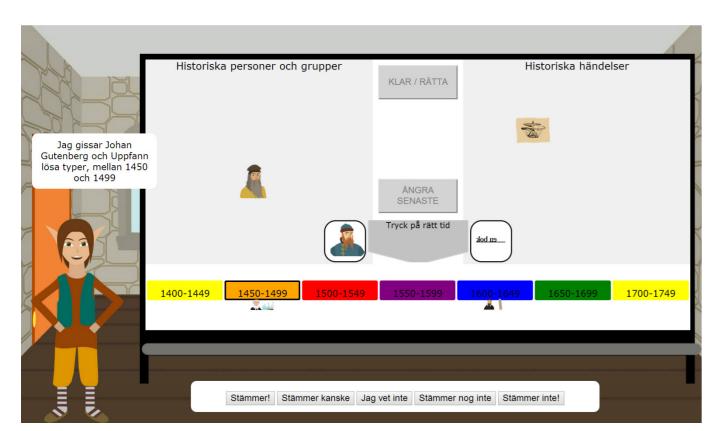
Ascribed gender and characteristics of a visually androgynous Teachable Agent

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The Pedagogical Agent

- A Teachable Agent (TA).
- Situated in an educational software in history targeting 10-12 year old children (Silvervarg et al., 2014).
- Performs learning activities in collaboration with the student.
- Takes tests to provide the student with feedback on how well she or he has taught the agent.







Gender of Pedagogical Agents

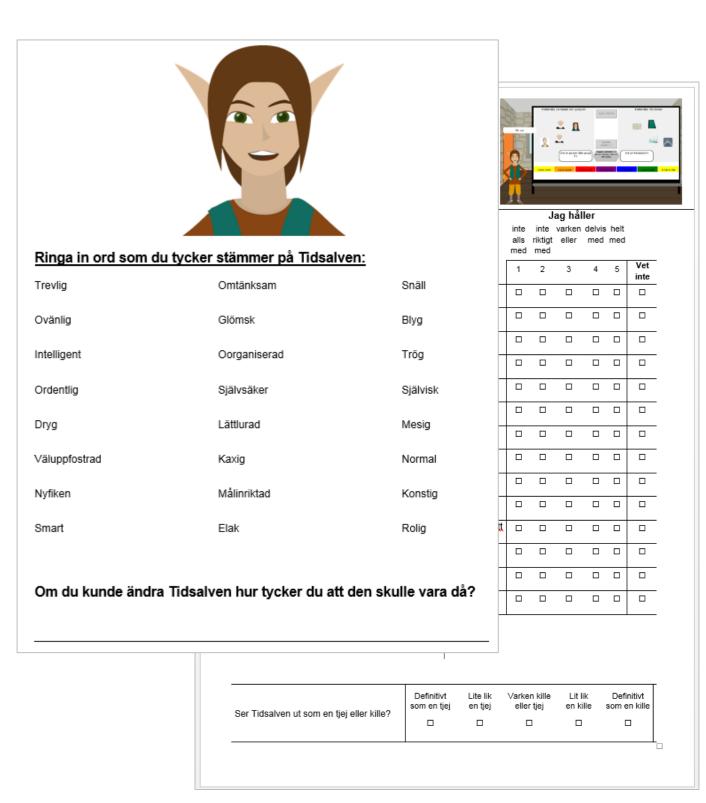
- + Good for identification and role modeling.
- Can reinforce gender stereotypes and prejudice.
- Abuse of female agents is often frequent.

Androgynous Pedagogical Agents

NOTE: Androgyny is NOT the same as genderless, but means a combination of both feminine and masculine traits (Bem, 1981).

Study Design

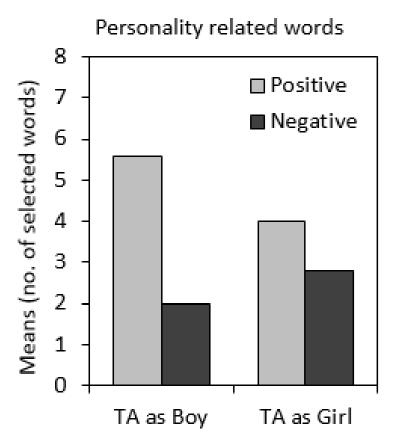
- How do students ascribe gender to a visually androgynous agent?
- How does the ascribed gender influence the perceived personality characteristics?
- Students interacted with the educational software and androgynous agent during two lessons and answered questionnaires regarding how they perceived the gender of the agent and what personality words related could be applied to it.



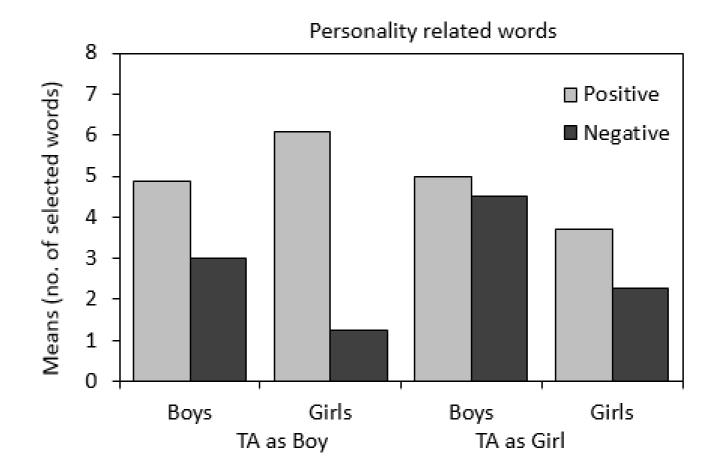
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Results

- The participants were allocated into two main groups: the group where the TA was perceived as "absolutely like a girl" or "a little like a girl" (N = 9) and the group that perceived the TA as "absolutely like a boy" or "a little like a boy" (N = 21).
- In the entire group, 69% (153 of 220) of the characteristics ascribed to the TAs were positive.



		positive	negative		
TA as Boy	obs.	117	42	159	
TA as Girl	obs.	36 25		61	
		153	67	220	
TA as Boy	exp.	110,6 48,4			
TA as Girl	exp.	42,4	18,6		
	Σ (i = 1:4)	0,37	0,85		
		0,97	2,22		
		X ²	4,42		
		df	1		
		р	0,036		
		p'	0,036		
		Φ	0,142		
		odds ratio	4,01		



		boys		girls		
		positive	negative	positive	negative	
TA as Boy	obs.	44	27	73	15	159
TA as Girl	obs.	10	9	26	1 6	61
		54	36	99	31	220
TA as Boy	exp.	39,0	26,0	71,6	22,4	
TA as Girl	ехр.	15,0	10,0	27,5	8,6	
	Σ(i = 1:8)	0,63	0,04	0,03	2,45	
		1,65	0,10	0,08	6,38	
		Χ²	11,35			
		df	3			
		p	0,010			
		p'	0,010			
		Φ	0,227			
		odds ratio				

- A Chi-square test indicated a significant difference between the characteristics given to the TA perceived as a boy compared to when it was perceived as a girl ($\chi^2(1,220) = 4.42$, p < .05).
- The TA perceived as a boy received a mean of 5.6 positive words and a mean of 2.0 negative words.
- The TA perceived as a girl received a mean of 4.0 positive words and a mean of 2.8 negative words.

- A Chi-square test showed that there was a significant difference between the distribution of positive and negative words with regard to ascribed gender of the TA in combination with the gender of the students ($\chi^2(1,220) = 11.3$, p < .01).
- The TA perceived as a boy received a mean of 6.1 positive words and 1.3 negative words from girls, while it received a mean of 4.9 positive and 3.0 negative words from the boys.
- For the agent perceived as a girl the corresponding numbers were a mean of 3.7 positive words and a mean of 2.3 negative words from the girls, and a mean of 5.0 positive words and a mean of 4.5 negative words from the boys.

Conclusions

- Previous studies have shown that an agent's appearance can influence how it is perceived and that female agents typically are subjected to more negative descriptions and abuse.
- In this pilot study we found the same pattern, namely that the TA that was perceived as a girl received fewer positive words and more negative words than the same TA when it was perceived as a boy.
- Girls gave more positive words and fewer negative words to the TA when perceived as a boy, and boys gave more negative words to the TA when perceived as a girl.

References

Bem, S. L. (1981). Gender Schema Theory: A cognitive account of sex typing. *Psychol. Rev., 88,* pp. 354-364.

Silvervarg, A., Kirkegaard, C., Nirme, J., Haake, M. & Gulz A. (2014) Steps Towards a Challenging Teachable Agent. In Proc. of the 14th Int. Conf. on Intelligent Virtual Agents (IVA 2014), Boston, MA, August, 27-29, 2014.