

Supplementary material 1

to:

Current motivation, self-efficacy, cognitive load, and hands-on performance of secondary school students during bystander-cardiopulmonary resuscitation training

A comparative interventional study between two teaching models

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DBR-Research Design Description

last modified: 2024-01-21

Table S1: DBR-phases and characteristics according to methods used in the project (cf. Plomp, 2013). In **bold**: Presented sub-study of the assessment phase (3)

Phase	Quality focus	Objective(s)	Used Methods
(1) Preliminary re-search phase	Relevance (content validity)	<ul style="list-style-type: none"> Elaboration of <ul style="list-style-type: none"> known problem-related theories or evidence ongoing educational problems 	<ul style="list-style-type: none"> <i>cycle 1: Systematic literature review</i> <ul style="list-style-type: none"> a) feasibility and efficacy of BLS teaching with students b) strategies for and difficulties of BLS implementation (Dumcke et al., 2019) <i>cycle 2: Focus group consultation</i> <ul style="list-style-type: none"> a) medical professionals (structured interviews, n = 5) b) educational practitioners: biology teachers (Dumcke et al., 2021b) (survey, n=150) <i>cycle 3: Opening for school development</i> (needs and solutions from an in-service point-of-view) <ul style="list-style-type: none"> a) Online survey (all school types), in prep. b) Structured teacher interviews (n = 13) (Dumcke et al., 2024)
(2) Development/ Prototyping phase (cf. Reinmann, 2014, pp. 70–71)	<ul style="list-style-type: none"> <i>start:</i> consistency <i>later:</i> practicability and effectivity 	<ul style="list-style-type: none"> Iterative cycles for improvement and refinement of interventions Testing in practice 	<ul style="list-style-type: none"> <i>cycle 1: Framing</i> frames: a) flexibility/modularity, b) constructivist learning (problem- context-based, interactive methods), c) holistic, cross-linked concepts <i>cycle 2: Scripting/Prototyping</i> Development of an extracurricular one-day workshop for students (of 3 modules) at university (“walkthrough” prototype) <i>cycle 3: Comparing and testing</i> iterative testing with different school classes (8th, 9th, 10th grade), micro-evaluation (+ teamwork, interactivity; — resources, hygiene) repetitive refinement of the structure (e.g. more reflexive parts; smaller steps in practice tasks; more precise instruction, etc.)
(3) Assessment phase	<ul style="list-style-type: none"> practicability effectivity 	<ul style="list-style-type: none"> Outlining of <ul style="list-style-type: none"> feasibility effectiveness implementation guidelines 	<ul style="list-style-type: none"> <i>cycle 1: Re-design / prototype for school</i> Optimized Walkthrough-version was modified for horizontal implementation into lessons e.g. reduction of the material effort (no rescue breaths), a stronger focus on peer learning (due to worse teacher-to-student-ratio), ... <i>cycle 2: Testing</i> Pre-testing of single modules in research settings (e.g. Dumcke et al., 2021a) in partner-schools Final comparative testing of a short versus an modular version, embedded into biology lessons in grade six.

References

- Dumcke, R., Rahe-Meyer, N., & Wegner, C. (2021a). Does age still matter? An age-group comparison of self-efficacy, initial interest and performance when learning bystander resuscitation in secondary schools. *International Journal of First Aid Education*, 4(1), 5–22. <https://oaks.kent.edu/node/14543>
- Dumcke, R., Wegner, C., Böttiger, B. W., Kucknat, L., & Rahe-Meyer, N. (2019). The process of implementing cardiopulmonary resuscitation training in schools: A review of current research. *Journal of Innovation in Psychology, Education and Didactics (JIPED)*, 23(2), 141–166.
- Dumcke, R., Wegner, C., & Rahe-Meyer, N. (2021b). Die Implementierung von Reanimationsunterricht: Eine Befragung von Biologielehrkräften zu Einflussfaktoren und Gelingensbedingungen. *HeiEDUCATION Journal*, 7(1), 143–175. <https://doi.org/10.17885/heiup.heied.2021.7.24443>
- Dumcke, R., Wegner, C., Wingen, S., & Rahe-Meyer, N. (2024). Facilitators and Barriers Perceived by German Teachers Considering Basic Life Support Education in School-A Qualitative Study. *European Journal of Investigation in Health, Psychology and Education*, 14(6), 1769–1785. <https://doi.org/10.3390/ejihpe14060117>
- Plomp, T. (2013). Educational Design Research: An Introduction. In T. Plomp & N. Nieveen (Eds.), *Educational design research: An introduction* (pp. 10–51). SLO.
- Reinmann, G. (2014). Entwicklungsfrage: Welchen Stellenwert hat die Entwicklung im Kontext von Design Research? Wie wird Entwicklung zu einem wissenschaftlichen Akt? In D. Euler & P. F. E. Sloane (Eds.), *Zeitschrift für Berufs- und Wirtschaftspädagogik: Beiheft 27. Design-Based Research* (pp. 63–78). Steiner.

Supplementary material 2

to:

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Scale report – summary

survey data output

last modified:

2024-01-20

Table S2: Item characteristics and scale reliability summary.

	ID	instrument - subscale	items	N (mis.)	Selectivity (r_{itc})		α	α (reference)
					lower	upper		
Baseline and post-intervention assessment	1.1	QCM - interest	4	110 (6)	.44	.71	.73/.75	.74 ¹
	1.2	QCM - challenge	3	111 (5)	.44	.57	.75/.69	.71 ¹
	1.2	QCM - probability of success	3	113 (3)	.27	.42	.58/.53	.72 ¹
	1.4	QCM -anxiety	3	113 (3)	.40	.47	.74/.64	.83 ¹
	2.1	SET-BLS-SE - psycho.	5	110 (6)	.46	.67	.78/.78	.81 ²
	2.2	SET-BLS-SE - social	4	110 (6)	.69	.75	.80/.87	.85 ²
	2.3	SET-BLS-OE - positive	5	109 (7)	.22	.42	.54/.55	.66 ²
	2.4	SET-BLS-OE - negative	5	106 (10)	.19	.35	.51/.50	.55 ²
Post-intervention assessment only	3.1	s-FCI ^k - constructivist	4	95 (21)	.39	.62	-./.69	.69 / .74 ³
	3.2	s-FCI ^k - self-determined	3	98 (18)	.39	.63	-./.67	.77 / .72 ^{3,4}
	3.4	s-FCI ^k - active	3	98 (18)	.44	.54	-./.67	.77 / .84 ³
	3.5	s-FCI ^k - situated	3	100 (16)	.40	.69	-./.68	.82 / .89 ³
	3.6	s-FCI ^k - emotion	3	111 (5)	.48	.68	-./.75	.81 / .86 ³
	3.7	s-FCI ^k - social	3	109 (7)	.48	.54	-./.70	.79 / .68 ³
	4.1	CLI - intrinsic	4	110 (6)	.20	.63	-./.61	.86 ⁵
	4.2	CLI - extraneous	4	108 (8)	.42	.64	-./.73	.80 ⁵
	4.3	CLI - germane	3	110 (6)	.47	.68	-./.72	.80 ⁵

N = sample size; α = Cronbachs alpha coefficient; QCM = Questionnaire Of Current Motivation (German version: Fragebogen zur Erfassung der aktuellen Motivation (FAM). SET-BLS = Self-Efficacy Theory for Basic Life Support scale; SE = self-efficacy; OE = outcome expectations. S-FCI = short scale: Features of constructivist instruction (German version: Kurzskaala zur Messung gemäßigt konstruktivistischer Prozessmerkmale [Kurz-PgK]). CLI = Cognitive Load Inventory (modified).

^a one out of three items is inverted (E2)

^b baseline (to) α = .73 (r_{itc} .49-.61). Consistency is maybe influenced by individual divergent judgements in retrospective.

^c Covering a wide range of BLS-related variations was preferred to consistency in content, cf. Dumcke et al., 2021.

¹ Rheinberg et al. 2001, cf. *biology-lab-study* (N=321).

² Dumcke et al. 2021, measured at baseline assessment to

³ Basten et al. 2015; data from two study branches

⁴ Basten et al's. (2015) subscale contained only two revised items; item three is from Urhahne et al. (2011).

⁵ Klepsch et al. 2017, modified; only for the single items ICL 1,4; ECL 3,4; GCL 1,2.

References

- Basten, M., Greiff, S., Marsch, S., Meyer, A., Urhahne, D., & Wilde, M. (2015). Kurzskaala zur Messung gemäßigt konstruktivistischer Prozessmerkmale (Kurz-PgK) im Biologieunterricht. *Erkenntnisweg Biologiedidaktik* (2015), 43-57.
- Dumcke, R., Rahe-Meyer, N., & Wegner, C. (2021). Self-efficacy and outcome expectancies of secondary school students in performing basic life support. *The Journal of Health, Environment, & Education*, 13, 1-12. <https://doi.org/10.18455/13001>
- Fuchs, R., & Schwarzer, R. (1994). Selbstwirksamkeit zur sportlichen Aktivität: Reliabilität und Validität eines neuen Meßinstruments. [Self-efficacy towards physical exercise: Reliability and validity of a new instrument]. *Zeitschrift für differentielle und diagnostische Psychologie*, 15(3), 141-154.
- Klepsch, M., Schmitz, F., & Seufert, T. (2017). Development and Validation of Two Instruments Measuring Intrinsic, Extraneous, and Germane Cognitive Load. *Front. Psychol.* 8:1997. <https://doi.org/10.3389/fpsyg.2017.01997>
- Leppink, J., Paas, F., Van der Vleuten, C.P.M., Van GogT., & Van Merriënboer, J. J. G. (2013). Development of an instrument for measuring different types of cognitive load. *Behav Res* 45, 1058-1072 (2013). <https://doi.org/10.3758/s13428-013-0334-1>
- Leppink, J., van den Heuvel, A (2015). The evolution of cognitive load theory and its application to medical education. *Perspect Med Educ* 4, 119-127. <https://doi.org/10.1007/s40037-015-0192-x>
- Rheinberg, F., Vollmeyer, R. & Burns, B. D. (2019). FAM. Ein Fragebogen zur Erfassung aktueller Motivation in Lern- und Leistungssituationen [Verfahrensdokumentation und Fragebogen]. In Leibniz-Institut für Psychologie (ZPID) (Hrsg.), *Open Test Archive*. Trier: ZPID. <https://doi.org/10.23668/psycharchives.4486>
- Rheinberg, F., Vollmeyer, R. & Burns, B. D. (2001). FAM: Ein Fragebogen zur Erfassung aktueller Motivation in Lern- und Leistungssituationen-agnostica (2001), *Diagnostica* 47, 57-66. <https://doi.org/10.1026//0012-1924.47.2.57>.
- Urhahne, D., Marsch, S., Wilde, M., Krüger, D. (2011). Die Messung konstruktivistischer Unterrichtsmerkmale auf der Grundlage von Schülerurteilen. *Psychologie in Erziehung und Unterricht*, 2011, 58, 116 -127. <https://doi.org/10.2378/peu2011.art06d>.

Supplementary material 3

to:

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MANOVA-Output

survey data output

last modified: 2023-05-30

Table S3-1: MANOVA-output: Descriptive results and tests of homogeneity.

Subscale	Group	N	M	SD	Levene test (median) ^a		Box test ^b		
					<i>F</i> (<i>df</i>)	<i>p</i>	<i>M</i> (<i>df</i>)	<i>p</i>	
QCM	Interest	TG	48	3.95	1.09	3.46 (1,114)	.065	27,12 (10, 48046)	.004
		CG	68	3.95	0.77				
		total	116	3.95	0.91				
QCM	Prob. of success	TG	48	2.90	0.44	1.26 (1,114)	.270	27,12 (10, 48046)	.004
		CG	68	2.92	0.58				
		total	116	2.91	0.52				
QCM	Anxiety	TG	48	1.09	0.87	5.88 (1,114)	.016	27,12 (10, 48046)	.004
		CG	68	1.50	1.15				
		total	116	1.33	1.06				
QCM	Challenge	TG	48	3.98	0.96	0.339 (1,114)	.561	27,12 (10, 48046)	.004
		CG	68	4.19	0.80				
		total	116	4.11	0.87				
SET-BLS	SE-psychological	TG	48	3.68	0.97	0.29 (1,113)	.592	20.92 (10,48139)	.028
		CG	67	3.40	1.04				
		total	115	3.52	1.01				
SET-BLS	SE – social	TG	48	4.21	1.09	1.15 (1,113)	.287	20.92 (10,48139)	.028
		CG	67	3.91	1.12				
		total	115	4.04	1.11				
SET-BLS	OE – positive	TG	48	4.16	0.85	1.41 (1,113)	.238	20.92 (10,48139)	.028
		CG	67	4.34	0.59				
		total	115	4.26	0.72				
SET-BLS	OE - negative	TG	48	2.07	0.76	4.48 (1,113)	.037	20.92 (10,48139)	.028
		CG	67	2.56	0.94				
		total	115	2.36	0.90				
s-FCI	Constructivist	TG	46	3.96	0.93	0.07 (1,109)	.793	51.540 (21,34484)	.001
		CG	65	3.85	0.83				
		total	111	3.90	0.87				
s-FCI	Self-determined	TG	46	2.83	0.99	2.08 (1,109)	.153	51.540 (21,34484)	.001
		CG	65	2.78	1.20				
		total	111	2.80	1.11				
s-FCI	Active	TG	46	3.90	0.97	1.22 (1,109)	.272	51.540 (21,34484)	.001
		CG	65	4.27	0.68				
		total	111	4.12	0.83				
s-FCI	Situated	TG	46	4.55	0.82	0.60 (1,109)	.441	51.540 (21,34484)	.001
		CG	65	4.65	0.54				
		total	111	4.61	0.67				
s-FCI	Emotional	TG	46	4.07	0.91	1.05 (1,109)	.308	51.540 (21,34484)	.001
		CG	65	4.19	0.72				
		total	111	4.14	0.80				
s-FCI	Social	TG	46	4.13	0.94	0.10 (1,109)	.749	51.540 (21,34484)	.001
		CG	65	4.28	0.74				
		total	111	4.22	0.83				

Subscale	Group	N	M	SD	Levene test (median) ^a		Box test ^b		
					F (df)	p	M (df)	p	
<i>Table S3-1 continued</i>									
CLI	Intrinsic load	TG	46	1.97	0.86	0.47 (1,109)	.495	4.223 (6,64103)	.664
		CG	65	1.98	0.93				
		total	111	1.98	0.90				
CLI	Extraneous load	TG	46	1.40	0.92	0.06 (1,109)	.813	4.223 (6,64103)	.664
		CG	65	1.59	1.06				
		total	111	1.51	1.00				
CLI	Germane load	TG	46	4.13	0.91	<0.01 (1,109)	.952		
		CG	65	4.23	0.82				
		total	111	4.19	0.85				
QCPR	%correct depth	TG	41	70.54	33.92	0.09 (1,100)	.769		
		CG	61	61.69	33.48				
		total	102	65.25	33.77				
QCPR	%correct freq.	TG	41	41.20	32.68	0.76 (1,100)	.384	12.010 (6,49661)	.072
		CG	61	36.80	29.95				
		total	102	38.57	31.00				
QCPR	%corr. de-comp.	TG	41	96.61	7.15	0.15 (1,100)	.699		
		CG	61	97.38	11.21				
		total	102	97.07	9.75				

N = sample size; M = mean; SD = standard deviation; F = F-value; p = p-value; M = M value; df = degrees of freedom; QCM = Questionnaire Of Current Motivation (German version: Fragebogen zur Erfassung der aktuellen Motivation (FAM). SET-BLS = Self-Efficacy Theory for Basic Life Support scale; SE = self-efficacy; OE = outcome expectations. s-FCI = short scale: Features of constructivist instruction (German version: Kurzsкала zur Messung gemäßigt konstruktivistischer Prozessmerkmale [Kurz-PgK]). CLI = Cognitive Load Inventory (modified).

^a p ≤ .050

^b p ≤ .001

Table S3-2: MANOVA-output: multivariate tests and post hoc ANOVA.

	Subscale	Multivariate test ^a					Post hoc ANOVA ^a			
		<i>F</i>	<i>df</i>	<i>p</i>	η^2_p	<i>Wilks</i> λ	<i>F</i>	<i>df</i>	<i>p</i>	η^2_p
QCM	Interest						0.00	1,114	.984	<.001
QCM	Prob. of suc- cess	1.63	4,111	.171	.056	.944	0.07	1,114	.796	.001
QCM	Anxiety						4.25	1,114	.042	.036
QCM	Prob. of suc- cess						1.67	1,114	.199	.014
SET- BLS	SE-psycholog- ical						2,26	1,113	.136	.020
SET- BLS	SE – social	3.070	4,110	.019	.100	.900	2.08	1,113	.152	.018
SET- BLS	OE – positive						1.92	1,113	.169	.017
SET- BLS	OE - negative						8.97	1,113	.003	.074
s-FCI	Constructivist						0.45	1,109	.502	.004
s-FCI	Self-deter- mined						0.05	1,109	.825	<.001
s-FCI	Active	1.58	6,104	.160	.084	.916	5.57	1,109	.020	.049
s-FCI	Situated						0.60	1,109	.441	.005
s-FCI	Emotional						0.58	1,109	.450	.005
s-FCI	Social						0.79	1,109	.375	.007
CLI	Intrinsic load						0.002	1,109	.964	.000
CLI	Extraneous load	0.85	3,107	.469	.023	.024	0.928	1,109	.338	.008
CLI	Germane load						0.342	1,109	.560	.003
QCPR	%correct depth						1.695	1,100	.196	.017
QCPR	%correct freq.	0.67	3,98	.572	.020	.980	0.486	1,100	.486	.002
QCPR	%corr. de- comp.						0.151	1,100	.699	.005

F = F-value; p = p-value; M = M value; df = degrees of freedom; QCM = Questionnaire Of Current Motivation (German version: Fragebogen zur Erfassung der aktuellen Motivation (FAM). SET-BLS = Self-Efficacy Theory for Basic Life Support scale; SE = self-efficacy; OE = outcome expectations. S-FCI = short scale: Features of constructivist instruction (German version: Kurzskala zur Messung gemäßigt konstruktivistischer Prozessmerkmale [Kurz-PgK]). CLI = Cognitive Load Inventory (modified).

^a p ≤ .050

Supplementary material 4

to:

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Mixed ANOVA-Output

survey data output

last modified: 2023-05-31

Table S4-1: mixed-ANOVA-output: Descriptive results and tests of homogeneity.

Inventory	Subscale	Group	N	M		SD		Levene test (median) ^a F(df); p		Box test ^b
				t ₀	t ₁	t ₀	t ₁	t ₀	t ₁	M(df); p
QCM	Interest	TG	48	3.63	3.95	0.95	0.77	0.63	3.46	8.57
		CG	68	3.85	3.95	0.89	0.91	(1,114); .431	(1,114) .065	(3,763383); .038
QCM	Prob. of success	TG	48	2.65	2.90	0.53	0.44	0.47	1.23	5.11
		CG	68	2.75	2.92	0.52	0.58	(1,114); .494	(1,114); .270	(3,763383); .171
QCM	Anxiety	TG	48	1.55	1.09	1.17	0.87	2.78	5.94	11.78
		CG	68	1.84	1.50	1.39	1.15	(1,114); .098	(1,114) .016	(3,763383); .009
QCM	Challenge	TG	48	4.15	3.98	0.96	0.96	0.10	0.34	3.09
		CG	68	4.09	4.19	0.90	0.80	(1,114); .688	(1,114) .561	(3,763383); .388
SET-BLS	SE – psychological	TG	48	3.29	3.68	1.12	0.97	<0.01	0.241	0.98
		CG	67	3.31	3.40	1.07	1.03	(1,113); .946	(1,113); .625	(3,845880); .812
SET-BLS	SE – social	TG	48	3.55	4.21	1.37	1.09	4.09	1.01	8.20
		CG	67	3.86	3.94	1.10	1.12	(1,113); .046	(1,113); .318	(3,845881); .045
SET-BLS	OE – positive	TG	48	3.96	4.16	0.76	0.85	3.34	1.96	15.90
		CG	66	3.92	4.34	0.55	0.60	(1,112); .070	(1,112); .276	(3,947983) .001
SET-BLS	OE - negative	TG	48	2.64	2.07	0.86	0.76	<0.01	4.16	9.62
		CG	66	2.58	2.54	0.83	0.94	(1,112); .963	(1,112); .044	(3,947983); .024
QCPR	%correct depth	TG	41	87.6 1	96.6 1	33.0 6	7.15	6.78	0.09	12.93
		CG	61	79.7 4	97.3 8	39.8 6	11.2 1	(1,100); .205	(1,100); .769	(3,412155); .005
QCPR	%correct freq.	TG	41	6.93	41.2 0	15.5 7	32.6 8	0.48	0.76	4.24
		CG	61	9.56	36.8 0	20.6 7	29.9 5	(1,100); .490	(1,100); .384	(3,412155); .247
QCPR	%corr. decomp.	TG	41	4.05	70.5 4	15.8 5	33.9 2	1.093	0.15	10.87
		CG	61	10.1 0	61.6 9	27.3 9	33.4 8	(1,100); .298	(1,100); 0.699	(3,412155) .014

N = sample size; M = mean; SD = standard deviation; t_x time of assessment; F = F-value; p = p-value; M = M value; df = degrees of freedom; QCM = Questionnaire Of Current Motivation (German version: Fragebogen zur Erfassung der aktuellen Motivation (FAM). SET-BLS = Self-Efficacy Theory for Basic Life Support scale; SE = self-efficacy; OE = outcome expectations.

^a α-level: p ≤ .050

^b α-level: p ≤ .001

Table S4-2: mixed-ANOVA-output: Main and interaction effects.

Inventory		Within-subject analysis ^a				
	Subscale	effect ^b	<i>F</i>	<i>df</i>	<i>p</i>	η^2_p
QCM	Interest	time	6.80	1,114	.010	.056
		time*group	1.87	1,114	.175	.020
QCM	Prob. of success	time	12.56	1,114	.001	.099
		time*group	0.34	1,114	.558	.003
QCM	Anxiety	time	14.05	1,114	<.001	.110
		time*group	0.26	1,114	.609	.002
QCM	challenge	time	0.12	1,114	.735	.001
		time*group	2.30	1,114	.132	.020
SET-BLS	SE-psychological	time	6.15	1,113	.015	.052
		time*group	2.33	1,113	.130	.020
SET-BLS	SE – social	time	9.79	1,113	.002	.080
		time*group	5.89	1,113	.017	.050
SET-BLS	OE – positive	time	13.00	1,113	<.001	.104
		time*group	1.71	1,113	.194	.015
SET-BLS	OE - negative	time	9.43	1,113	.003	.078
		time*group	3.94	1,113	.008	.062
QCPR	%correct depth	time	231.98	1,100	<.001	.699
		time*group	3.69	1,100	.057	.036
QCPR	%correct freq.	time	56.46	1,100	<.001	.361
		time*group	0.74	1,100	.393	.007
QCPR	%corr. decomp.	time	11.46	1,100	.001	.103
		time*group	1.21	1,100	.275	.012

F = F-value; p = p-value; df = degrees of freedom; η^2_p Partial squared Eta, effect size (small $\geq .01$; medium $\geq .06 \geq .14$; cf. Cohen 1988; Ellis, 2010); QCM = Questionnaire Of Current Motivation (German version: Fragebogen zur Erfassung der aktuellen Motivation (FAM)). SET-BLS = Self-Efficacy Theory for Basic Life Support scale; SE = self-efficacy; OE = outcome expectations.

^a α -level: $p \leq .050$

^b Mauchly-Test was not applied because the within-subject factor time only has to categories. Sphericity was assumed.

References

- Cohen, J. (1988). Statistical power analysis for the behavioral sciences. Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Ellis, P. D. (2010). The essential guide to effect sizes: Statistical power meta-analysis and the interpretation of research results. Cambridge [u.a.]: Cambridge Univ. Press.