns	ns	ns	ns	ns	ns
video gaming affinity	ns	ns	.204***	ns	ns	.177***
interest in politics (pretest)				.097	.140**	.345***
obj. knowledge (pretest)				ns	.190**	ns
R <sup>2</sup>	.032	.051	.092	.047	.070	.215



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## Open Question: „What did you particularly like about the puzzle station?“ (n=331)

Categories	Number of mentions	%
Diversity of tasks	71	21%
Teamwork	70	21%
Interactive design	41	12%
Reward at the end	17	5%
Learning gain	17	5%
Technology	13	4%
Buttons	10	3%
Active/playful learning	11	3%
Specific puzzles	11	3%
Intresting	9	2%
Variation from regural lessons	5	1%
Creative	5	1%
Guidance/Moderation	4	1%
Everything	24	7%
Other	21	6%
Nothing	10	3%
	339	100%

Open Question: „What did you particularly *not* like about the puzzle station?“  
 (n=271)

Categories	Number of mentions	%
Technical Problems	55	18%
Not intuitive/hard to understand (e.g., introduction, tasks)	45	16%
Team too large	39	14%
Music	20	9%
Teamwork/group	19	7%
Insufficient content	14	5%
Time pressure	8	3%
Puzzle: Flight route puzzle	6	2%
Too short	5	2%
Too long	4	1%
Everything	4	1%
Nothing/everything is good	44	16%
Other	18	6%
	281	100%

## Open Question: „Do you have any suggestions für improving the puzzle station?“ (n=214)

Categories	Number of mentions	%
Better introduction/support	28	13%
More content	26	12%
Resolution of technical issues	23	11%
Improved organization of groups	16	7%
Clearer task descriptions	15	7%
Better time management	9	4%
More space	7	3%
More rewards	6	3%
No music/quieter music	6	3%
Everything is good/no suggestions	68	31%
Other	14	6%
	218	100 %

## Escape Room „UNgelöst”

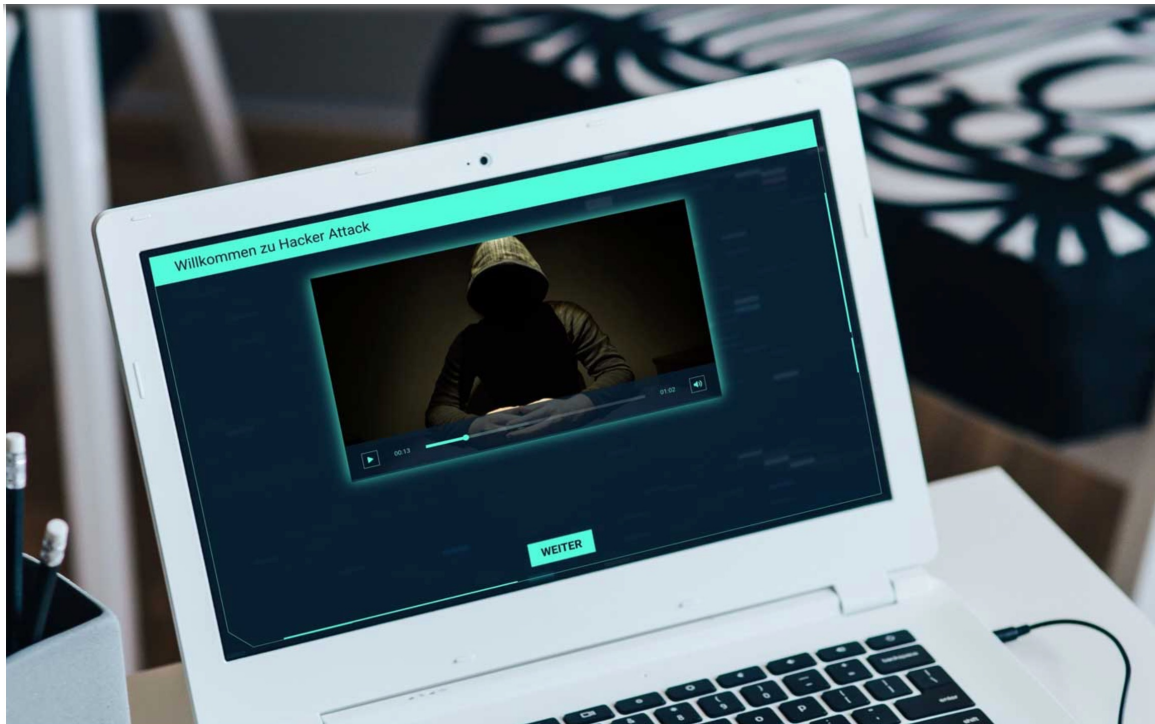


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# Serious Game „Hacker Attack“ (research project in cooperation with Ipb BaWü)



## Serious Game „Escape Fake“



Deutscher Akademischer Austauschdienst  
German Academic Exchange Service

## Digital media literacy as a goal of civic education

- Research suggests that young people struggle to evaluate digital content, indicating difficulties in assessing the credibility of online information (*McGrew et al., 2018*).
- Little knowledge about how youth assess credibility of digital information and online sources (*Nygren & Guath, 2021*).
- Need for raising awareness about fake news and improving media literacy → serious games as a potentially useful tool (*Maertens et al., 2020; Roozenbeek & van der Linden, 2020*).

## Students' Assessment of Credibility in Online Environments: Assessment Criteria, Influencing Factors, and Skills for Citizenship in the Digital Age

- Cooperation with the University of Hong Kong  
(Asst. Prof. Frank Reichert, Faculty of Education)

### **Project aims to:**

- Develop tools for measuring digital literacy to assess students' competencies in dealing with fake news
- Investigate the effects of serious games embedded in education on students' digital literacy
- Consider game suitability for cultural contexts of Germany & Hong Kong

## Pilot Study (Germany)

- N=134, September 2023, Posttest survey & individual interviews (N=13)
- Selected feedback:

- General contentment with the game „Escape Fake“

### **The most favourable aspects:**

- Movement (across classroom)
- Teamwork
- Variation from regular lessons
- Challenging puzzles

### **The most criticised aspects:**

- Not enough printed material
- Not intuitive/challenging to understand

### **Improving suggestions:**

- More tasks
- More space/time
- Better moderation

Thank you very much for your attention.

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