

Structuring Collaboration Scripts: Optimizing online group work on classroom dilemmas in teacher education

Citation for published version (APA):

Hummel, H., Geerts, W., Sloomaker, A., Kuipers, D., & Westera, W. (2014). *Structuring Collaboration Scripts: Optimizing online group work on classroom dilemmas in teacher education*. Paper presented at 6th International Conference on Computer Supported Education, Barcelona, Spain.

Document status and date:

Published: 01/01/2014

Document Version:

Peer reviewed version

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

[Link to publication](#)

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal.

If the publication is distributed under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license above, please follow below link for the End User Agreement:

<https://www.ou.nl/taverne-agreement>

Take down policy

If you believe that this document breaches copyright please contact us at:

pure-support@ou.nl

providing details and we will investigate your claim.

Downloaded from <https://research.ou.nl/> on date: 07 Dec. 2022

Open Universiteit
www.ou.nl



Structuring Collaboration Scripts

Optimizing online group work on classroom dilemmas in teacher education

**Hans Hummel, Walter Geerts, Aad Slootmaker,
Derek Kuipers & Wim Westera**

NHL
UNIVERSITY OF APPLIED SCIENCES

Open Universiteit
welten-institute.org



Introduction

- Use serious games to enable collaboration on professional problems
- Explain the role of scripts in collaboration games
- Define and optimize the structure of collaboration scripts
- Introduce the mastership game
- Pose hypotheses

NHL

Hans Hummel

CSEDU2014 / 1-3 april 2014



Introduction: workplace learning

- Professionals are lifelong learners that continuously face problem situations in their workplace that change dynamically and rapidly
- Organisations' tacit knowledge can only be expressed and accessed in direct collaboration on professional tasks (e.g., Nonaka & Takeuchi, 1995)
- Games may take workplace contexts as starting point to stimulate learners acquire new knowledge by sharing and co-creating (e.g., Bell *et al.*, 2008)



Introduction: collaboration scripts

- Collaboration scripts (Kobbe *et al.*, 2007) are an instructional method that structures the collaboration by guiding the interacting partners online through a sequence of interaction phases with designated activities and roles
- Collaboration scripts have hardly been tested in more open and flexible learning environments like serious games (Dillenbourg & Hong, 2008)
- No research has focused on optimizing essential structure elements, nor has measured the learning effects of collaboration scripts in serious game play



Introduction: structure

- An optimal level of structure appears to be a key success factor for effective learner support
- Risks of over-scripting: ‘mathematic’ versus ‘mathematic’ (Rothkopf, 1996)
- *Segmentation* and *inter-dependency* within the task constitute the main structure elements (e.g., Dillenbourg, 2002)



Selecting a classroom dilemma (phase 1)



Dorine, KIES JE DRIE PRAKTIJKVRAGEN ?

Kies je praktijkvraag:

Kies je praktijkvraag:

- Hoe zet ik activerende verworvenen in?
- Hoe breng ik variatie in mijn manier van uitleggen?
- Hoe controleer ik of mijn leerlingen zijn behaaid?
- Hoe speel ik het beste in op onverwachte gebeurtenissen?
- Hoe houd ik op een goede manier de orde?
- Hoe betrek ik ook de stille leerlingen bij de les?
- Hoe krijg ik zicht op wat de individuele leerling doet?
- Hoe ga ik om met extreme ordeverstooten?
- Hoe zorg ik ervoor dat leerlingen niet te veel energie lood?
- Hoe breng ik mijn eigen kleur aan in mijn lessen?
- Hoe zorg ik voor een veilige leeromgeving?
- Hoe verwerk ik de vlie van de school in mijn lessen?
- Hoe ga ik om met negatieve collega's?
- Hoe coach ik een groep?
- Hoe ga ik om met een leerling die zich niet laat coachen?
- Hoe voer ik een effectief coachingsgesprek?
- Hoe werk ik aan betere groepeerings?
- Wat is de rol naar de ouders van mijn leerlingen toe?
- Wat is de rol binnen het team waarin ik werk?

KEESES

MEES TER ZAKEN

KEESES | Kies een PRAKTIJKVRAAG

Discussing assigned themes (phase 3)

The screenshot shows a discussion forum interface. At the top, there is a header with the text "Hans, LEES ELKAARS MOTIVATIES!" and a question mark icon. Below the header, there is a post by "Dorine" with the subject "Intercultureel". The post content includes a question: "Praktijvraag: Hoe betrek ik ook de stille leerlingen bij de les?" and a list of assigned themes: "1 INTERCULTUREEL", "2 MIJN ABRONCHOS", and "3 GESPREKSCERING". There are three links for reading motivations: "(Lees [MOTIVATIE](#) door Dorine)", "(Lees [MOTIVATIE](#) door Hans)", and "(Lees [MOTIVATIE](#) door Hans)". The post is marked as "gelezen!" (read) and has a "reageer" (reply) button. The forum is titled "MEES TER 20 CHA9" and "FOND 1 Over de lesdag" is visible at the bottom.



Negotiating declined themes (phase 4)

The screenshot shows a web-based learning environment. At the top left, there is a profile picture of a man and two small icons labeled 'WEL' and 'NET'. The main header reads 'Margarita, STELLEN EN BEANTWOORDEN VAN JURTYVRAGEN'. Below this, a text box says 'Door Hans afgewezen thema: DIT KLAS-AUS GROEP [Lees MOTIVATIE] door Hans'. A red heading states 'I SPELERS ZIJN NIET OVERTUIGD DOOR DE MOTIVATIE'. The text continues: 'Gebruik de oefunde om de motivatie bij het afgevozen thema te bespreken. Als jullie eens uiting nodig vinden van een speler, gebruik dan één van de onderstaande JURTYVRAGEN en laat de speler daar een antwoord geven.' Below this is a question: 'JURTYVRAGEN: 1. Waarom vindt de speler dat hij/zij deze klasst kan wegleggen?'. There is a text input field for the answer, followed by a 'VERBODEN' button. At the bottom, there are two buttons: 'IK BEN WEL OVERTUIGD' and 'IK BEN NIET OVERTUIGD'. A footer at the very bottom reads 'POODGE-4: De klas is af'.



Peer assessment (phase 6)

Hans, BEKIJK EN BEOORDEEL ELKAARS OPDRACHTEN

Proefvraag: Hoe betrek ik ook de stille leerlingen bij de les?

DOWNLOAD AFWERDING?

Tegengevozen theme(s):
HET LESBEHOEVEN

Opdracht gemaakt door Margrita :
Ga op het internet op zoek naar actuele informatie over het door jou geselecteerde thema. Maak vervolgens een bondig schema of samenvatting waarin het antwoord op de proefvraag helder en overtuigend naar voren komt.

[Bijlage](#)

Lees feedback van:
Eloise

STEM HIER: ★★☆☆☆

PLAATS REACTIE

MEETS TERZOU CHIAZI

FORUM 6: PEER ASSESSMENT



Introduction: hypotheses

- Will less structure lead to more ‘natural’ and effective collaborative learning? (We hypothesize that the individual reports of those that played the low-structured game will be objectively graded higher by their teachers and peers)
- Will less structure in the collaboration be appreciated more by students? (We hypothesize that students will subjectively appreciate the low-structured game higher on a number of aspects)



Method

- 29 teachers-in-training
- Experiment with 3 conditions: high- and low structured game, (non-playing) control group (→ definition, elements of structure)
- Learning effects measures to proof first hypothesis (→ correction model)
- Student satisfaction measures to proof second hypothesis (→ questionnaire)



Method: structure elements

Scene	a1 (has to finish scene)	a2 (cards to draw)	b1 (wait for others)	b2 (feedback required)	b3 (others draw cards)
1_1	true	3/2/1	true/false	false	false
1_2	true	1	true/false	false	false
2_1	false	-	true/false	false	false
2_2	true/false	-	true/false	false	false
2_3	true/false	-	true/false	true/false	false
3_1	true	3/2/1	true/false	false	true/false
3_2	true/false	-	true/false	false	false
4_1	true/false	-	true/false	false	false
4_2	true	-	true	true	false
4_3	true	-	true	true	false
5_1	true	-	true/false	true/false	false
5_2	-	-	-	-	-
6_1	-	-	-	-	-
6_2	-	-	-	-	-



Method: correction model

Subscales	Insufficient (0 points)	Sufficient (1 point)	Good (2 points)	Score
A. Ownership	Refers to others: "They will solve the problem"	"I will take action"	The answer shows real commitment.	0-2
B. Reflection	No reflection	Some reflection, partly rich	Rich reflection	0-2
C. Focus	The problem has not been framed / focused	The problem has partly been focused	The problem is rich and has been correctly focused	0-2
D. Nuance / complexity	The answer does not contain nuance	The answer is correctly linked to one design pattern	The answer is correctly linked to (a network of) more design patterns	0-2
E. Richness / correctness	The elaboration is not correct	The elaboration is partly rich and correct	The elaboration is rich and correct	0-2
Total score				0-10



Method: satisfaction questionnaire

Item	Aspect	+/-	Statement
1	U	+	The way to play the game is clear, playing rules are clear.
2	Q	+	The elaborations (of practical assignments) by co-players were of sufficient quality
3	Q	+	The composition of the group was good (regarding interest and level of expertise).
4	U	+	The user-interface of the game is clear and user-friendly.
5	S	+	Group play was possible without teacher intervention, the collaboration process has been determined well in advance.
6	T	-	The time allowed to play was too low.
7	S	-	The amount of game structure is too low.
8	U	+	The time allowed for each phase was too low.
9	S	-	The amount of structure in each phase is too high.
10	T	-	The time allowed for each phase was too high.
11	U	-	The way to collaborate during each phase was too complex.
12	I	+	Mutual interaction and collaboration proceeded well and were useful.
13	Q	+	Feedback (assigning cards, peer assessment, etc.) from co-players was useful (in further elaborating my assignment).
14	Q	+	The elaborations of the exploratory assignments by co-players were of sufficient quality.

Results: teacher grades

	High structure (n = 9)		Low structure (n = 10)		Control (n = 10)		All (N = 29)	
Assessment	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Teacher grade	6.44	1.59	7.35	1.03	6.05	0.93	6.62	1.29
Peer rating	7.93	.66	7.52	1.04	7.68	0.89	7.70	0.87



Results: teacher grades

- Most individual reports (76%) were graded as sufficient ($M = 6.62$, $SD = 1.29$)
- Condition effect is 'marginally' significant ($F(2, 26) = 3.072$, $MSE = 4.428$, $p = 0.063$, $\eta_p^2 = 0.18$)
- Low-structure outperforms control significantly ($t(18) = 2.97$, $p < 0.01$), an effect not significant for high-structure ($t(17) = 0.67$, $p = 0.51$)
- Low-structure outperforms high-structure significantly ($t(17) = 4.86$, $p = 0.042$)
- Weighted Kappa was acceptable ($K_w = .47$, $\delta = .08$), and without sub-scale B even good ($K_w = .68$, $\delta = .09$)



Results: student satisfaction

Item	High structure (n = 9)		Low structure (n = 10)		All (N = 19)		p Δ
	M	SD	M	SD	M	SD	
1	3.00	1.41	2.70	1.25	2.85	1.30	.64
2	4.00	0.76	4.00	0.82	4.00	0.76	1.00
3	3.50	1.31	4.20	0.92	3.89	1.13	.20
4	2.88	1.25	3.50	1.08	3.22	1.17	.27
5	2.38	1.40	2.67	1.50	2.53	1.42	.67
6	2.25	0.89	1.40	0.52	1.78	0.81	.02
7	3.13	1.25	3.40	1.07	3.28	1.13	.62
8	3.25	1.49	4.20	1.03	3.78	1.31	.13
9	2.75	0.87	2.30	0.95	2.50	0.92	.32
10	2.13	0.83	2.20	1.40	2.17	1.15	.89
11	4.00	0.53	2.90	1.37	3.39	1.19	.04
12	3.38	1.51	2.80	1.23	3.06	1.35	.38
13	2.88	1.36	3.00	0.90	2.91	1.14	.88
14	3.13	0.99	3.33	0.82	3.21	0.89	.68
15	2.88	0.99	2.33	1.16	2.73	1.01	.46
16	2.50	1.31	2.56	1.24	2.53	1.23	.93
17	4.25	1.04	3.56	1.24	3.88	1.16	.23
18	3.00	1.07	3.67	1.55	3.18	1.08	.39
19	3.00	1.19	3.22	1.56	3.12	1.36	.75



Results: student satisfaction

Item	High structure (n = 9)		Low structure (n = 10)		All (N = 19)		p Δ
	M	SD	M	SD	M	SD	
1	3.00	1.41	2.70	1.25	2.85	1.30	.64
2	4.00	0.76	4.00	0.82	4.00	0.76	1.00
3	3.50	1.31	4.20	0.92	3.89	1.13	.20
4	2.88	1.25	3.50	1.08	3.22	1.17	.27
5	2.38	1.40	2.67	1.50	2.53	1.42	.67
6	2.25	0.89	1.40	0.52	1.78	0.81	.02
7	3.13	1.25	3.40	1.07	3.28	1.13	.62
8	3.25	1.49	4.20	1.03	3.78	1.31	.13
9	2.75	0.87	2.30	0.95	2.50	0.92	.32
10	2.13	0.83	2.20	1.40	2.17	1.15	.89
11	4.00	0.53	2.90	1.37	3.39	1.19	.04
12	3.38	1.51	2.80	1.23	3.06	1.35	.38
13	2.88	1.36	3.00	0.90	2.91	1.14	.88
14	3.13	0.99	3.33	0.82	3.21	0.89	.68
15	2.88	0.99	2.33	1.16	2.73	1.01	.46
16	2.50	1.31	2.56	1.24	2.53	1.23	.93
17	4.25	1.04	3.56	1.24	3.88	1.16	.23
18	3.00	1.07	3.67	1.55	3.18	1.08	.39
19	3.00	1.19	3.22	1.56	3.12	1.36	.75

“Time allowed to play was too low”

“The way to collaborate during each phase was too complex”



Results: student satisfaction

- No significant differences for peer ratings
- No significant differences on student satisfaction, with just two exceptions



Conclusions

- Collaboration can be enabled by serious games
- Over-scripting has disruptive effects (e.g., order and turns)
- Collaboration scripting holds promise for future research but requires a. theory of guidance, b. dedicated authoring, and c. studies into various collaboration patterns



Questions / Discussion

NHL

Hans Hummel

CSEDU2014 / 1-3 april 2014

