Supplementary

		nline			ontrol			Std. Mean Difference	Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% Cl	IV, Random, 95% Cl
1.4.1 knowledge									
Aleman 2011	6.57	0.69	15	6.52	0.96	26	3.5%	0.06 [-0.58, 0.69]	+
Alnabelsi 2015	89.6	14.07	25	86.4	15.47	25	3.6%	0.21 [-0.34, 0.77]	+
Bhatti 2011	19.13	3.476	75	18.23	4.159	73	3.9%	0.23 [-0.09, 0.56]	t t
Bjaenr 2013	94.3	6.734	21	93.3	6.253	21	3.6%	0.15 [-0.45, 0.76]	+
BOWDISH 2003	79.08	12.68	56	78.51	9.44	56	3.8%	0.05 [-0.32, 0.42]	+
Chao 2012	12.7	4.4	111	11.2	4.5	56	3.9%	0.34 [0.01, 0.66]	
Clement 2012	2.9	1.1	41	2.8	0.9	33	3.7%	0.10 [-0.36, 0.56]	+
DENNIS 2003	88.47647	4.42133	17	87.01176	5.345078	17	3.5%	0.29 [-0.38, 0.97]	+
Farahman 2016	12.5	1.98	60	12.6	1.94	60	3.8%	-0.05 [-0.41, 0.31]	+
Hu 2016	14.2	2.8	49	13.9	3.4	51	3.8%	0.10 [-0.30, 0.49]	+
Moazami 2014	22.45	4.41	15	19.25	5.11	20	3.4%	0.65 [-0.04, 1.34]	+
Morente 2013	15.83	2.52	30	11.6	2.39	43	3.6%	1.71 [1.17, 2.26]	+
Nicklen 2017	9	0.5	19	10	0.75	19	3.4%	-1.54 [-2.27, -0.80]	+
Peine 2016	17.23	2.21	61	14.37	2.76	55	3.8%	1.14 [0.75, 1.54]	-
Phadtare 2009	75.3	14.21	24	47.27	14.64	24	3.4%	1.91 [1.22, 2.60]	+
Porter 2014	40.7	4.5	71	40.7	4.8	69	3.9%	0.00 [-0.33, 0.33]	+
Portero 2013	24.4	6.2	71	21.2	5.4	43	3.8%	0.54 [0.15, 0.92]	-
Pusponegoro 2015	16.95	3.178	39	16.88	2.575	36	3.7%	0.02 [-0.43, 0.48]	+
RAUPACH 2009	31.9	7.2	72	31.7	7.5	71	3.9%	0.03 [-0.30, 0.35]	+
Solomon 2004	4.88	2	17	4.42	1.08	12	3.4%	0.27 [-0.48, 1.01]	+
Subramanian 2012	86.7	2	15	61.7	2	15	0.8%	12.16 [8.78, 15.54]	
Taradi 2005	25.81	0.66	37	22.08	0.67	84	3.3%	5.56 [4.75, 6.37]	-
Yeung 2012	42.7	10.5	43	22.00	11.6	35	3.8%	0.15 [-0.29, 0.60]	1
Subtotal (95% CI)	42.7	10.5	984	41	11.0	944	81.3%	0.63 [0.26, 1.00]	•
Heterogeneity: Tau ² =	0.72 Chiz-	214 60 4		0 ~ 0 00001	1.15 - 0.200	344	01.570	0.05 [0.20, 1.00]	·
Test for overall effect:			1-22(- ~ 0.00001),1 = 55%				
restion overall ellect.	Z = 3.30 (F -	- 0.0010)							
1.4.2 skills									
Assadi 2003	20.24	0.83	41	18.05	1.86	40	3.7%	1.51 [1.02, 2.01]	+
Brettle 2013	1.7714	2.2372	35	2.2286	1.98651	35	3.7%	-0.21 [-0.68, 0.26]	+
Chittenden 2013	2.9	1.1	41	2.8	0.9	33	3.7%	0.10 [-0.36, 0.56]	+
Farahman 2016	16.5	1.96	60	12.3	2.22	60	3.8%	1.99 [1.55, 2.43]	-
Kaltman 2018	4	1.55	60	3.23	1.86	39	3.8%	0.46 [0.05, 0.86]	+
Subtotal (95% CI)	-		237	5.20		207	18.7%	0.77 [-0.05, 1.59]	◆
Heterogeneity: Tau ² =	0.82: Chi ² =	65.60, df		0.0000111	² = 94%			,,	
Test for overall effect:									
Total (95% CI)			1221			1151	100.0%	0.66 [0.32, 0.99]	•
Heterogeneity: Tau ² =	0.74 Chi ² =	393 13 d		P < 0 00001): 17 = 93%				
Test for overall effect:			21 (/1. = 00.0				-10 -5 0 5 10
				P = 0.76), I ² =	212324				Favours (experimental) Favours (control)

Figure S1 Subgroup analysis on study outcome of online vs. offline education on knowledge and skills acquisitions at the post-test levels.

$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			nline			e-to-face			Std. Mean Difference	Std. Mean Difference
$\begin{array}{c} \mbox{leman} 2011 & 6.57 & 0.68 & 15 & 6.52 & 0.68 & 26 & 3.6\% & 0.06 [+ 0.34 & 0.69] \\ \mbox{linabels} 2015 & 86 & 14.07 & 25 & 86 & 15.47 & 25 & 3.8\% & 0.21 [+ 0.34 & 0.76] \\ \mbox{linabels} 2013 & 19.13 & 3.476 & 75 & 18.23 & 4.159 & 73 & 4.0\% & 0.23 [+ 0.34 & 0.76] \\ \mbox{linabels} 2013 & 19.43 & 6.734 & 21 & 9.33 & 6.253 & 21 & 3.7\% & 0.15 [+ 0.45 & 0.76] \\ \mbox{linabels} 2013 & 1.7714 & 2.2372 & 35 & 2.2266 & 1.98651 & 35 & 3.9\% & -0.21 [+ 0.86 & 0.26] \\ \mbox{letted} 2013 & 1.7714 & 2.2372 & 35 & 2.2266 & 1.98651 & 35 & 3.9\% & -0.21 [+ 0.86 & 0.26] \\ \mbox{letted} 2013 & 1.7714 & 2.2372 & 35 & 2.2266 & 1.98651 & 35 & 3.9\% & -0.21 [+ 0.86 & 0.26] \\ \mbox{letted} 2013 & 1.7714 & 2.2372 & 35 & 2.2266 & 1.98651 & 35 & 3.9\% & 0.29 [+ 0.84 & 0.06] \\ \mbox{letted} 2013 & 1.7714 & 2.2372 & 35 & 2.2266 & 1.98651 & 35 & 3.9\% & 0.29 [+ 0.84 & 0.06] \\ \mbox{letted} 2013 & 1.277 & 4.4 & 111 & 11.2 & 8 & 0.9 & 33 & 3.9\% & 0.40 [0.10 [+ 3.06 & 0.66] \\ \mbox{lettem} 2013 & 2.9 & 1.1 & 41 & 2.8 & 0.9 & 3.3 & 3.9\% & 0.46 [0.05 & 0.86] \\ \mbox{lettem} 2013 & 14.2 & 2.8 & 49 & 13.9 & 3.4 & 51 & 4.0\% & 0.16 [+ 3.06 & 0.06] \\ \mbox{lettem} 2016 & 14.2 & 2.8 & 49 & 13.9 & 3.4 & 51 & 4.0\% & 0.01 [+ 3.0 & 0.48] \\ \mbox{lettem} 2017 & 9 & 0.5 & 19 & 10 & 0.75 & 19 & 3.9\% & 0.46 [0.05 & 0.86] \\ \mbox{lettem} 2016 & 17.23 & 2.21 & 61 & 14.37 & 2.76 & 55 & 4.0\% & 1.14 [1.075 & 1.54] \\ \mbox{lettem} 2017 & 9 & 5.7 & 12 & 47.27 & 14.64 & 24 & 3.5\% & 1.91 [1.22 & 2.60] \\ \mbox{matrans} 2016 & 17.23 & 2.21 & 61 & 14.37 & 2.76 & 55 & 4.0\% & 0.00 [+ 0.33 & 0.33] \\ \mbox{matrans} 2016 & 17.23 & 2.21 & 61 & 14.27 & 2.86 \\ \mbox{lettem} 2013 & 2.44 & 6.2 & 71 & 4.24 & 1.08 & 12 & 3.5\% & 0.05 [0.41 & 0.33] \\ \mbox{lettem} 2012 & 4.77 & 10.5 & 4.3 & 41 & 11.6 & 53 & 3.9\% & 0.05 [0.34 & 0.03 & 0.33] \\ \mbox{lettem} 2012 & 4.72 & 10.5 & 51.11 & 20 & 3.8\% & 0.56 [1.06 & 3.03] \\ \mbox{lettem} 2012 & 2.24 & 4.24 & 12.8 & 1.56 & 1.96 & 3.168 & 3.76 & 3.9\% & 0.02 [0.41 & 0.34 & 0.07 & 6.61 \\ \mbox{lettem} 2013 & 2.024 &$	Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% Cl	IV, Random, 95% Cl
$\begin{aligned} \text{in abelis 2015} & \text{99.6} 14.07 25 86.4 15.47 25 3.98 \\ \text{shaft 2011} & 19.13 3.476 75 18.23 4.159 73 4.0\% 0.23 \mid 0.09 0.56 \\ \text{shaft 2013} & 94.3 6.734 21 93.3 6.233 21 3.7\% 0.15 \mid 0.45 0.76 \\ \text{solution 21} 9.08 12.68 56 78.51 9.44 56 4.0\% 0.05 \mid 0.23 0.24 \\ \text{solution 21} 1.771 4.2372 23 22.28 1.98651 3.3\% 0.23 \mid 0.08 0.05 0.32 0.42 \\ \text{predite 2013} 1.771 4.2372 23 2.23 0.42 \\ \text{predite 2013} 1.77 4.4 111 112 4.5 56 4.0\% 0.34 \mid 0.01 0.66 \\ \text{predite 2013} 2.58 1.19 71 3.9 0.99 59 4.0\% 0.29 \mid 0.38 0.56 \\ \text{predite 2013} 2.58 1.19 71 3.9 0.99 59 4.0\% 0.29 \mid 0.38 0.66 \\ \text{predite 2013} 3.8\% 0.10 \mid 0.30 0.49 \\ \text{predite 2013} 5.8 5.19 71 87.01176 5.345078 17 3.6\% 0.29 \mid 0.38 0.56 \\ \text{predite 2013} 5.8 5.2 2.30 11.6 2.39 4.3 3.8\% 1.01 \mid 0.30 0.49 \\ \text{predite 2013} 5.8 5.2 0.53 1.18 7.7 8.0\% 0.29 \mid 0.38 0.56 \\ \text{predite 2013} 5.8 2.52 0.116 0.37 1.43 0.35 0.36 0.36 \\ \text{predite 2013} 5.8 2.57 30 11.6 2.39 4.3 3.8\% 1.71 \mid 1.17, 2.26 \\ \text{predite 2016} 1.42 2.8 4.9 1.3.9 3.4 51 4.0\% 0.00 \mid 0.30 0.36 \\ \text{predite 2017} 9 0.5 19 10 0.75 19 3.5\% 1.54 \mid 4.77 8.09 4.0\% 0.05 \mid 0.30 0.36 \\ \text{predite 2013} 2.44 6.2 71 2.12 5.4 4.3 4.0\% 0.05 \mid 0.30 0.36 \\ \text{predite 2013} 2.44 6.2 71 2.12 5.4 4.3 4.0\% 0.35 \mid 0.30 0.36 \\ \text{predite 2013} 2.44 6.2 71 2.15 6.17 2 15 0.3\% 1.51 \mid 1.02 2.01 \\ \text{predite 2013} 2.44 6.2 71 4.0\% 0.38 \mid 0.36 \mid 0.07 0.61 \\ \text{predite 203} 3.44 11.6 3.5 3.3\% 0.27 \mid 0.43 0.03 0.36 \\ 0.36 \mid 0.07 0.61 \\ \text{predite 203} 2.44 6.2 71 2.17 7.5 71 4.0\% 0.38 \mid 0.27 \mid 0.43 0.43 0.46 0.25 0.24 0.43 0.46 0.25 0.24 0.43 0.46 0.25 0.24 0.43 0.46 0.25 0.24 0.43 0.46 0.25 0.24 0.43 0.46 0.25 0.24 0.4$	1.3.1 Developed									
hatti 2011 1913 3.476 75 19.23 4.159 73 4.0% 0.23 [0.06] giaen 2013 94.3 6.734 21 93.3 6.253 21 3.7% 0.15 [0.45,0.76] Sylaen 2013 1.7714 2.2372 35 2.2286 1.98651 35 3.9% 0.21 [0.45,0.76] Sylaen 2012 1.2.7 4.4 111 11.2 4.5 56 4.0% 0.05 [0.32,0.42] rettle 2013 1.7714 2.2372 35 2.2286 1.98651 35 3.9% 0.21 [0.68,0.26] The 2012 1.2.7 4.4 111 11.2 4.5 56 4.0% 0.34 [0.01,0.66] The 2013 2.9 1.1 41 2.8 0.9 33 3.9% 0.10 [0.28,0.56] Sylaen 2012 3.58 1.19 71 3.9 0.99 59 4.0% -0.29 [0.64,0.06] The 2013 1.4.2 2.8 4.9 13.9 3.4 51 4.0% 0.10 [0.03,0.49] Sylam 2018 4.155 50 3.2.2 1.86 39 3.9% 0.46 [0.05,0.86] Adman 2018 4.155 50 3.2.2 1.86 39 3.9% 0.46 [0.05,0.86] Adman 2018 14.2 2.8 4.9 13.9 3.4 51 4.0% 0.10 [0.03,0.49] Sylam 2018 14.2 5.2 3.0 11.6 2.39 43 3.8% 1.71 [1.7,2.26] The 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 [0.75,1.54] Pacter 2013 15.83 2.52 3.0 11.6 2.39 43 3.8% 1.51 [1.02,2.01] Pacter 2014 4.0.7 4.5 71 4.0.7 4.8 69 4.0% 0.00 [0.33,0.33] Pacter 2014 4.0.7 4.5 71 4.0.7 4.8 69 4.0% 0.03 [0.30,0.36] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [0.48, 1.01] Subtroat [05% C1) 999 877 81.4% 0.34 [0.07, 0.61] Heterogeneity. Tat" = 0.35, 0.1t ² = 1.52, 3.1t ² = 0.6 9 < 0.00001); P = 87% Test for overall effect Z = 3.44 (P = 0.01) L3.2 Developing Test and 2012 12.2.4 4.9 < 0.00001; P = 87% Test for overall effect Z = 2.44 (P = 0.00001); P = 98% Test for overall effect Z = 1.94 (P = 0.05) Total (95% C1) 192 2.2.0 0.67 84 3.4% 1.51 [1.00, 2.01] Test and 2005 2.58.1 0.66 37 2.2.08 0.67 84 3.4% 5.56 [4.75,6.37] Tubtotal (95% C1) 192 2.2.0 0.0001; P = 98% Test for overall effect Z = 1.94 (P = 0.0001) Test and 2005 2.58.1 0.68 37 2.2.08 0.67 84 3.4% 5.56 [4.75,6.37] Tubtotal (95% C1) 192 192 2.24 0.24 (P = 0.0001); P = 98% Test for overall effect Z = 1.94 (P = 0.005) Tubtotal (95% C1) 192 106 7 2.06 9 < 0.00001); P = 98% Test for overall effect Z = 1.94 (P = 0.0001) Test for overall effect Z = 1.94 (P = 0.0001) Test for overall effect Z = 0.44 (P = 0.00001); P = 98% Test for overall eff	Aleman 2011	6.57	0.69	15	6.52	0.96	26	3.6%	0.06 [-0.58, 0.69]	+
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	Alnabelsi 2015	89.6	14.07	25	86.4	15.47	25	3.8%	0.21 [-0.34, 0.77]	
$ \begin{array}{c} \text{jow 0018} 2003 & 79.08 & 12.88 & 56 & 78.51 & 9.44 & 56 & 4.0\% & 0.05 0.32, 0.42] \\ \text{jorettle 2013} & 1.7714 & 2.2372 & 35 & 2.286 & 1.98651 & 35 & 3.9\% & -0.21 0.68, 0.26] \\ \text{joha 2012} & 1.2.7 & 4.4 & 111 & 11.2 & 4.5 & 56 & 4.0\% & 0.34 0.01, 0.66] \\ \text{joherent 2013} & 2.9 & 1.1 & 41 & 2.8 & 0.9 & 33 & 3.9\% & 0.10 0.38, 0.56] \\ \text{jorement 2013} & 3.8 & 1.19 & 71 & 3.9 & 0.99 & 94 & 4.0\% & 0.29 0.64, 0.06] \\ \text{jement 2013} & 88.47647 & 4.42133 & 17 & 87.01176 & 5.345078 & 17 & 3.6\% & 0.29 0.64, 0.06] \\ \text{jement 2013} & 14.2 & 2.8 & 49 & 13.9 & 3.4 & 51 & 4.0\% & 0.10 0.30, 0.49] \\ \text{juants 2018} & 4 & 1.55 & 60 & 3.23 & 1.86 & 33 & 3.8\% & 1.71 1.71, 2.26] \\ \text{jorement 2013} & 15.83 & 2.52 & 30 & 11.6 & 2.39 & 43 & 3.8\% & 1.54 2.27, 0.80] \\ \text{leiken 2016} & 17.23 & 2.21 & 61 & 14.37 & 2.76 & 55 & 4.0\% & 1.14 0.75, 1.54] \\ \text{leiken 2016} & 17.23 & 2.21 & 61 & 14.37 & 2.76 & 55 & 4.0\% & 1.14 0.75, 1.54] \\ \text{readtare 2009} & 75.3 & 14.21 & 24 & 47.27 & 14.64 & 24 & 3.5\% & 1.91 1.22, 2.60] \\ \text{roter 2014} & 40.7 & 4.5 & 71 & 40.7 & 4.8 & 69 & 4.0\% & 0.03 0.30, 0.35] \\ \text{soursmanian 2012} & 2.4 & 72 & 71 & 51.7 & 2 & 15 & 0.3\% & 0.27 0.48, 1.01] \\ \text{soursmanian 2012} & 42.7 & 10.5 & 43 & 41 & 11.6 & 55 & 3.9\% & 0.21 6.8, 78, 15.54] \\ \text{reung 2012} & 42.7 & 10.5 & 43 & 41 & 11.6 & 55 & 3.9\% & 0.02 0.43, 0.48] \\ \text{readtion 2004} & 4.88 & 2 & 17 & 4.42 & 1.08 & 12 & 3.6\% & 0.05 0.041, 0.31] \\ \text{dozaminan 2012} & 42.7 & 10.5 & 43 & 41 & 11.6 & 55 & 3.9\% & 0.02 0.43, 0.48] \\ \text{restor overall effect Z = 3.44 \ (P = 0.0001); P = 97\% \\ \text{restor overall effect Z = 2.44 \ (P = 0.0000) \\ \text{readia (95\% CI)} & 192 & 2.40 & 18.6\% & 1.51 1.00.1, 3.03] \\ \text{readia (2005} & 2.5.81 & 0.66 & 37 & 22.08 & 0.57 & 84 & 3.4\% & 5.56 4.75, 6.37] \\ \text{rainting 2015} & 1.5.4 \ (P = 0.005) \\ \text{readia (95\% CI)} & 192 & 2.40 & 18.6\% & 1.51 1.00.1, 3.03] \\ \text{readia (95\% CI)} & 192 & 2.40 & 18.6\% & 1.51 1.00.1, 3.03] \\ restor overall effect Z = 3.44 \ (P = 0.00001); P = 93\% \\ \text{restor overa$	Bhatti 2011	19.13	3.476	75	18.23	4.159	73	4.0%	0.23 [-0.09, 0.56]	+-
$ \frac{1}{2} \operatorname{rettle} 2013 1.7714 2.2372 35 2.2286 1.98651 35 3.9\% -0.21 \left(0.66 \right) 0.26 \right) \\ \frac{1}{2} \operatorname{restle} 2013 1.7714 2.2372 35 2.2286 1.98651 35 3.9\% 0.01 \left(0.36 \right) 0.066 \right) \\ \frac{1}{2} \operatorname{restle} 2013 2.27 4.4 111 11.2 4.5 56 4.0\% 0.04 \left(0.01 \right) 0.066 \right) \\ \frac{1}{2} \operatorname{restle} 2013 2.9 1.1 41 2.8 0.9 959 4.0\% 0.22 \left(0.64 \right) 0.06 \right) \\ \frac{1}{2} \operatorname{restle} 2013 88.47647 4.4213 17 870.176 5.345078 17 3.6\% 0.22 \left(0.38 \right) 0.049 \right) \\ \frac{1}{2} \operatorname{restle} 2016 14.2 2.8 49 13.9 3.4 51 4.0\% 0.10 \left(0.30 , 0.49 \right) \\ \operatorname{restle} 2016 14.2 2.8 49 13.9 3.4 51 4.0\% 0.10 \left(0.30 , 0.49 \right) \\ \operatorname{restle} 2018 4 1.55 60 3.23 1.86 39 3.9\% 0.14 \left(10.5, 1.54 \right) \\ \operatorname{restle} 2016 17.23 2.21 61 14.37 2.76 55 4.0\% 1.14 \left(10.75 , 1.54 \right) \\ \operatorname{restle} 2016 17.23 2.21 61 14.37 2.76 55 4.0\% 1.24 \left(1.27, 0.60 \right) \\ \operatorname{restle} 2016 17.23 2.21 61 14.37 2.76 55 4.0\% 0.00 \left(0.33 , 0.33 \right) \\ \operatorname{restle} 2016 17.23 2.21 61 14.37 2.76 55 4.0\% 0.00 \left(0.33 , 0.33 \right) \\ \operatorname{restle} 2016 17.23 2.21 61 14.37 2.76 55 4.0\% 0.00 \left(0.37 , 0.35 \right) \\ \operatorname{restle} 2016 17.23 2.21 61 14.37 2.76 55 4.0\% 0.01 \left(0.37 , 0.35 \right) \\ \operatorname{restle} 2016 17.23 2.21 61 14.37 2.76 55 4.0\% 0.00 \left(0.33 , 0.35 \right) \\ \operatorname{restle} 2016 17.23 2.21 61 14.37 2.76 55 4.0\% 0.00 \left(0.37 , 0.35 \right) \\ \operatorname{restle} 2017 2.44 62 71 2.17 5.7 71 4.0\% 0.036 \left(0.36 \right) 0.35 \left(0.36 \right) 0.35 \left(0.37 0.35 \right) \\ \operatorname{restle} 2012 4.2.7 10.5 4.3 4.11 11.6 35 3.9\% 0.37 \left(0.34 \left(0.07 , 0.61 \right) \right) \\ \operatorname{restle} 2012 2.24 4.88 2.57 5.11 20 3.6\% 0.55 \left(0.27 , 0.43 \right) 4.01 2.5 2.44 (P = 0.01) \\ \operatorname{restle} 2012 2.24 18.6\% 1.51 \left[.0.21 , 0.43 \right] \\ \operatorname{restle} 205 2.581 0.66 37 2.208 0.67 84 3.4\% 5.56 \left[0.25 , 0.91 \right] \\ \operatorname{restle} 4.7 2 0 2 4 4.4 (P < 0.00001); P = 93\% \\ \operatorname{restle} 4.4 $	Bjaenr 2013	94.3	6.734	21	93.3	6.253	21	3.7%	0.15 [-0.45, 0.76]	+
The 2012 12.7 4.4 111 11.2 4.5 56 4.0% 0.34 $[0.01, 0.66]$ Shittender 2013 2.9 1.1 41 2.8 0.9 33 3.9% 0.10 $[0.36, 0.56]$ Shittender 2013 2.9 1.1 41 2.8 0.9 33 3.9% 0.010 $[0.36, 0.56]$ Shittender 2012 3.56 1.19 71 3.9 0.99 59 4.0% $-0.29 [0.36, 0.67]$ Val 2016 1.4.2 2.8 49 13.9 3.4 51 4.0% 0.010 $[0.30, 0.49]$ Gatman 2018 4 1.55 60 3.23 1.86 39 3.9% 0.410 $[0.56, 0.66]$ Morente 2013 15.83 2.52 30 11.6 2.39 43 3.8% 1.71 $[1.17, 2.26]$ Val 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 $[0.55, 1.54]$ Pentagravity 12 4 47.72 14.64 24 3.5% 1.91 $[1.22, 2.60]$ Petre 2013 2.4.4 6.2 71 21.2 5.4 43 4.0% 0.00 $[0.33, 0.33]$ Poter 2013 2.4.4 6.2 71 21.2 5.4 43 4.0% 0.00 $[0.33, 0.33]$ Poter 2013 2.4.4 6.2 71 21.2 5.4 43 4.0% 0.00 $[0.33, 0.36]$ Poter 2013 2.4.4 6.2 71 21.2 5.4 43 4.0% 0.03 $[1.30, 0.35]$ Subtranalized 12 4.2.7 15 61.7 2 15 0.6% 12.16 $[1.5, 2.4]$ Putagravity 13 4.1 11.6 35 3.9% 0.15 $[0.29, 0.60]$ By 12 $[0.27, 0.48]$ 1.01 By 12 $[0.2, 2.01]$ The end 2012 4.2.7 10.5 43 41 11.6 35 3.9% 0.15 $[0.29, 0.60]$ By 12 $[0.2, 2.4]$ $[0.5, 3.17, 39 1.68, 2.57.5 36 3.39\%$ 0.15 $[0.29, 0.60]$ By 12 $[0.2, 1.3, 0.4]$ Vagone goro 2015 16.85 3.17.8 9 10 $[2.6, 1.94]$ 60 4.0% $-0.05 [-0.41, 0.31]$ Start and 2016 12.2 5.1.9 60 12.6 1.94 60 4.0% $-0.05 [-0.41, 0.31]$ Heterogenetic, Tau ² = 0.35, Ch ² = 163.03, df = 21 (P < 0.00001); P = 97\% Test for overall effect $Z = 2.44$ (P = 0.01) 3.2 Developing Test for overall effect $Z = 3.2$ Ch ² = 173.46, df = 4 (P < 0.00001); P = 93\% Test for overall effect $Z = 1.94$ (P = 0.005) Total (95% C1) 192 2.208 0.67 84 3.4% 5.56 [4.75, 6.37] Taut 2005 2.581 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Taut 2005 2.581 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Taut 2005 2.581 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Taut 2005 2.581 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Taut 2005 2.581 0.66 7 2.2000001); P = 93\% Test for overall effect $Z = 3.44$ (P = 0.005) Total (95% C1) 192 2.20 2.40 18.6% 1.51 [-0.01, 3.03] Feasure Experimental Exp	BOWDISH 2003	79.08	12.68	56	78.51	9.44	56	4.0%	0.05 [-0.32, 0.42]	+
Chiltenden 2013 2.9 1.1 41 2.8 0.9 33 3.9% 0.10 $[0.36, 0.56]$ Chement 2012 3.58 1.19 71 3.9 0.99 59 4.0% -0.29 $[0.38, 0.37]$ Leven 2013 88.47647 4.4213 17 87.01176 5.345078 17 3.6% 0.29 $[0.38, 0.37]$ tu 2016 14.2 2.8 49 13.9 3.4 51 4.0% 0.01 $[0.30, 0.49]$ du 2016 14.2 2.8 49 13.9 3.4 51 4.0% 0.46 $[0.05, 0.86]$ forente 2013 15.83 2.52 30 11.6 2.39 43 3.8% 1.71 $[1.17, 2.26]$ tucklen 2017 9 0.5 19 10 0.75 19 3.5% -1.54 $[2.27, -0.80]$ there 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 $[0.75, 1.54]$ there 2016 17.23 2.21 61 14.37 2.76 55 4.0% 0.00 $[0.33, 0.33]$ there 2016 17.23 2.21 61 14.37 2.76 55 4.0% 0.00 $[0.33, 0.33]$ there 2016 17.23 2.21 61 14.37 2.76 55 4.0% 0.00 $[0.33, 0.33]$ there 2016 17.2 2.2 15 11.2 5.4 43 4.0% 0.54 $[0.15, 0.92]$ there 2016 17.2 7.2 31.7 7.5 71 4.0% 0.03 $[0.30, 0.35]$ there 2013 2.4.4 6.2 71 2.1 5.4 43 4.0% 0.54 $[0.15, 0.92]$ AUAUPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03 $[0.30, 0.35]$ Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 1.51 $[1.02, 2.01]$ Subtramanian 2012 86.7 2 15 61.7 2 15 0.8% 12.16 $[8.78, 15.54]$ there geneity: Tau" = 0.35; Chi" = 183.03; df = 21 (P < 0.00001); P = 87% Test for overall effect: Z = 2.44 (P = 0.01) 3.3.2 Developing testerogeneity: Tau" = 0.35; Chi" = 173.46, df = 4 (P < 0.00001); P = 87% Test for overall effect: Z = 1.94 (P = 0.00001); P = 98% Test for overall effect: Z = 1.94 (P = 0.0001); P = 98% Test for overall effect: Z = 1.94 (P = 0.00001); P = 98% Test for overall effect: Z = 1.94 (P = 0.00001); P = 98% Test for overall effect: Z = 1.94 (P = 0.00001); P = 98% Test for overall effect: Z = 1.94 (P = 0.00001); P = 98% Test for overall effect: Z = 3.44 (P = 0.00001); P = 98% Test for overall effect: Z = 3.44 (P = 0.00001); P = 98% Test for overall effect: Z = 3.44 (P = 0.00001); P = 98%	Brettle 2013	1.7714	2.2372	35	2.2286	1.98651	35	3.9%	-0.21 [-0.68, 0.26]	-+
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Chao 2012	12.7	4.4	111	11.2	4.5	56	4.0%	0.34 [0.01, 0.66]	-
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Chittenden 2013	2.9	1.1	41	2.8	0.9	33	3.9%	0.10 [-0.36, 0.56]	+
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Clement 2012	3.58	1.19	71	3.9	0.99	59	4.0%	-0.29 [-0.64, 0.06]	
$ \begin{array}{c} \text{Caltman } 2018 & 4 & 1.55 & 60 & 3.23 & 1.86 & 39 & 3.9\% & 0.46 [0.05, 0.86] \\ \text{Aorente } 2013 & 15.83 & 2.52 & 30 & 11.6 & 2.39 & 43 & 3.8\% & 1.71 [1.17, 2.26] \\ \text{Peine } 2016 & 17.23 & 2.21 & 61 & 14.37 & 2.76 & 55 & 4.0\% & 1.14 [0.75, 1.54] \\ \text{Phadtare } 2009 & 75.3 & 14.21 & 24 & 47.27 & 14.64 & 24 & 3.5\% & 1.91 [1.22, 2.60] \\ \text{Phadtare } 2009 & 75.3 & 14.21 & 24 & 47.27 & 14.64 & 24 & 3.5\% & 0.054 [0.15, 0.92] \\ \text{Phadtare } 2013 & 24.4 & 6.2 & 71 & 21.2 & 5.4 & 43 & 4.0\% & 0.054 [0.15, 0.92] \\ \text{Porter } 2014 & 40.7 & 4.5 & 71 & 40.7 & 4.8 & 69 & 4.0\% & 0.00 [-0.33, 0.35] \\ \text{Porter } 2013 & 24.4 & 6.2 & 71 & 21.2 & 5.4 & 43 & 4.0\% & 0.54 [0.15, 0.92] \\ \text{AUPACH } 2009 & 31.9 & 7.2 & 72 & 31.7 & 7.5 & 71 & 4.0\% & 0.03 [-0.30, 0.35] \\ \text{Subtramanian } 2012 & 86.7 & 2 & 15 & 61.7 & 2 & 15 & 0.8\% & 12.16 [8.78, 15.54] \\ \text{reung } 2012 & 42.7 & 10.5 & 43 & 41 & 11.6 & 35 & 3.9\% & 0.15 [-0.29, 0.60] \\ \text{Muthotal } (95\% C1) & 999 & 877 & 81.4\% & 0.34 [0.07, 0.61] \\ \text{Heterogeneity: Tau" = 0.35; Chi" = 163.03, df = 21 (P < 0.00001); P = 87\% \\ \text{rest for overall effect } Z = 2.44 (P = 0.01) \\ \textbf{I.3.2 Developing} \\ \text{sesail } 2005 & 25.81 & 0.66 & 37 & 22.08 & 0.67 & 84 & 3.4\% & 5.56 [4.75, 6.37] \\ \text{Muthotal } (95\% C1) & 192 & 240 & 18.6\% & 1.51 [1.001, 3.03] \\ \text{Heterogeneity: Tau" = 2.93; Chi" = 173.46, df = 4 (P < 0.00001); P = 93\% \\ \text{rest for overall effect } Z = 1.94 (P = 0.05) \\ \text{rest for overall effect } Z = 1.94 (P = 0.05) \\ \text{rest for overall effect } Z = 1.94 (P = 0.05) \\ \text{rest for overall effect } Z = 3.44 (P = 0.0006) \\ \end{array}$	DENNIS 2003	88.47647	4.42133	17	87.01176	5.345078	17	3.6%	0.29 [-0.38, 0.97]	+
Average 2013 15.83 2.52 30 11.6 2.39 43 3.8% 1.71 [1.17, 2.26] vicklen 2017 9 0.5 19 10 0.75 19 3.5% -1.54 [-2.7, 0.80] Peline 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 [0.75, 1.54] Phadtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] Proter 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00 [-0.33, 0.33] Proter 2013 24.4 6.2 71 21.2 54 43 4.0% 0.54 [0.15, 0.92] AUPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03 [-0.30, 0.35] Solornon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [-0.48, 1.01] Subtranaina 2012 86.7 2 15 61.7 2 15 0.8% 0.27 [-0.48, 1.01] Subtranaina 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 [-0.29, 0.60] Subtral (95% CI) 999 999 877 81.4% 0.34 [0.07, 0.61] Heterogeneity: Tau ² = 0.35; Ch ² = 163.03; df = 21 (P < 0.00001); P = 87% Test for overall effect Z = 2.44 (P = 0.01) 1.3.2 Developing Valuetarial 2015 15.85 3.178 39 16.88 2.575 36 3.9% 0.02 [-0.43, 0.48] Taradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Subtrate lefter 2 = 2.93; Ch ² = 173.46, df = 4 (P < 0.00001); P = 98% Test for overall effect Z = 1.94 (P = 0.05) 1.117 100.0% 0.58 [0.25, 0.91] Heterogeneity: Tau ² = 2.93; Ch ² = 173.46, df = 4 (P < 0.00001); P = 98% Test for overall effect Z = 1.94 (P = 0.05) 1.119 1.117 100.0% 0.58 [0.25, 0.91] 1.117 100.0% 0.58 [0.25, 0.91] 1.119 1.117 100.0% 0.58 [0.25, 0.91] 1.119 1.117 100.0% 0.58 [0.25, 0.91] 1.119 1.117 100.0% 1.19 1.117	Hu 2016	14.2	2.8	49	13.9	3.4	51	4.0%	0.10 [-0.30, 0.49]	+
Nicklen 2017 9 0.5 19 10 0.75 19 3.5% -1.54 [$\frac{1}{2}$, 27, 0.80] Peine 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 [0,75, 1.54] Protatare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] Porter 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00 [-0.33, 0.33] Porter 2013 24.4 6.2 71 21.2 5.4 43 4.0% 0.03 [-0.30, 0.35] Solormon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [-0.48, 1.01] Subtramanian 2012 86.7 2 15 61.7 2 15 0.8% 1.51 [0.02, 0.60] Subtramanian 2012 42.7 10.5 43 41 1.805 1.86 40 3.8% 1.51 [0.07, 0.61] Heterogeneiky: Tau ² = 0.35; Chi ² = 163.03; df = 21 (P < 0.00001); P = 87% 78.4% 0.34 [0.07, 0.61] 4.34% 0.55 [6.04, 1.34] Vaspanigrong 2015 16.95<	Kaltman 2018	4	1.55	60	3.23	1.86	39	3.9%	0.46 [0.05, 0.86]	
Perine 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 [0.75, 1.54] Phadtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] Porter 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00 [0.33, 0.33] Porter 2013 24.4 6.2 71 21.2 5.4 43 4.0% 0.54 [0.15, 0.92] AUPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03 [0.30, 0.35] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [0.48, 1.01] Subtramaina 2012 86.7 2 15 61.7 2 15 0.8% 12.16 [8.78, 15.54] (reung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 [0.29, 0.60] Subtrant generity: Tau ² = 0.35; Ch ² = 163.03, df = 21 (P < 0.00001); P = 87% rest for overall effect: Z = 2.44 (P = 0.01) L3.2 Developing vssadi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] arahman 2016 12.5 1.98 60 12.6 1.94 60 4.0% -0.05 [0.41, 0.31] doazami 2014 22.45 4.41 15 19.25 5.11 20 3.8% 0.65 [0.04, 1.34] Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [0.43, 0.48] aradi 2005 25.81 0.66 37 22.08 0.67 64 3.4% 5.56 [4.75, 6.37] Subtotal (95% Cl) 192 240 18.6% 1.51 [1.001, 3.03] Heterogeneity: Tau ² = 2.93; Ch ² = 173.46, df = 4 (P < 0.00001); P = 93% Test for overall effect: Z = 3.44 (P = 0.0005) Total (95% Cl) 192 240 18.6% 1.51 [-0.01, 3.03] Heterogeneity: Tau ² = 2.67; Ch ² = 354.22, df = 26 (P < 0.00001); P = 93% Test for overall effect: Z = 3.44 (P = 0.0005) Total (95% Cl) 192 240 18.6% 1.51 [-0.01, 3.03] Heterogeneity: Tau ² = 2.93; Ch ² = 173.46, df = 4 (P < 0.00001); P = 93% Test for overall effect: Z = 3.44 (P = 0.0005) Total (95% Cl) 192 44 (P = 0.0005) Total (95% Cl) 192 44 (P = 0.0005) Total (95% Cl) 192 44 (P = 0.00005) Total (95% Cl) 192 44 (P = 0.00005)	Morente 2013	15.83	2.52	30	11.6	2.39	43	3.8%	1.71 [1.17, 2.26]	
Phadtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] order 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00 [-0.33, 0.33] ordero 2013 24.4 6.2 71 21.2 5.4 43 4.0% 0.03 [-0.30, 0.35] AUPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03 [-0.30, 0.35] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [-0.48, 1.01] Subaranaina 2012 86.7 2 15 61.7 2 15 0.8% 12.16 [8.78, 15.54] (supcarding first arg = 0.35; Ch ² = 163.03, df = 21 (P < 0.00001); P = 87% rest for overall effect: Z = 2.44 (P = 0.01) Subtotal (95% Cl) 999 877 81.4% 0.34 [0.07, 0.61] Faradi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] Grazd 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [0.44, 1.34] Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [-0.43, 0.48] Faradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [0.76, 6.37] Subtotal (95% Cl) 192 240 18.6% 1.51 [-0.01, 3.03] Heterogeneity: Tau ² = 2.83; Ch ² = 173.46, df = 4 (P < 0.00001); P = 93% Test for overall effect: Z = 3.44 (P = 0.005) Total (95% Cl) 192 240 18.6% 1.51 [-0.01, 3.03] Heterogeneity: Tau ² = 2.67; Ch ² = 354.22, df = 26 (P < 0.00001); P = 93% Test for overall effect: Z = 3.44 (P = 0.0005) Total (95% Cl) 192 240 18.6% 1.51 [-0.01, 3.03] Heterogeneity: Tau ² = 2.67; Ch ² = 354.22, df = 26 (P < 0.00001); P = 93% Test for overall effect: Z = 3.44 (P = 0.0005) Total (95% Cl) 192 240 18.6% 1.51 [-0.01, 3.03] Heterogeneity: Tau ² = 2.67; Ch ² = 354.22, df = 26 (P < 0.00001); P = 93% Test for overall effect: Z = 3.44 (P = 0.0005) Total (95% Cl) 192 240 18.6% 1.51 [-0.01, 3.03] Test for overall effect: Z = 3.44 (P = 0.0005)	Nicklen 2017	9	0.5	19	10	0.75	19	3.5%	-1.54 [-2.27, -0.80]	(
Porter 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00 $[0.33, 0.33]$ Porter 2013 24.4 6.2 71 21.2 5.4 43 4.0% 0.54 $[0.15, 0.92]$ AUUPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03 $[0.30, 0.35]$ Solormon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 $[0.48, 1.01]$ Subtramanian 2012 86.7 2 15 61.7 2 15 0.8% 12.16 $[8.78, 15.54]$ reung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 $[0.29, 0.60]$ Subtotal (95% CI) 999 877 81.4% 0.34 $[0.07, 0.61]$ Heterogeneity: Tau ² = 0.35; Chi ² = 163.03, df = 21 (P < 0.00001); P = 87% Test for overall effect: Z = 2.44 (P = 0.01) Acazami 2014 22.45 4.41 15 19.25 5.11 20 3.6% 0.65 $[0.04, 1.34]$ Pusponegoro 2015 16.85 3.178 33 16.88 2.575 36 3.3% 0.02 $[-0.43, 0.48]$ Faradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 $[4.75, 6.37]$ Subtotal (95% CI) 192 240 18.6% 1.51 $[1.00, 1, 3.03]$ Heterogeneity: Tau ² = 2.93; Chi ² = 173.46, df = 4 (P < 0.00001); P = 93% Test for overall effect: Z = 1.94 (P = 0.005) Fortal (95% CI) 191 1117 100.0% 0.58 $[0.25, 0.91]$ Heterogeneity: Tau ² = 2.93; Chi ² = 173.46, df = 4 (P < 0.00001); P = 93% Test for overall effect: Z = 3.44 (P = 0.0006) Fortal (95% CI) 2 0.00001; P = 93%	Peine 2016	17.23	2.21	61	14.37	2.76	55	4.0%	1.14 [0.75, 1.54]	-
Portero 2013 24.4 6.2 71 21.2 5.4 43 4.0% 0.54 [0.15 [0.92] AUPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03 [0.30] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [0.48, 1.01] Subtramaina 2012 86.7 2 15 61.7 2 15 0.8% 12.16 [8.78, 15.54] (eung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 [0.29, 0.60] Subtrat (95% CI) 999 877 81.4% 0.34 [0.07, 0.61] Heterogeneity. Tau ² = 0.35; Chi ² = 163.03, df = 21 (P < 0.00001); P = 87% Test for overall effect: Z = 2.44 (P = 0.01) 	Phadtare 2009	75.3	14.21	24	47.27	14.64	24	3.5%	1.91 [1.22, 2.60]	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Porter 2014	40.7	4.5	71	40.7	4.8	69	4.0%		+
Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [0.48] 1.01] Subtramanian 2012 86.7 2 15 61.7 2 15 0.8% 12.16 [8.78, 15.54] (support 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 [0.29, 0.60] Subtotal (95% CI) 999 877 81.4% 0.34 [0.07, 0.61] Heterogeneity: Tau ² = 0.35; Chi ² = 163.03, df = 21 (P < 0.00001); P = 87% Test for overall effect: Z = 2.44 (P = 0.01) 3.3.2 Developing Kasadi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] (arathma 2016 12.5 1.98 60 12.6 1.94 60 4.0% -0.05 [-0.41, 0.31] Acazami 2014 22.45 4.41 15 19.25 5.11 20 3.6% 0.65 [-0.04, 1.34] (usponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [-0.43, 0.48] Subtotal (95% CI) 192 240 18.6% 1.51 [-0.01, 3.03] Heterogeneity: Tau ² = 2.93; Chi ² = 173.46, df = 4 (P < 0.00001); P = 93% Test for overall effect: Z = 3.44 (P = 0.0006) Favours [control]	Portero 2013	24.4	6.2	71	21.2	5.4	43	4.0%	0.54 [0.15, 0.92]	
Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [0.48] 1.01] Subtramanian 2012 86.7 2 15 61.7 2 15 0.8% 12.16 [8.78, 15.54] (support 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 [0.29, 0.60] Subtotal (95% CI) 999 877 81.4% 0.34 [0.07, 0.61] Heterogeneity: Tau ² = 0.35; Chi ² = 163.03, df = 21 ($P < 0.00001$); $P = 87\%$ Test for overall effect: Z = 2.44 ($P = 0.01$) I.3.2 Developing (ssadi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] (arathma 2016 12.5 1.98 60 12.6 1.94 60 4.0% -0.05 [-0.41, 0.31] Acazami 2014 22.45 4.41 15 19.25 5.11 20 3.8% 0.65 [-0.04, 1.34] Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [-0.43, 0.48] Subtotal (95% CI) 192 240 18.6% 1.51 [-0.01, 3.03] Heterogeneity: Tau ² = 2.93; Chi ² = 173.46, df = 4 ($P < 0.00001$); $P = 93\%$ Test for overall effect: Z = 3.44 ($P = 0.0006$) Favours [control]	RAUPACH 2009	31.9		72	31.7		71	4.0%		+
Subtramanian 2012 86.7 2 15 61.7 2 15 0.8% 12.16 [$8.78, 15.54$] feung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 [-0.29, 0.60] Subtotal (95% CI) 999 877 81.4% 0.34 [0.07, 0.61] teterogeneity: Tau ² = 0.35; Chi ² = 163.03, df = 21 (P < 0.00001); I ² = 87% Test for overall effect: Z = 2.44 (P = 0.01) 1.3.2 Developing Kssadi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] arahman 2016 12.5 1.98 60 12.6 1.94 60 4.0% -0.05 [0.41, 0.31] Aoazami 2014 22.45 4.41 15 19.25 5.11 20 3.6% 0.65 [0.04, 1.34] Usponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [-0.43, 0.48] Taradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Subtotal (95% CI) 192 240 18.6% 1.51 [-0.01, 3.03] Heterogeneity: Tau ² = 2.93; Chi ² = 173.46, df = 4 (P < 0.00001); I ² = 93% Test for overall effect: Z = 3.44 (P = 0.0006) Feature feeter 2 = 3.44 (P = 0.0006)	Solomon 2004		2	17		1.08	12	3.5%		-
feung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 [-0.29, 0.60] Subtotal (95% CI) 999 877 81.4% 0.34 [0.07, 0.61] teterogeneity. Tau ² = 0.5; Ch ² = 163.03, df = 21 (P < 0.00001); P = 87% Test for overall effect: Z = 2.44 (P = 0.01) I.3.2 Developing sesadi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] arahman 2016 12.5 1.98 60 12.6 1.94 60 4.0% -0.05 [-0.41, 0.31] doazami 2014 22.45 4.41 15 19.25 5.11 20 3.8% 0.65 [-0.04, 1.34] Ursponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [-0.43, 0.48] Taradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Subtotal (95% CI) 192 240 18.6% 1.51 [-0.01, 3.03] Heterogeneity. Tau ² = 2.93; Ch ² = 173.46, df = 4 (P < 0.00001); P = 98% Test for overall effect: Z = 1.94 (P = 0.05) Fotal (95% CI) 191 1117 100.0% 0.58 [0.25, 0.91] Heterogeneity. Tau ² = 0.67; Ch ² = 354.22, df = 26 (P < 0.00001); P = 93% Test for overall effect: Z = 3.44 (P = 0.0006) Favours [control]	Subramanian 2012			15						
Subtotal (95% CI) 9999 877 81.4% 0.34 [0.07, 0.61] Heterogeneity: Tau ² = 0.35; Chi ² = 163.03, df = 21 (P < 0.00001); I ² = 87% Test for overall effect: Z = 2.44 (P = 0.01) I.3.2 Developing Versadi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] arathma 2016 12.5 1.98 60 12.6 1.94 60 4.0% -0.05 [-0.41, 0.31] Acazami 2014 22.45 4.41 15 19.25 5.11 20 3.6% 0.65 [-0.04, 1.34] Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [-0.43, 0.48] aratal 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Subtotal (95% CI) 192 240 18.6% 1.51 [-0.01, 3.03] Heterogeneity: Tau ² = 2.93; Chi ² = 173.46, df = 4 (P < 0.00001); I ² = 93% Test for overall effect: Z = 1.94 (P = 0.05) For all (95% CI) 191 1117 100.0% 0.58 [0.25, 0.91] Heterogeneity: Tau ² = 0.67; Chi ² = 354.22, df = 26 (P < 0.00001); I ² = 93% Test for overall effect: Z = 3.44 (P = 0.0006) Favours [control]	Yeung 2012	42.7	10.5	43	41	11.6	35	3.9%		+
$\begin{array}{c} \text{Heterogeneity: } Tau^2 = 0.35; \ \text{Ch}^2 = 163.03, \ \text{df} = 21 \ (P < 0.00001); \ P = 87\% \\ \text{fest for overall effect: } Z = 2.44 \ (P = 0.01) \\ \hline \textbf{i.3.2 Developing} \\ \text{sssadi } 2003 & 20.24 & 0.83 & 41 & 18.05 & 1.86 & 40 & 3.8\% & 1.51 \ [1.02, 2.01] \\ \text{arahman } 2016 & 12.5 & 1.98 & 60 & 12.6 & 1.94 & 60 & 4.0\% & -0.05 \ [-0.41, 0.31] \\ \text{Aoazami } 2014 & 22.45 & 4.41 & 15 & 19.25 & 5.11 & 20 & 3.6\% & 0.65 \ [-0.41, 0.31] \\ \text{avagone goro } 2015 & 16.95 & 3.178 & 39 & 16.88 & 2.575 & 36 & 3.9\% & 0.02 \ [-0.43, 0.48] \\ \text{aradi } 2005 & 25.81 & 0.66 & 37 & 22.08 & 0.67 & 84 & 3.4\% & 5.56 \ [4.75, 6.37] \\ \text{subtotal } (95\% \ \text{Cl}) & 192 & 240 & 18.6\% & 1.51 \ [-0.01, 3.03] \\ \text{Heterogeneity: } Tau^2 = 2.93; \ \text{Ch}^2 = 173.46, \ \text{df} = 4 \ (P < 0.00001); \ P = 98\% \\ \text{fest for overall effect: } Z = 1.94 \ (P = 0.05) \\ \hline \text{fotal } (95\% \ \text{Cl}) & 1191 & 1117 & 100.0\% & 0.58 \ [0.25, 0.91] \\ \text{Heterogeneity: } Tau^2 = 0.67; \ \text{Ch}^2 = 354.22, \ \text{df} = 26 \ (P < 0.00001); \ P = 93\% \\ \hline \text{fest for overall effect: } Z = 3.44 \ (P = 0.0006) \\ \hline \end{array}$	Subtotal (95% CI)			999			877	81.4%		◆
Test for overall effect: $Z = 2.44$ (P = 0.01) 1.3.2 Developing 1.3.2 Developing 1.3.2 Developing 1.3.3 Developing 1.3.4 1.3.5 1.86 40 3.8% 1.51 [1.02, 2.01] 1.3.6 1.2.5 1.98 60 12.6 1.94 60 4.0% -0.05 [0.41, 0.31] 1.3.7 1.00 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [0.43, 0.48] 1.3.7 2005 2.5.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] 1.3.86% 1.51 [-0.01, 3.03] 1.3.7 1.00 0, 1.5 1.7 1.00 0, 1.5 1.00 1, 3.03] 1.3.7 1.00 0, 1.5 1.00 1, 3.03 1.3.7 1.00 0, 1.5 1.00 1, 3.03 1.5.7 1.00 1, 3	Heterogeneity: Tau ² =	= 0.35; Chi ² =	163.03, d	f= 21 (P < 0.00001	1); I ² = 87%				
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$										
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1.3.2 Developing									
Avazami 2014 22.45 4.41 15 19.25 5.11 20 3.6% $0.65 [-0.04, 1.34]$ Uusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% $0.02 [-0.43, 0.48]$ aradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Subtotal (95% CI) 192 240 18.6% 1.51 [-0.01, 3.03] Heterogeneity: Tau ² = 2.93; Chi ² = 173.46, df = 4 (P < 0.00001); I ² = 98% Test for overall effect: Z = 1.94 (P = 0.05) Total (95% CI) 191 1117 100.0% 0.58 [0.25, 0.91] Heterogeneity: Tau ² = 0.67; Chi ² = 354.22, df = 26 (P < 0.00001); I ² = 93% Test for overall effect: Z = 3.44 (P = 0.0006) Favours [control]	Assadi 2003	20.24	0.83	41	18.05	1.86	40	3.8%	1.51 [1.02, 2.01]	
Avazami 2014 22.45 4.41 15 19.25 5.11 20 3.6% $0.65 [-0.04, 1.34]$ Uusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% $0.02 [-0.43, 0.48]$ aradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Subtotal (95% CI) 192 240 18.6% 1.51 [-0.01, 3.03] Heterogeneity: Tau ² = 2.93; Chi ² = 173.46, df = 4 (P < 0.00001); I ² = 98% Test for overall effect: Z = 1.94 (P = 0.05) Total (95% CI) 191 1117 100.0% 0.58 [0.25, 0.91] Heterogeneity: Tau ² = 0.67; Chi ² = 354.22, df = 26 (P < 0.00001); I ² = 93% Test for overall effect: Z = 3.44 (P = 0.0006) Favours [control]	arahman 2016				12.6		60			+
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	doazami 2014			15						⊢ ⊷
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Pusponegoro 2015				16.88					+
Subtotal (95% CI) 192 240 18.6% 1.51 [-0.01, 3.03] teterogeneity: Tau ² = 2.93; Chi ² = 173.46, df = 4 (P < 0.00001); I ² = 98% rest for overall effect: Z = 1.94 (P = 0.05) rotal (95% CI) 1191 1117 100.0% 0.58 [0.25, 0.91] teterogeneity: Tau ² = 0.67; Chi ² = 354.22, df = 26 (P < 0.00001); I ² = 93% rest for overall effect: Z = 3.44 (P = 0.0006) Favours [control II]	Faradi 2005									
Heterogeneity: Tau ² = 2.93; Chi ² = 173.46, df = 4 (P < 0.00001); l ² = 98% Fest for overall effect: Z = 1.94 (P = 0.05) Total (95% Cl) 1191 1117 100.0% 0.58 [0.25, 0.91] -4 -2 -2 -4 -2 -2 -4 -2 -4 -2 -4 -2 -4 -2 -4 -2 -4 -2 -4 -2	Subtotal (95% CI)									
Total (95% CI) 1191 1117 100.0% 0.58 [0.25, 0.91] Heterogeneity: Tau ² = 0.67; Chi ² = 354.22, df = 26 (P < 0.00001); l ² = 93% -4 -2 0 2 4 Test for overall effect: Z = 3.44 (P = 0.0006) Favours [control] -4 -2 0 2 4				f= 4 (P	< 0.00001)	; I² = 98%				
Heterogeneity: Tau ² = 0.67; Chi ² = 354.22, df = 26 (P < 0.00001); l ² = 93%	l est for overall effect	:∠=1.94 (P÷	= 0.05)							
Test for overall effect: Z = 3.44 (P = 0.0006)4 - 2 U Z 4 Eavy time tail Eavy entremental Eavy une for the former tail Eavy une former tail Eavy une former tail Eavy the fo	Total (95% CI)						1117	100.0%	0.58 [0.25, 0.91]	
				f= 26 (P < 0.00001	1); I² = 93%				-4 -2 0 2 4
										Favours (experimental) Favours (control)

Figure S2 Subgroup analysis on country of online vs. offline education on knowledge and skills acquisitions at the post-test levels.

12.1 Medical students Anabelei 2015 96.6 14.07 25 86.4 15.47 25 3.8% 0.21 [-0.34, 0.77] Assadi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] Bhatt 2011 1.91.3 3.476 75 18.23 4.159 73 4.0% 0.23 [+0.08, 0.56] Chao 2012 1.2.7 4.4 111 11.2 4.5 56 4.0% 0.34 [0.01, 0.36, 0.56] Chittender 2013 2.9 1.1 41 2.8 0.9 3.3 3.9% 0.10 [-0.36, 0.56] DENNIS 2003 88.47647 4.42133 17 87.45078 0.29 [-0.31, 0.97] 1.44 1.41 2.8 1.49 1.3.9 3.4 51 4.0% 0.05 [0.41, 0.31]			nline			e-to-face			Std. Mean Difference	Std. Mean Difference
Anabels 2015 88,6 14,07 25 88,4 15,47 25 3,8% 0,21 (0,24,077) sead: 2003 20,24 0,83 41 18,05 186 40 3,8% 15,11 (0,2,01) Bhatt 2011 18,13 3,476 75 18,23 4,159 73 4,0% 0,23 (0,00,056) BOWDISH 2003 79,08 12,68 56 78,51 9,44 56 4,0% 0,34 (0,01,0,66) DOWDISH 2003 79,08 12,68 56 78,51 9,44 56 4,0% 0,34 (0,01,0,66) DOWDISH 2003 88,4764 4,4213 11 11,2,8 0,9 33 3,3% 0,10 (1,0,8,0,66) DOWDISH 2003 88,4764 4,4213 17 87,01176 5,345078 17 36% 0,22 (1,0,31) Farahman 2016 12,5 1,98 60 12,6 1,94 60 4,0% -0.05 (0,41,0,31) Hu 2016 14,2 2,8 49 13,9 3,4 51 4,0% 0,04 (0,0,0,66) Mozarmi 2014 22,45 4,41 15 19,25 5,11 20 3,6% 0,665 (0,04,1,34) Nicklen 2017 9 0,5 19 10 0,75 19 3,5% -1.54 (-2,7,-080) Peniee 2016 17,23 2,21 61 14,37 2,76 55 4,0% 1,14 (0,75,1,54) Porten 2016 17,23 2,21 61 14,37 2,76 55 4,0% 1,14 (0,75,1,54) Porten 2016 17,23 2,21 61 14,37 2,76 55 4,0% 0,34 (0,0,3,0,36) BARUPACH 2009 31,9 7,2 72 31,7 7,5 71 4,0% 0,03 (0,03,0,36) Submanian 2012 66,7 2 15 61,7 2 15 0,8% 12,16 (5,6,1) Submanian 2012 68,7 2 15 61,7 2 15 0,8% 12,16 (8,6,16,56,1) Submanian 2012 86,7 2 15 61,7 2 15 0,8% 12,16 (8,7,6,54) Trand 2005 25,81 0,66 17 20,00 (1,7 e) 93% Test for overall effect Z = 3,10 (P = 0,002) 1.2.2 Nurse students Harden 2005 25,81 0,66 15 6,52 0,96 26 3,8% 0,06 (-0.58, 0.69) Biaent 2011 6,67 0,69 15 6,52 0,96 26 3,8% 0,06 (-0.58, 0.69) Biaent 2013 1,7714 2,237 2 3,223, df = 19 (P < 0,00001); P = 93% Test for overall effect Z = 3,10 (P = 0,002) 1.2.2 Nurse students Hat 19,0% 0,27 (-0.43, 0.68) District 2013 1,774 4,237 2 3,2 2,238 0,47 4,06 3,38% 0,27 (-0.43, 0.08) District 2013 1,771 4,237 2 3,2 3,38% 1,11 (1,7, 2,26) Test for overall effect Z = 0,76 (P = 0,45) 1.2.3 Ottes Phadtare 2009 75,3 14,21 24 47,27 14,64 24 3,5% 1,91 (1,22,5,60) Porter 2013 15,83 2,52 30 11,6 2,99 4,0% 0,00 (-0.33, 0.33] District 2013 1,774 2,4 47,27 14,64 24 3,5% 1,91 (1,22,5,60) Porter 2013 15,83 2,52 30 11,6 2,99 4,0% 0,00 (-0.33, 0.33] District 2013 1,774 2,4 47,27 14,64 24 3,5% 1,91 (1,22,5,60) Porter 2014 (95%	Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% Cl	IV, Random, 95% Cl
Assad 2003 2024 0.83 41 18.05 186 40 3.8% 1.51[1.02.201] BolWDISH 2003 79.08 12.68 56 78.51 9.44 56 4.0% 0.05[0.32,0.42] DOWDISH 2003 79.08 12.68 56 78.51 9.44 56 4.0% 0.05[0.32,0.42] Chao 2012 12.7 4.4 111 11.2 4.5 56 4.0% 0.05[0.32,0.42] Chao 2012 12.7 4.4 111 11.2 4.5 56 4.0% 0.05[0.32,0.42] Chao 2012 12.7 4.4 111 11.2 4.5 56 4.0% 0.05[0.41,0.31] Farlman 2016 12.5 1.98 60 12.6 1.94 60 4.0% 0.06[0.5,0.86] Hu 2016 14.2 2.8 49 13.9 3.4 51 4.0% 0.06[0.5,0.86] Mazama 2014 12.24 5 4.41 15 19.25 5.11 20 3.6% 0.65[0.04,1.34] Hu 2016 14.2 2.45 4.41 15 19.25 5.11 20 3.6% 0.65[0.04,1.34] Hu 2016 14.2 2.45 4.41 15 19.25 5.11 20 3.6% 0.65[0.41,1.34] Hu 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 [0.75, 154] Pelne 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 [0.75, 0.51] Pusponegoro 2015 15.69 3.178 39 16.88 2.575 36 3.9% 0.02[0.43,0.48] RAUPACH 2009 31.9 7.7 2 31.7 7.5 71 4.0% 0.03[0.30,35] Solormon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27[0.48,1.01] Subramaina 2012 86.7 2 15 61.7 2 15 0.8% 12.16 [0.28, 0.66] Subtotal (6% C) Heterogenety, Tau" = 0.74, Chi ^m = 288.80, di = 19 (P < 0.00001); P = 93% Test for overall effect Z = 3.10 (P = 0.002) 12.2 Nurse students Heterogenety, Tau" = 0.74, Chi ^m = 288.80, di = 19 (P < 0.00001); P = 93% Test for overall effect Z = 0.76 (P = 0.45) 12.3 Others Phathar 2009 7.53 14.21 24 4.7.27 14.64 24 3.5% 1.91 [1.22, 2.60] Phathar 2009 7.53 14.21 24 4.7.27 14.64 24 3.5% 1.91 [1.2, 2.60] Phathar 2009 7.53 14.21 24 4.7.27 14.64 24 3.5% 1.91 [1.2, 2.60] Phathar 2009 7.53 14.21 24 4.7.27 14.64 24 3.5% 1.91 [1.2, 2.60] Phathar 2009 7.53 14.21 24 4.7.27 14.64 24 3.5% 1.91 [1.2, 2.60] Phathar 2009 7.53 14.21 24 4.7.27 14.64 24 3.5% 1.91 [1.2, 2.60] Phathar 2009 7.53 14.21 24 4.7.27 14.64 24 3.5% 1.91 [1.2, 2.60] Phathar 2009 7.53 14.21 24 4.7.27 14.64 24 3.5% 1.91 [1.2, 2.60] Phathar 2009 7.53 14.21 24 4.7.27 14.64 24 3.5% 1.91 [1.2, 2.60] Phathar 2009 7.53 14.21 24 4.7.27 14.64 24 3.5% 1.91 [1.2, 2.60] Phathar 2009 7.53 14.21 24 4.7.27 14.64 24 3.5% 1.91 [1.2, 2.60]										
Bhaffi 2011 1913 3.476 75 18.23 4.159 73 4.0% 0.23 (0.06) 0.56) SolvOVIDEH 2003 79.08 12.68 56 78.51 9.44 56 4.0% 0.05 (0.32, 0.42) Chao 2012 1.27 4.4 111 11.2 4.5 56 4.0% 0.05 (0.32, 0.42) Chao 2012 1.27 4.4 111 11.2 4.5 56 4.0% 0.05 (0.32, 0.42) Chao 2013 2.9 1.1 41 2.8 0.9 33 3.9% 0.10 (0.36, 0.56) DENNIS 200 88.47647 4.42133 17 87.01176 5.345078 17 36% 0.29 (0.38, 0.57) Farahma 2016 1.2.5 1.98 60 12.6 1.94 60 4.0% -0.05 (0.41, 0.31] 4.12016 14.2 2.8 4.9 13.9 3.4 51 4.0% 0.10 (0.30, 0.49) Kalaran 2018 4. 1.55 60 3.23 1.86 39 3.9% 0.46 (0.05, 0.66) Wicken 2017 9 0.5 19 10 0.75 19 3.5% -1.54 (-2.7, 0.80) Peine 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 (0.75, 1.54) Pointer 2013 2.4.4 6.2 71 21.2 5.4 43 4.0% 0.54 (0.15, 0.82) Waspengeror 2015 16.95 3.178 39 16.88 2.575 36 3.3% 0.02 (0.43, 0.48) AQUPACH 2009 31, 9 7.2 72 31.7 7.5 71 4.0% 0.03 (0.30, 0.35) Solutoranian 2012 88.7 2 15 61.7 2 15 0.3% 2.216 (18, 78, 15.54) Paramazon 2014 4.88 2 17 4.42 1.08 12 3.5% 0.02 (0.43, 0.48) AQUPACH 2009 31, 9 7.2 72 31.7 7.5 71 4.0% 0.03 (0.30, 0.35) Solutoranian 2012 86.7 2 15 6.7 2 15 0.8% 12.16 [8.78, 15.54] Faradi 2005 25.81 0.06 37 22.08 0.67 84 3.4% 5.56 (4.75, 6.37] Change 2014 4.88 2 17 4.42 1.08 12 3.5% 0.27 (0.48, 0.48] AQUPACH 2009 31.9 7.2 73 52.2286 1.98651 35 3.9% 0.15 (F0.29, 0.60] Subtoral (95% Ct) 924 840 73.4% 0.64 [0.23, 1.04] Heterogeneity: Tau ²⁺ 0.74 (-Th ²⁺ 2.86.80, df = 19 (P < 0.00001); P = 93% Test or overall effect Z = 3.10 (P = 0.00001); P = 93% Test or overall effect Z = 0.76 (P = 0.45) 1.2.2 Nurse students Heterogeneity: Tau ²⁺ 0.53, (-Th ²⁺ 3.98, df = 4 (P < 0.00001); P = 93% Test or overall effect Z = 0.76 (P = 0.45) 1.2.3 Others Pradatar 2009 7.5.3 14.21 24 4.7.27 14.64 24 3.5% 1.91 [1.22, 2.60] Poter 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00 (-0.33, 0.33] 93 7.6% 0.93 [-0.94, 2.80] Heterogeneity: Tau ²⁺ 1.75; Chi ²⁺ 3.93, df = 1 (P < 0.00001); P = 93% Test or overall effect Z = 0.97 (P = 0.30) Heterogeneity: Tau ²⁺ 0.57; Chi ²⁺ 3.94, 2.4 10.7 4.8 6										
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Assadi 2003	20.24	0.83	41	18.05	1.86	40	3.8%	1.51 [1.02, 2.01]	
The 2012 12, 12, 7 4, 4 111 11, 12, 4, 5 56 4, 0% 0, 0.44 [0.01, 0.66] The mode 2013 2, 9 1, 1 41 2, 8 0, 9 33 39% 0, 101, 0.36, 0.97] Tarahma 2016 12, 5 1, 98 60 12, 6 1, 44 60 4, 0% -0.05 [0.41, 0.31] Tarahma 2016 14, 2 2, 8 49 13, 9 3, 4 51 4, 0% 0, 101, 0.30, 0.49] Tarahma 2018 4 1, 55 60 3, 23 1, 86 39 3, 9% 0, 46 [0.50, 0.68] Micklen 2017 9 0, 5 19 10 0, 75 19 3, 5% -1.54 [2, 7, 0.80] The 2016 17, 23 2, 21 61 14, 37 2, 76 55 4, 0% 1, 14 [0, 76, 1, 54] The 2016 17, 23 2, 21 61 14, 37 2, 76 55 4, 0% 0, 0.24 [0, 16, 0.92] Puspone 2015 16, 95 3, 178 39 16, 88 2, 575 36 3, 9% 0, 0.44 [0, 16, 0.92] Puspone 2015 16, 95 3, 178 39 16, 88 2, 575 36 3, 9% 0, 0.44 [0, 16, 0.92] Puspone 2015 16, 95 3, 178 39 16, 88 2, 575 36 3, 9% 0, 0.24 [0, 41, 0.01] Puspone 2015 16, 95 3, 178 39 16, 88 2, 575 36 3, 9% 0, 0.24 [0, 41, 0.01] Puspone 2015 16, 95 3, 178 39 16, 88 2, 575 36 3, 9% 0, 0.24 [0, 41, 0.01] Puspone 2015 16, 95 3, 178 39 16, 88 2, 575 36 3, 9% 0, 0.24 [0, 41, 0.01] Puspone 2015 16, 95 3, 178 39 16, 88 2, 575 36 3, 14, 0, 78 4, 3, 4% 5, 564 (7, 56, 37] Puspone 2016 2, 25, 81 0, 66 37 2, 208 0, 67 84 3, 34% 5, 5564 (7, 56, 37] Faradi 2005 2, 581 0, 66 37 2, 208 0, 67 84 3, 34% 5, 5564 (7, 56, 37] Fest for overall effect Z = 3, 10 (P = 0, 0002) L2.2 Nurse students Herma 2011 6, 57 0, 69 15 6, 52 0, 96 26 3, 6% 0, 06 [-0.58, 0.69] Jagenr 2013 9, 43, 6, 734 21 9, 33, 6, 253 21 3, 7% 0, 15 [-0.45, 0, 76] Teater 2013 1, 7714 2, 2372 35 2, 2286 1, 98651 35 3, 38% 1, 171 [1, 17, 2, 26] Subtotal (95% CI) 172 184 19, 0% 0, 027 [-0.43, 0.08] Heter ogeneity, Tau [*] = 0, 76, (Ch [*] = 38, 86, df = 4 (P < 0, 00001); P = 93% Fest for overall effect Z = 0, 76 (P = 0, 45) L2.3 Others Heter ogeneity, Tau [*] = 1, 75; Ch [*] = 23 82, df = 1 (P < 0, 00001); P = 90% Fest for overall effect Z = 0, 97 (P = 0, 33) Total (95% CI) 1191 1117 100.0% 0, 58 [0.25, 0.91] Heterogeneity, Tau [*] = 0, 57; Ch [*] = 354, 22, df = 26 (P < 0, 00001); P = 96%		19.13	3.476	75	18.23	4.159	73	4.0%	0.23 [-0.09, 0.56]	+-
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	30WDISH 2003	79.08	12.68	56	78.51	9.44	56	4.0%	0.05 [-0.32, 0.42]	+
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Chao 2012	12.7	4.4	111	11.2	4.5	56	4.0%	0.34 [0.01, 0.66]	-
Farahman 2016 12.5 1.98 60 12.6 1.94 60 4.0% -0.05 (0.41, 0.31) Hu 2016 14.2 2.8 49 13.9 3.4 51 4.0% 0.10 [0.30, 0.49] callman 2018 4 1.55 60 3.23 1.86 39 3.9% 0.46 [0.05, 0.86] Vicklen 2017 9 0.5 19 10 0.75 15 3.5% 0.05 [1.04, 1.34] Vicklen 2016 17.23 2.21 61 14.37 2.76 55 4.0% 0.14 [0.30, 0.49] Paipe 2016 17.23 2.1 61 14.37 2.76 55 4.0% 0.02 [0.43, 0.48] Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [0.43, 0.48] Solomon 2004 4.88 2 17 4.42 1.08 12.3 fb% 0.27 [-0.48, 0.01] Subtramanian 2012 86.7 2.20 0.67 43 4.0% 0.64 [0.23, 1.04] Heterogeneity: Tau" = 0.74; Chi" = 286.80, df = 19 (P < 0.000001); P = 93%	Chittenden 2013	2.9	1.1	41	2.8	0.9	33	3.9%	0.10 [-0.36, 0.56]	+
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	DENNIS 2003	88.47647	4.42133	17	87.01176	5.345078	17	3.6%	0.29 [-0.38, 0.97]	+
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	arahman 2016	12.5	1.98	60	12.6	1.94	60	4.0%	-0.05 [-0.41, 0.31]	+
$ \begin{array}{llllllllllllllllllllllllllllllllllll$	łu 2016	14.2	2.8	49	13.9	3.4	51	4.0%	0.10 [-0.30, 0.49]	+
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	<altman 2018<="" td=""><td>4</td><td>1.55</td><td>60</td><td>3.23</td><td>1.86</td><td>39</td><td>3.9%</td><td>0.46 [0.05, 0.86]</td><td></td></altman>	4	1.55	60	3.23	1.86	39	3.9%	0.46 [0.05, 0.86]	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Aoazami 2014	22.45	4.41	15	19.25	5.11	20	3.6%		
Peine 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 [0.75, 1.54] Portero 2013 24.4 6.2 71 21.2 5.4 43 4.0% 0.54 [0.15, 0.92] Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [-0.43, 0.48] RAUPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03 [-0.30, 0.35] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [-0.48, 1.01] Subtramaina 2012 86.7 2 15 61.7 2 15 0.8% 12.16 [8.78, 15.54] Faradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Geung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 [-0.29, 0.60] Subtrat (95% CI) 924 840 73.4% 0.64 [0.23, 1.04] Heterogeneity. Tau" = 0.74; ChiP = 286.80, df = 19 (P < 0.00001); P = 93% Fest for overall effect Z = 3.10 (P = 0.002) L2.2 Nurse students Weman 2011 6.57 0.69 15 6.52 0.96 26 3.6% 0.06 [-0.59, 0.69] Signet 2013 1.7714 2.2372 35 2.2286 1.98651 35 3.9% -0.21 [-0.68, 0.26] Diement 2013 1.583 2.52 30 11.6 2.39 43 3.8% 1.71 [1.77, 2.26] Subtotal (95% CI) 172 184 19.0% 0.27 [-0.43, 0.98] Heterogeneity. Tau" = 0.58; ChiP = 39.86, df = 4 (P < 0.00001); P = 90% Fest for overall effect Z = 0.76 (P = 0.45) L2.3 Others Phadtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] Phadtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 0.091 [-0.33, 0.33] Subtotal (95% CI) 95 93 7.6% 0.93 [-0.94, 2.80] Heterogeneity. Tau" = 0.57; ChiP = 33.82, df = 1 (P < 0.00001); P = 90% Fest for overall effect Z = 0.97 (P = 0.33) Fortal (95% CI) 191 1117 100.0% 0.58 [0.25, 0.91] Heterogeneity. Tau" = 0.67; ChiP = 354.22, df = 26 (P < 0.00001); P = 93%										<u> </u>
Portero 2013 24.4 6.2 71 21.2 5.4 43 4.0% 0.54 [0.15, 0.92] Pursponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [-0.43, 0.48] AUPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03 [0.30, 0.35] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [-0.48, 1.01] Subramanian 2012 86.7 2 15 61.7 2 15 0.8% [2.16 [8.78, 15.54] Faradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] (reung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 [-0.29, 0.60] Subtotal (95% CI) 924 840 73.4% 0.64 [0.23, 1.04] Heterogeneity: Tau" = 0.74; ChiP = 288.80, df = 19 (P < 0.00001); P = 93% Test for overall effect Z = 3.10 (P = 0.002) L2.2 Nurse students Verman 2011 6.57 0.69 15 6.52 0.96 26 3.6% 0.06 [-0.58, 0.69] Bijaen 2013 1.7714 2.2372 35 2.2286 1.98651 35 3.9% 0.02 [-0.45, 0.76] Trattle 2013 1.7714 2.2372 35 2.2286 1.98651 35 3.9% 0.02 [-0.64, 0.06] Jement 2013 1.5.83 2.52 30 11.6 2.39 4.3 3.8% 1.71 [1.72, 2.6] Subtotal (95% CI) 172 184 19.0% 0.27 [-0.43, 0.98] Heterogeneity: Tau" = 0.58; ChiP = 39.86, df = 4 (P < 0.00001); P = 90% Test for overall effect Z = 0.76 (P = 0.45) L2.3 Others Phadtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] Total (95% CI) 95 93 7.6% 0.93 [-0.94, 2.80] Heterogeneity: Tau" = 1.75; ChiP = 23.82, df = 1 (P < 0.00001); P = 90% Test for overall effect Z = 0.97 (P = 0.33) Total (95% CI) 191 1117 100.0% 0.58 [0.25, 0.91] Heterogeneity: Tau" = 0.67; ChiP = 354.22, df = 26 (P < 0.00001); P = 93%		-								-
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$										
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biolomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [-0.48, 1.01] ubramanian 2012 86.7 2 15 61.7 2 15 0.8% 12.16 [8.78, 15.54] aradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] eung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 [-0.29, 0.60] ubtotal (95% CI) 924 840 73.4% 0.64 [0.23, 1.04] leterogeneity: Tau ² = 0.74; Chi ² = 286.80, df = 19 ($P < 0.00001$); $P = 93\%$ est for overall effect Z = 3.10 ($P = 0.002$) 2.2 Nurse students Leman 2011 6.57 0.69 15 6.52 0.96 26 3.6% 0.06 [-0.58, 0.69] jaenr 2013 94.3 6.734 21 93.3 6.253 21 3.7% 0.15 [-0.45, 0.76] rettle 2013 1.7714 2.2372 35 2.2286 1.98651 35 3.9% -0.21 [-0.68, 0.26] Lorente 2013 15.83 2.52 30 11.6 2.39 43 3.8% 1.71 [1.17, 2.26] ubtotal (95% CI) 172 184 19.0% 0.27 [-0.43, 0.98] Leterogeneity: Tau ² = 0.58; Chi ² = 39.86, df = 4 ($P < 0.00001$); $P = 90\%$ est for overall effect Z = 0.76 ($P = 0.45$) 2.3 Others hadtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] order 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00 [-0.33, 0.33] ubtotal (95% CI) 194 1117 100.0% 0.58 [0.25, 0.91] teterogeneity: Tau2 = 0.67; Chi2 = 3362, df = 1 ($P < 0.00001$); $P = 96%est for overall effect Z = 0.97 (P = 0.33)total (95% CI)$ 1191 1117 100.0% 0.58 [0.25, 0.91]										+
Subramanian 2012 86.7 2 15 61.7 2 15 0.8% 12.16 [8.78, 15.54] aradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] eung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 [-0.29 , 0.60] Subtotal (95% CI) 924 840 73.4% 5.66 [-0.58 , 0.69] Jetterogeneity: Tau ² = 0.74; Chi ² = 286.80, df = 19 (P < 0.00001); I ² = 93% Test for overall effect: Z = 3.10 (P = 0.002) 1.2.2 Nurse students Heman 2011 6.57 0.69 15 6.52 0.96 26 3.6% 0.06 [-0.58 , 0.69] Jetterogeneity: Tau ² = 0.58; Chi ² = 39.86, df = 4 (P < 0.00001); I ² = 93% Torente 2013 1.7714 2.2372 35 2.2286 1.98651 35 3.9% -0.21 [-0.68 , 0.26] Jetterogeneity: Tau ² = 0.58; Chi ² = 39.86, df = 4 (P < 0.00001); I ² = 90% Test for overall effect: Z = 0.76 (P = 0.45) L.2.3 Others Porter 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00 [-0.33 , 0.33] Subtotal (95% CI) 95 93 7.6% 0.93 [-0.94 , 2.80] Test for overall effect: Z = 0.97 (P = 0.33) Total (95% CI) 1191 1117 100.0% 0.58 [0.25, 0.91] Test for overall effect: Z = 0.97; Chi ² = 354.22, df = 2 (P < 0.00001); I ² = 93% Total (95% CI) 1191 1117 100.0% 0.58 [0.25, 0.91]										_ _
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The story over all effect: $Z = 0.76$ (P = 0.45) 1.2.3 Others Phadtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] Porter 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00 [-0.33, 0.33] Subtotal (95% CI) 95 93 7.6% 0.93 [-0.94, 2.80] Heterogeneity: Tau ² = 1.75; Chi ² = 23.82, df = 1 (P < 0.00001); I ² = 96% Total (95% CI) 1191 1117 100.0% 0.58 [0.25, 0.91] Heterogeneity: Tau ² = 0.67; Chi ² = 354.22, df = 26 (P < 0.00001); I ² = 93%							184	19.0%	0.27 [-0.43, 0.98]	—
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Subtotal (95% CI) 95 93 7.6% 0.93 [-0.94, 2.80] Heterogeneity: Tau ² = 1.75; Chi ² = 23.82, df = 1 (P < 0.00001); I ² = 96% Fest for overall effect: Z = 0.97 (P = 0.33) Fotal (95% CI) 1191 1117 100.0% 0.58 [0.25, 0.91] Heterogeneity: Tau ² = 0.67; Chi ² = 354.22, df = 26 (P < 0.00001); I ² = 93%										→
Heterogeneity: Tau ² = 1.75; Chi ² = 23.82, df = 1 (P < 0.00001); l ² = 96% rest for overall effect: Z = 0.97 (P = 0.33) iotal (95% Cl) 1191 1117 100.0% 0.58 [0.25, 0.91] Heterogeneity: Tau ² = 0.67; Chi ² = 354.22, df = 26 (P < 0.00001); l ² = 93% 4		40.7	4.5		40.7	4.8				+
est for overall effect: Z = 0.97 (P = 0.33) otal (95% Cl) 1191 1117 100.0% 0.58 [0.25, 0.91] ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	Subtotal (95% CI)			95			93	7.6%	0.93 [-0.94, 2.80]	
teterogeneity: Tau ² = 0.67; Chi ² = 354.22, df = 26 (P < 0.00001); l ² = 93%				= 1 (P <	0.00001);1	² = 96%				
Heterogeneity: Tau ² = 0.67; Chi ² = 354.22, df = 26 (P < 0.00001); l ² = 93%	otal (95% CI)			1191			1117	100.0%	0.58 [0.25, 0.91]	•
		0.67 Chi ² =	354.22. d	f = 26 (1)	P < 0 00001): I ² = 93%				
est for overall effect: Z = 3.44 (P = 0.0006) Favours (face-to-fa	leterogeneity: Tau* =									

Figure S3 Subgroup analysis on participant of online vs. offline education on knowledge and skills acquisitions at the post-test levels.

ot		nline	T - 4 - 5		Control	T . 4. 5		Std. Mean Difference	Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	fotal	Weight	IV, Random, 95% Cl	IV, Random, 95% Cl
1.8.1 post-test only									
BOWDISH 2003	79.08	12.68	56	78.51	9.44	56	4.0%	0.05 [-0.32, 0.42]	Ť
Chittenden 2013	2.9	1.1	41	2.8	0.9	33	3.9%	0.10 [-0.36, 0.56]	Ť
Clement 2012	3.58	1.19	71	3.9	0.99	59	4.0%	-0.29 [-0.64, 0.06]	-
DENNIS 2003	88.47647	4.42133	17	87.01176	5.345078	17	3.6%	0.29 [-0.38, 0.97]	+-
Farahman 2016	12.5	1.98	60	12.6	1.94	60	4.0%	-0.05 [-0.41, 0.31]	+
Hu 2016	14.2	2.8	49	13.9	3.4	51	4.0%	0.10 [-0.30, 0.49]	+
Kaltman 2018	4	1.55	60	3.23	1.86	39	3.9%	0.46 [0.05, 0.86]	-
Moazami 2014	22.45	4.41	15	19.25	5.11	20	3.6%	0.65 [-0.04, 1.34]	
Nicklen 2017	9	0.5	19	10	0.75	19	3.5%	-1.54 [-2.27, -0.80]	
Phadtare 2009	75.3	14.21	24	47.27	14.64	24	3.5%	1.91 [1.22, 2.60]	
Porter 2014	40.7	4.5	71	40.7	4.8	69	4.0%	0.00 [-0.33, 0.33]	+
Portero 2013	24.4	6.2	71	21.2	5.4	43	4.0%	0.54 [0.15, 0.92]	+
RAUPACH 2009	31.9	7.2	72	31.7	7.5	71	4.0%	0.03 [-0.30, 0.35]	+
Solomon 2004	4.88	2	17	4.42	1.08	12	3.5%	0.27 [-0.48, 1.01]	+-
Taradi 2005	25.81	0.66	37	22.08	0.67	84	3.4%	5.56 [4.75, 6.37]	
Yeung 2012	42.7	10.5	43	41	11.6	35	3.9%	0.15 [-0.29, 0.60]	+
Subtotal (95% CI)			723			692	60.7%	0.47 [0.03, 0.92]	◆
1.8.2 pretest/post-tes	t								
Aleman 2011									
	6.57	0.69	15	6.52	0.96	26	3.6%	0.06 [-0.58, 0.69]	+
Alnabelsi 2015	6.57 89.6	14.07	25	86.4	15.47	25	3.8%	0.21 [-0.34, 0.77]	+
Alnabelsi 2015 Assadi 2003	6.57 89.6 20.24	14.07 0.83	25 41	86.4 18.05	15.47 1.86	25 40	3.8% 3.8%	0.21 [-0.34, 0.77] 1.51 [1.02, 2.01]	+
Alnabelsi 2015 Assadi 2003 Bhatti 2011	6.57 89.6 20.24 19.13	14.07 0.83 3.476	25 41 75	86.4 18.05 18.23	15.47 1.86 4.159	25 40 73	3.8% 3.8% 4.0%	0.21 [-0.34, 0.77] 1.51 [1.02, 2.01] 0.23 [-0.09, 0.56]	+ + +
Alnabelsi 2015 Assadi 2003 Bhatti 2011 Bjaenr 2013	6.57 89.6 20.24 19.13 94.3	14.07 0.83 3.476 6.734	25 41 75 21	86.4 18.05 18.23 93.3	15.47 1.86 4.159 6.253	25 40 73 21	3.8% 3.8% 4.0% 3.7%	0.21 [-0.34, 0.77] 1.51 [1.02, 2.01] 0.23 [-0.09, 0.56] 0.15 [-0.45, 0.76]	+ + +
Alnabelsi 2015 Assadi 2003 Bhatti 2011 Bjaenr 2013 Brettle 2013	6.57 89.6 20.24 19.13 94.3 1.7714	14.07 0.83 3.476 6.734 2.2372	25 41 75 21 35	86.4 18.05 18.23 93.3 2.2286	15.47 1.86 4.159 6.253 1.98651	25 40 73 21 35	3.8% 3.8% 4.0% 3.7% 3.9%	0.21 [-0.34, 0.77] 1.51 [1.02, 2.01] 0.23 [-0.09, 0.56] 0.15 [-0.45, 0.76] -0.21 [-0.68, 0.26]	
Alnabelsi 2015 Assadi 2003 Bhatti 2011 Bjaenr 2013	6.57 89.6 20.24 19.13 94.3 1.7714 12.7	14.07 0.83 3.476 6.734 2.2372 4.4	25 41 75 21 35 111	86.4 18.05 18.23 93.3 2.2286 11.2	15.47 1.86 4.159 6.253 1.98651 4.5	25 40 73 21	3.8% 3.8% 4.0% 3.7% 3.9% 4.0%	0.21 [-0.34, 0.77] 1.51 [1.02, 2.01] 0.23 [-0.09, 0.56] 0.15 [-0.45, 0.76] -0.21 [-0.68, 0.26] 0.34 [0.01, 0.66]	
Alnabelsi 2015 Assadi 2003 Bhatti 2011 Bjaenr 2013 Brettle 2013 Chao 2012 Morente 2013	6.57 89.6 20.24 19.13 94.3 1.7714 12.7 15.83	14.07 0.83 3.476 6.734 2.2372 4.4 2.52	25 41 75 21 35 111 30	86.4 18.05 18.23 93.3 2.2286 11.2 11.6	15.47 1.86 4.159 6.253 1.98651 4.5 2.39	25 40 73 21 35 56 43	3.8% 3.8% 4.0% 3.7% 3.9% 4.0% 3.8%	0.21 [-0.34, 0.77] 1.51 [1.02, 2.01] 0.23 [-0.09, 0.56] 0.15 [-0.45, 0.76] -0.21 [-0.68, 0.26] 0.34 [0.01, 0.66] 1.71 [1.17, 2.26]	
Alnabelsi 2015 Assadi 2003 Bhatti 2011 Bjaenr 2013 Brettle 2013 Chao 2012 Morente 2013 Peine 2016	6.57 89.6 20.24 19.13 94.3 1.7714 12.7	14.07 0.83 3.476 6.734 2.2372 4.4 2.52 2.21	25 41 75 21 35 111 30 61	86.4 18.05 18.23 93.3 2.2286 11.2	15.47 1.86 4.159 6.253 1.98651 4.5	25 40 73 21 35 56	3.8% 3.8% 4.0% 3.7% 3.9% 4.0%	0.21 [-0.34, 0.77] 1.51 [1.02, 2.01] 0.23 [-0.09, 0.56] 0.15 [-0.45, 0.76] -0.21 [-0.68, 0.26] 0.34 [0.01, 0.66] 1.71 [1.17, 2.26] 1.14 [0.75, 1.54]	+ + + + + + + + + + + + + + + + + + + +
Alnabelsi 2015 Assadi 2003 Bhatti 2011 Bjaenr 2013 Brettle 2013 Chao 2012 Morente 2013	6.57 89.6 20.24 19.13 94.3 1.7714 12.7 15.83 17.23 16.95	14.07 0.83 3.476 6.734 2.2372 4.4 2.52 2.21 3.178	25 41 75 21 35 111 30 61 39	86.4 18.05 18.23 93.3 2.2286 11.2 11.6 14.37 16.88	15.47 1.86 4.159 6.253 1.98651 4.5 2.39 2.76 2.575	25 40 73 21 35 56 43 55 36	3.8% 3.8% 4.0% 3.7% 3.9% 4.0% 3.8% 4.0% 3.9%	0.21 [-0.34, 0.77] 1.51 [1.02, 2.01] 0.23 [-0.09, 0.56] 0.15 [-0.45, 0.76] -0.21 [-0.68, 0.26] 0.34 [0.01, 0.66] 1.71 [1.17, 2.26] 1.14 [0.75, 1.54] 0.02 [-0.43, 0.48]	
Alnabelsi 2015 Assadi 2003 Bhatti 2011 Bjaenr 2013 Brettle 2013 Chao 2012 Morente 2013 Peine 2016 Pusponegoro 2015 Subramanian 2012	6.57 89.6 20.24 19.13 94.3 1.7714 12.7 15.83 17.23	14.07 0.83 3.476 6.734 2.2372 4.4 2.52 2.21	25 41 75 21 35 111 30 61 39 15	86.4 18.05 18.23 93.3 2.2286 11.2 11.6 14.37	15.47 1.86 4.159 6.253 1.98651 4.5 2.39 2.76	25 40 73 21 35 56 43 55 36 15	3.8% 3.8% 3.7% 3.9% 4.0% 3.8% 4.0% 3.9% 0.8%	0.21 [-0.34, 0.77] 1.51 [1.02, 2.01] 0.23 [-0.09, 0.56] 0.15 [-0.45, 0.76] -0.21 [-0.68, 0.26] 0.34 [0.01, 0.66] 1.71 [1.17, 2.26] 1.14 [0.75, 1.54] 0.02 [-0.43, 0.48] 12.16 [8.78, 15.54]	
Alnabelsi 2015 Assadi 2003 Bhatti 2011 Bjaenr 2013 Brettle 2013 Chao 2012 Morente 2013 Peine 2016 Pusponegoro 2015 Subramanian 2012 Subratal (95% Cl)	6.57 89.6 20.24 19.13 94.3 1.7714 12.7 15.83 17.23 16.95 86.7	14.07 0.83 3.476 6.734 2.2372 4.4 2.52 2.21 3.178 2	25 41 75 21 35 111 30 61 39 15 468	86.4 18.05 18.23 93.3 2.2286 11.2 11.6 14.37 16.88 61.7	15.47 1.86 4.159 6.253 1.98651 4.5 2.39 2.76 2.575 2	25 40 73 21 35 56 43 55 36	3.8% 3.8% 4.0% 3.7% 3.9% 4.0% 3.8% 4.0% 3.9%	0.21 [-0.34, 0.77] 1.51 [1.02, 2.01] 0.23 [-0.09, 0.56] 0.15 [-0.45, 0.76] -0.21 [-0.68, 0.26] 0.34 [0.01, 0.66] 1.71 [1.17, 2.26] 1.14 [0.75, 1.54] 0.02 [-0.43, 0.48]	+ + + + + + + + + + + + + + + +
Alnabelsi 2015 Assadi 2003 Bhatti 2011 Bjaenr 2013 Brettle 2013 Chao 2012 Morente 2013 Peine 2016 Pusponegoro 2015 Subramanian 2012	6.57 89.6 20.24 19.13 94.3 1.7714 12.7 15.83 17.23 16.95 86.7 0.59; Chi ^z =	14.07 0.83 3.476 6.734 2.2372 4.4 2.52 2.21 3.178 2 111.68, d	25 41 75 21 35 111 30 61 39 15 468	86.4 18.05 18.23 93.3 2.2286 11.2 11.6 14.37 16.88 61.7	15.47 1.86 4.159 6.253 1.98651 4.5 2.39 2.76 2.575 2	25 40 73 21 35 56 43 55 36 15	3.8% 3.8% 3.7% 3.9% 4.0% 3.8% 4.0% 3.9% 0.8%	0.21 [-0.34, 0.77] 1.51 [1.02, 2.01] 0.23 [-0.09, 0.56] 0.15 [-0.45, 0.76] -0.21 [-0.68, 0.26] 0.34 [0.01, 0.66] 1.71 [1.17, 2.26] 1.14 [0.75, 1.54] 0.02 [-0.43, 0.48] 12.16 [8.78, 15.54]	+ + + + + + + + + + + + +
Alnabelsi 2015 Assadi 2003 Bhatti 2011 Bjaenr 2013 Brettle 2013 Chao 2012 Morente 2013 Peine 2016 Pusponegoro 2015 Subramanian 2012 Subtotal (95% C1) Heterogeneity: Tau ² =	6.57 89.6 20.24 19.13 94.3 1.7714 12.7 15.83 17.23 16.95 86.7 0.59; Chi ^z =	14.07 0.83 3.476 6.734 2.2372 4.4 2.52 2.21 3.178 2 111.68, d	25 41 75 21 35 111 30 61 39 15 468	86.4 18.05 18.23 93.3 2.2286 11.2 11.6 14.37 16.88 61.7	15.47 1.86 4.159 6.253 1.98651 4.5 2.39 2.76 2.575 2	25 40 73 21 35 56 43 55 36 15 425	3.8% 3.8% 3.7% 3.9% 4.0% 3.8% 4.0% 3.9% 0.8%	0.21 [-0.34, 0.77] 1.51 [1.02, 2.01] 0.23 [-0.09, 0.56] 0.15 [-0.45, 0.76] -0.21 [-0.68, 0.26] 0.34 [0.01, 0.66] 1.71 [1.17, 2.26] 1.14 [0.75, 1.54] 0.02 [-0.43, 0.48] 12.16 [8.78, 15.54]	+ + + + + + + + + + + + +
Alnabelsi 2015 Assadi 2003 Bhatti 2011 Bjaenr 2013 Brettle 2013 Chao 2012 Morente 2013 Peine 2016 Pusponegoro 2015 Subramanian 2012 Subtotal (95% CI) Heterogeneity: Tau ² = Test for overall effect:	6.57 89.6 20.24 19.13 94.3 1.7714 12.7 15.83 17.23 16.95 86.7 0.59; Chiᢪ= Z = 2.87 (P =	14.07 0.83 3.476 6.734 2.2372 4.4 2.52 2.21 3.178 2 111.68, d = 0.004)	25 41 75 21 35 111 30 61 39 15 468 f= 10 (1191	86.4 18.05 18.23 93.3 2.2286 11.2 11.6 14.37 16.88 61.7 P < 0.00001	15.47 1.86 4.159 6.253 1.98651 4.5 2.39 2.76 2.575 2	25 40 73 21 35 56 43 55 36 15 425	3.8% 3.8% 4.0% 3.9% 4.0% 3.8% 4.0% 3.9% 0.8% 39.3%	0.21 [-0.34, 0.77] 1.51 [1.02, 2.01] 0.23 [-0.09, 0.56] 0.15 [-0.45, 0.76] -0.21 [-0.68, 0.26] 0.34 [0.01, 0.66] 1.71 [1.17, 2.26] 1.14 [0.75, 1.54] 0.02 [-0.43, 0.48] 12.16 [8.78, 15.54] 0.73 [0.23, 1.23]	+ + + + + + + + + + + + + + + + + + +

Figure S4 Subgroup analysis on study design of online vs. offline education on knowledge and skills acquisitions at the post-test levels.

Study or Subgroup Mean SD Total Meint SD Total Weight N. Random, 95% CI M. Random, 95% CI Aleman 2011 6.57 0.69 15 6.52 0.06 26 3.8% 0.06 [0.34, 0.05] 4 Almabels 2015 80.6 14.07 25 86.4 15.47 25 3.8% 0.02 [0.34, 0.07] 4 Bhathi 2011 19.13 3.476 75 18.23 4.159 73 4.0% 0.21 [0.68, 0.26] - Brettle 2013 1.7714 2.32 2.226 1.98651 3.9% -0.16 [0.64, 0.06] - Chement 2013 2.9 1.1 41 2.8 0.9 3.3 3.9% 0.10 [0.30, 0.49] - Chement 2013 8.84.7647 42133 17 701176 5.345078 17 3.6% 0.29 [0.64, 0.06] - - DENNIS 2003 84.7647 42133 17 77.0176 5.3450 1.07 3.5% 1.41075, 1.541 - <th></th> <th></th> <th>nline</th> <th></th> <th></th> <th>Offline</th> <th></th> <th></th> <th>Std. Mean Difference</th> <th>Std. Mean Difference</th>			nline			Offline			Std. Mean Difference	Std. Mean Difference
Aleman 2011 6.57 0.69 15 6.52 0.96 26 3.6% 0.06 1.05 0.69		Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% Cl	IV, Random, 95% Cl
Anabelsi 2015 89.6 14.07 25 86.4 15.47 25 3.8% 0.21 [0.34 0.77] Bhati 2011 19.13 3.476 75 18.23 4.159 73 4.0% 0.23 [0.09, 0.56] Brette 2013 1.7714 2.2372 35 2.2286 1.98651 35 3.9% 0.21 [0.08, 0.76] Brette 2013 1.7714 2.2372 35 2.2286 1.98651 35 3.9% 0.21 [0.08, 0.76] Chement 2013 2.9 1.1 41 2.8 0.9 33 3.9% 0.10 [0.08, 0.26] Chement 2012 3.568 1.19 71 3.9 0.99 59 4.0% -0.29 [0.04, 0.06] DENNIS 2003 88.47647 4.42133 17 870.1176 5.345078 17 3.6% 0.29 [0.38, 0.476] Hu 2016 14.2 2.8 49 13.9 3.4 51 4.0% 0.10 [0.30, 0.49] Kaltma 2018 4 1.55 60 3.23 1.86 39 3.3% 0.46 [10.05, 0.86] Mocarani 2014 2.245 4.41 15 19.25 5.11 20 3.8% 0.65 [-0.04, 1.34] Morente 2013 15.83 2.52 30 11.6 2.39 43 3.8% 1.71 [1.7, 2.26] Headtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.72, 2.60] Phene 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 [0.75, 1.54] Phadtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] Phene 2016 17.23 2.21 61 7.4 2.77 14.64 24 3.5% 1.91 [1.22, 2.60] Phene 2016 17.23 2.21 61 7.2 15 0.63 3.0% 0.02 [0.03, 0.33] Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [0.43, 0.48] RUMPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03 [0.03, 0.33] Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [0.43, 0.48] RUMPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03 [0.03, 0.35] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [0.43, 0.48] RUMPACH 2003 7.9.08 12.26 56 78.51 9.44 56 4.0% 0.05 [0.32, 0.42] Yeung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.05 [0.05, 0.66] Tazl mon-RCT Assad1 2003 20.24 0.83 41 18.05 1.96 40 3.8% 1.51 [1.02, 2.01] BOWDISH 2003 7.9.08 12.26 56 78.51 9.44 56 4.0% 0.05 [0.32, 0.42] Chao 2012 12.7 4.4 111 11.2 4.5 56 4.0% 0.04 [0.01, 0.66] Farahma 2016 2.5 1.98 60 72.2.0 8 0.67 84 3.34% 5.56 [4.75, 6.37] Tared 2.005 2.5.81 0.66 37 2.2.08 0.67 84 3.34% 5.56 [4.75, 6.37] Tared 2.005 2.5.81 0.66 37 2.2.08 0.67 84 3.34% 5.56 [4.75, 6.37] Tared 2.005 2.5.81 0.66 37 2.2.08 0.67 84 3.34% 5.56 [4.75, 6.37] Tared 2.005 2.5.81 0.66 37 2.2.08 0.67 84 3.34% 5.56 [4.75, 6.37] Tared 2.00	1.9.1 RCT									
Bhaffi 2011 19.13 3.476 75 18.23 4.159 73 4.0% 0.23 [0.09, 0.56] Bjaerr 2013 94.3 6.734 21 93.3 6.253 21 3.7% 0.15 [0.45, 0.76] Bjaerr 2013 1.774 2.2372 5 2.2286 1.98651 53 3.9% 0.10 [0.38, 0.56] Chittenden 2013 2.9 1.1 41 2.8 0.9 33 3.9% 0.10 [0.38, 0.56] Chittenden 2013 2.9 1.1 41 2.8 0.9 33 3.9% 0.10 [0.38, 0.56] Chittenden 2013 2.9 1.1 41 2.8 0.9 33 3.9% 0.10 [0.38, 0.97] Hu 2016 14.2 2.8 49 13.9 3.4 51 4.0% 0.10 [0.38, 0.97] Hu 2016 14.2 2.8 49 13.9 3.4 51 4.0% 0.10 [0.38, 0.97] Hu 2016 14.2 2.8 49 13.9 3.4 51 4.0% 0.10 [0.38, 0.97] Hu 2016 14.2 2.4 5 4.41 15 19.25 5.11 20 3.8% 0.46 [0.05, 0.86] Morarmi 2014 22.45 4.41 15 19.25 5.11 20 3.8% 0.46 [0.05, 0.86] Morente 2013 15.83 2.52 30 11.6 2.39 4.33 3.8% 1.71 [1.17, 2.6] Pine 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 [0.75, 1.54] Pinetare 2009 75.3 14.21 24 4.72.7 14.64 24 3.5% 1.94 [1.27, 0.80] Pinetare 2009 75.3 14.21 24 4.72.7 14.64 24 3.5% 0.02 [0.43, 0.33] Pinetare 2009 75.3 14.21 24 4.72.7 14.64 24 3.5% 0.02 [0.43, 0.33] Pinetare 2009 75.3 14.21 24 4.72.7 14.64 24 3.5% 0.02 [0.48, 1.01] Subsmannian 2012 86.7 2 15 61.7 2 15 0.3% 0.15 [0.30, 0.35] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [0.48, 1.01] Subtrad (95% C) 815 778 76.8% 0.35 [0.05, 0.66] Heterogeneibly Tau ² = 0.41; Chi ² = 161.68, df = 20 (P < 0.00001); P = 88% Test for overall effect: $Z = 2.29$ (P = 0.02) Total (95% C) 376 376 339 2.28 0.67 44 3.4% 5.56 [4.75, 6.37] Subtrad (95% C) 376 376 339 2.28 0.67 44 3.4% 5.56 [4.75, 6.37] Fearbarr 2016 12.5 1.98 60 7.2 2.0 0.67 378 3.99 2.28% 1.51 [1.02, 2.01] For avail effect: $Z = 2.45$ (P = 0.0001); P = 93% Test for overall effect: $Z = 2.45$ (P = 0.00001); P = 93% Total (95% C) 191 1117 100.0% 0.58 [0.25, 0.91] Heterogeneibly Tau ² = 1.637; Chi ² = 36.(P < 0.00001); P = 93%	Aleman 2011	6.57	0.69	15	6.52	0.96	26	3.6%	0.06 [-0.58, 0.69]	+
Bigenr 2013 94.3 6.734 21 93.3 6.253 21 3.7% 0.16 [0.45] 0.76] Bretlie 2013 1.7714 2.2372 35 2.2266 1.96651 35 3.9% 0.21 [0.68, 0.26] Chitheroden 2013 2.9 1.1 41 2.8 0.9 33 3.9% 0.10 [0.36, 0.56] Clement 2012 3.58 1.19 71 3.9 0.99 59 40% -0.29 [0.36, 0.97] Hu 2016 14.2 2.8 49 13.9 3.4 51 40% 0.10 [0.30, 0.49] Kaltman 2016 14.2 2.8 49 13.9 3.4 51 40% 0.06 [0.05, 0.86] Mozarni 2014 2.245 4.41 15 19.25 5.11 20 3.6% 0.66 [0.05, 0.86] Mozarni 2014 2.245 4.41 15 19.25 5.11 20 3.6% 0.66 [0.05, 0.86] Peine 2013 15.83 2.52 30 11.6 2.39 43 3.8% 1.71 [1.17, 2.26] Peine 2016 17.23 2.21 61 14.37 2.76 55 40.0% 1.14 [0.75, 1.54] Peine 2016 17.23 2.21 61 14.37 2.76 55 40.0% 1.14 [0.75, 1.54] Peine 2016 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] Poter 2014 40.7 4.5 71 40.7 4.8 69 40% 0.00 [0.33, 0.33] Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [0.43, 0.48] RAUPACH 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.216 [1.81, 55.4] Pustare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 0.27 [0.48, 1.01] Subtranaina 201 86.7 2 15 61.7 2 15 0.6% 12.16 [8.15.4] Test for overall effect Z = 2.29 (P = 0.02) 1.92 non-RCT Assadi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] BOWDISH 2003 79.08 12.68 56 78.51 9.44 56 4.0% 0.05 [0.32, 0.42] Chao 2012 12.7 4.4 1111 11.2 4.5 56 4.0% 0.05 [0.32, 0.42] Chao 2012 2.27 0.83 41 18.05 1.86 40% 0.05 [0.32, 0.42] Chao 2012 2.27 0.28 1.20 (P < 0.00001); P = 87% Test for overall effect Z = 2.29 (P = 0.02) 1.92 non-RCT Assadi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] BOWDISH 2003 79.08 12.68 56 78.51 9.44 56 4.0% 0.56 [0.32, 0.42] Chao 2012 2.42 0.83 41 18.05 1.86 40% 0.54 [0.15, 0.92] Test for overall effect Z = 2.46 (P = 0.000) Test for soverall effect Z = 2.46 (P = 0.000) Test for soverall effect Z = 2.46 (P = 0.000) Test for soverall effect Z = 0.67; Chi''' = 354 22, df = 26 (P < 0.00001); P = 97% Test for overall effect Z = 0.67; Chi''' = 364 22, df = 26 (P < 0.00001); P = 97% Test for overall effect Z = 0.67; Chi'''' = 36 (P < 0.0000	Alnabelsi 2015	89.6	14.07	25	86.4	15.47	25	3.8%	0.21 [-0.34, 0.77]	+
Brettle 2013 1.7714 2.2372 35 2.2286 1.98661 35 3.9% -0.21[-0.68], 0.26] Chittenden 2013 2.9 1.1 41 2.8 0.9 33 3.9% -0.21[-0.68], 0.26] Chittenden 2013 2.9 1.1 41 2.8 0.9 33 3.9% -0.21[-0.68], 0.26] Clement 2013 1.58 1.9 0.9 59 4.0% -0.29[-0.64, 0.06] DENNIS 2003 88.47647 4.42133 17 87.01176 5.345078 17 3.6% 0.04[-0.36, 0.66] Mozarni 2014 4 1.55 60 3.23 1.86 39 .046[0.05, 0.86] Morente 2013 15.83 2.52 30 11.6 2.39 43 3.9% 0.46[0.06, 0.86] Morente 2013 15.83 2.52 30 11.6 2.39 43 3.9% 0.47[0.00, 1.34] Morente 2014 40.7 4.57 55 4.0% 0.04[0.03, 0.33]	Bhatti 2011	19.13	3.476	75	18.23	4.159	73	4.0%	0.23 [-0.09, 0.56]	t
Chiltenden 2013 2.9 1.1 41 2.8 0.9 33 3.9% 0.10 [0.36, 0.56] Clement 2012 3.58 1.19 71 3.9 0.99 59 4.0% 0.29 [0.36, 0.56] DENNIS 2003 88 4764 74.213 17 87.0176 5.345078 17 3.6% 0.29 [0.38, 0.97] Hu 2016 14.2 2.8 49 13.9 3.4 51 4.0% 0.10 [0.30, 0.49] Mozarni 2014 2.2.45 4.41 15 19.2.5 5.11 20 3.6% 0.65 [-0.04, 1.34] Morente 2013 15.83 2.52 30 11.6 2.39 43 3.8% 0.55 [-0.04, 1.34] Morente 2013 15.83 2.52 30 11.6 2.39 43 3.8% 0.55 [-0.04, 1.34] Morente 2013 15.83 2.52 30 11.6 2.39 43 3.8% 0.55 [-0.04, 1.34] Morente 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 [0.75, 1.54] Phadtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.54 [2.2, 2.60] Peine 2016 17.23 2.21 61 14.37 2.76 55 4.0% 0.00 [-0.33, 0.33] Pusponegoro 2015 16.95 3.178 39 18.88 2.575 36 3.9% 0.02 [-0.3, 0.48] Pusponegoro 2015 16.95 3.178 39 18.88 2.575 36 3.9% 0.02 [-0.3, 0.48] Pusponegoro 2015 16.95 3.178 39 18.88 2.575 36 3.9% 0.02 [-0.3, 0.48] Pusponegoro 2015 16.95 3.178 39 18.88 2.575 36 3.9% 0.02 [-0.3, 0.08] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [-0.48, 1.01] Subramanian 2012 86.7 2 15 61.7 2 15 0.8% 1.216 [8.78, 15.54] Test for overall effect Z = 2.29 (P = 0.02) 1.9.2 non-RCT Assadl 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] BOWDISH 2003 79.08 12.68 56 78.51 9.44 56 4.0% 0.36 [0.05, 0.66] Heterogeneity: Tau ² = 0.47; ChP = 161.63, df = 20 (P < 0.00001); P = 88% Test for overall effect Z = 2.45 (P = 0.02) 1.9.2 non-RCT Assadl 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] BOWDISH 2003 79.08 12.68 56 78.51 9.44 56 4.0% 0.34 [0.01, 0.68] Farahman 2015 12.5 1.98 60 12.6 1.94 60 4.0% -0.05 [0.41, 0.31] Porter 2013 24.4 6.2 71 21.2 5.4 43 4.0% 0.34 [0.01, 0.68] Farahman 2016 12.5 1.98 60 12.6 1.94 60 4.0% -0.05 [0.41, 0.31] Porter 20.53 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Subtotal (95% CI) 376 339 23.2% 1.27 [0.25, 2.28] 4.10 -5 0 5 100 Total (95% CI) 1911 1117 100.0% 0.58 [0.25, 0.91] 4.10 -5 0 5 10	Bjaenr 2013	94.3	6.734	21	93.3	6.253	21	3.7%	0.15 [-0.45, 0.76]	+
Clement 2012 3.58 1.19 71 3.9 0.99 59 4.0% $-0.29 [0.64, 0.66]$ DENNIS 2003 88.47647 4.42133 17 87.01176 5.345078 17 3.6% $-0.29 [0.64, 0.66]$ Hu 2016 14.2 2.8 49 13.9 3.4 51 4.0% $0.10 [-0.30, 0.49]$ Kaltman 2018 4 1.55 60 3.23 1.86 39 3.9% $0.46 [0.05, 0.86]$ Morazmi 2014 22.45 4.41 15 19.25 5.11 20 3.6% $0.65 [-0.04, 1.34]$ Morente 2013 15.83 2.52 30 11.6 2.39 43 3.8% 1.71 [1.17, 2.26] Nicklen 2017 9 0.5 19 10 0.75 19 3.5% $-1.54 [-2.27, -0.80]$ Phatare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.14 [0.75, 1.54] Phatare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] Proter 2014 40.7 4.5 71 40.7 4.8 69 4.0% $0.00 [-0.30, 0.35]$ Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% $0.02 [-0.43, 0.48]$ Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% $0.02 [-0.43, 0.48]$ Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% $0.02 [-0.43, 0.48]$ Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% $0.02 [-0.43, 0.48]$ Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% $0.02 [-0.43, 0.48]$ Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% $0.02 [-0.43, 0.48]$ Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% $0.02 [-0.43, 0.48]$ Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% $0.02 [-0.43, 0.48]$ Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% $0.02 [-0.43, 0.48]$ Pusponegoro 2015 16.95 3.178 39 16.89 2.575 36 3.9% $0.02 [-0.43, 0.48]$ Pusponegoro 2015 16.95 3.178 39 16.80 2.575 36 3.9% $0.02 [-0.43, 0.48]$ Pusponegoro 2015 16.95 3.178 39 16.80 2.575 36 3.9% $0.05 [-0.30, 0.25]$ Subtotal (95% CI) 815 778 76 6.39% 0.35 [0.05, 0.66] Farahman 2016 12.5 1.98 60 12.6 1.94 60 4.0% $-0.05 [-0.21, 0.68]$ Farahman 2016 12.5 1.98 60 12.6 1.94 60 4.0% $-0.05 [-0.41, 0.58]$ Potero 2013 2.4.4 6.2 71 21.2 5.4 43 4.0% $0.56 [0.25, 0.51]$ Heterogeneity: Tau ² = 1.54; Chi ² = 180.53, dif = 5 (P < 0.00001); P = 97% Test for overail effect Z = 2.45 (P = 0.01) Total (95% CI) 1376 339 23.2% 1.27 [0.25, 2.28] Heterogeneity: Tau ² = 0.67; Chi ² = 354 2.2, dif = 26 (P < 0.00001); P =	Brettle 2013	1.7714	2.2372	35	2.2286	1.98651	35	3.9%	-0.21 [-0.68, 0.26]	+
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Chittenden 2013	2.9	1.1	41	2.8	0.9	33	3.9%	0.10 [-0.36, 0.56]	+
Hu 2016 14.2 2.8 49 13.9 3.4 51 4.0% 0.10 [-0.30, 0.49] Kaltman 2018 4 1.55 60 3.23 1.86 39 3.9% 0.46 [0.05, 0.86] Morazami 2014 22.45 4.41 15 19.25 5.11 20 3.6% 0.66 [-0.41, 1.34] Morente 2013 15.83 2.52 30 11.6 2.39 43 3.8% 1.71 [1.17, 2.26] Nicklen 2017 9 0.5 19 10 0.75 19 3.6% 1.54 [-2.27, -0.80] Peine 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 [0.75, 1.54] Pradtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] Porter 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00 [-0.33, 0.33] Porter 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [-0.43, 0.48] RAUPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03 [-0.30, 0.35] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [-0.48, 1.01] Subtransina 2012 86.7 2 15 61.7 2 15 0.68% 12.616 [R.78, 15.54] Yeung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 [-0.29, 0.60] Subtrat (95% CI) 815 778 76.8% 0.35 [0.05, 0.66] Heterogeneity. Tau ² = 0.41; Chi ² = 161.68, df = 20 (P < 0.00001); P = 88% Test for overall effect $Z = 2.29$ (P = 0.02) 1.9.2 non-RCT Assail 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] BOWDISH 2003 79.08 12.68 56 78.51 9.44 56 4.0% 0.05 [-0.32, 0.42] Chao 2012 12.7 4.4 111 11.2 4.5 56 4.0% 0.34 [0.01, 0.66] Farahman 2016 12.5 1.98 60 12.6 1.94 60 4.0% 0.05 [-0.32, 0.42] Taradi 2005 25.81 0.66 37 22.08 0.67 84 3.44% 5.56 [4.75, 6.37] Subtrat (95% CI) 376 339 23.2% 1.27 [0.25, 2.28] Heterogeneity. Tau ² = 0.67; Chi ² = 354 22, df = 26 (P < 0.00001); P = 97% Test for overall effect $Z = 2.45$ (P = 0.01) Total (95% CI) 191 1117 100.0% 0.58 [0.25, 0.91] Heterogeneity. Tau ² = 0.67; Chi ² = 354 22, df (P < 0.00001); P = 97% Test for overall effect $Z = 2.45$ (P = 0.001)	Clement 2012	3.58	1.19	71	3.9	0.99	59	4.0%	-0.29 [-0.64, 0.06]	+
Kaltman 2018 4 1.55 60 3.23 1.86 39 3.9% $0.46[0.05, 0.86]$ Moazami 2014 22.45 4.41 15 19.25 5.11 20 3.6% $0.66[+0.04, 1.34]$ Morente 2013 15.83 2.52 30 11.6 2.39 43 3.8% 1.71[1.17, 2.26] Peine 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14[0.75, 1.54] Protare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91[1.22, 2.60] Protare 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00[+0.33, 0.33] Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02[+0.43, 0.48] RUPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03[+0.30, 0.35] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27[+0.48, 1.01] Subtranaina 2012 86.7 2 15 61.7 2 15 0.8% 12.56[4.78, 15.54] Yeung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15[+0.29, 0.66] Heterogeneity: Tau ² = 0.41; Ch ² = 151.68, df = 20 (P < 0.00001); P = 88% Test for overall effect: Z = 2.29 (P = 0.02) 1.9.2 non-RCT Assal 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51[1.02, 2.01] BOWDISH 2003 79.08 12.68 56 78.51 9.44 56 4.0% 0.05[+0.32, 0.42] Chao 2012 12.7 4.4 111 11.2 4.5 56 4.0% 0.05[+0.32, 0.42] Taradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56[4.75, 6.37] Subtotal (95% C1) 191 1117 100.0% 0.58[0.25, 0.91] Heterogeneity: Tau ² = 0.67; Ch ² = 354.22, df = 26 (P < 0.00001); P = 93% Total (95% C1) 191 1117 100.0% 0.58[0.25, 0.91] Heterogeneity: Tau ² = 0.67; Ch ² = 354.22, df = 26 (P < 0.00001); P = 93%	DENNIS 2003	88.47647	4.42133	17	87.01176	5.345078	17	3.6%	0.29 [-0.38, 0.97]	+
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Hu 2016	14.2	2.8	49	13.9	3.4	51	4.0%	0.10 [-0.30, 0.49]	+
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Kaltman 2018	4	1.55	60	3.23	1.86	39	3.9%	0.46 (0.05, 0.86)	+
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Moazami 2014	22.45	4.41	15	19.25		20	3.6%		+-
Nicklen 2017 9 0.5 19 10 0.75 19 3.5% $-1.54[2.27, -0.80]$ Peine 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 [0.75, 1.54] Phadtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% $-1.54[2.27, -0.80]$ Poter 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00[-0.33, 0.33] Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02[-0.43, 0.48] RAUPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03[-0.30, 0.35] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27[-0.48, 1.01] Subtramanian 2012 86.7 2 15 61.7 2 15 0.8% 12.16[8.78, 15.54] Yeung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15[-0.29, 0.60] Subtotal (95% CI) 815 778 76.8% 0.35[0.05, 0.66] Heterogeneity: Tau ² = 0.41; Chi ² = 161.68, df = 20 (P < 0.00001); I ² = 88% Test for overall effect Z = 2.29 (P = 0.02) 1.9.2 non-RCT Assadi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] BOWDISH 2003 79.08 12.68 56 78.51 9.44 56 4.0% 0.05[-0.32, 0.42] Chao 2012 12.7 4.4 111 11.2 4.5 56 4.0% 0.34 [0.01, 0.66] Farahman 2016 12.5 1.98 60 12.6 1.94 60 4.0% -0.05 [0.41, 0.31] Portero 2013 24.4 6.2 71 21.2 5.4 43 4.0% 0.54 [0.15, 0.92] Taradl 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Subtotal (95% CI) 376 339 23.2% 1.27 [0.25, 2.28] Heterogeneity: Tau ² = 1.54; Chi ² = 180.53, df = 5 (P < 0.00001); I ² = 97% Test for overall effect Z = 2.45 (P = 0.01) Total (95% CI) 1191 1117 100.0% 0.58 [0.25, 0.91] Heterogeneity: Tau ² = 0.67; Chi ² = 354 22, df = 26 (P < 0.00001); I ² = 93%		15.83		30						+
Peine 2016 17.23 2.21 61 14.37 2.76 55 4.0% 1.14 [0.75, 1.54] Phadtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] Photer 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00 [0.33, 0.33] Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [-0.43, 0.48] RAUPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03 [-0.30, 0.35] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [-0.48, 1.01] Subtranaina 2012 86.7 2 15 61.7 2 15 0.8% 12.16 [8.78, 15.54] Yeung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.15 [-0.29, 0.60] Subtranaina (95% CI) 815 778 76.8% 0.35 [0.05, 0.66] Heterogeneity: Tau ² = 0.41; Chi ² = 161.68, df = 20 (P < 0.00001); P = 88% Test for overall effect: Z = 2.29 (P = 0.02) 1.9.2 non-RCT Assadi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] BOWDISH 2003 79.08 12.68 56 78.51 9.44 56 4.0% 0.05 [-0.32, 0.42] Chao 2012 12.7 4.4 111 11.2 4.5 56 4.0% 0.05 [-0.32, 0.42] Chao 2012 12.7 4.4 111 11.2 4.5 56 4.0% 0.05 [-0.32, 0.42] Chao 2013 24.4 6.2 71 21.2 5.4 43 4.0% 0.54 [0.15, 0.92] Tarad 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Subtotal (95% CI) 376 339 23.2% 1.27 [0.25, 2.28] Heterogeneity: Tau ² = 1.54; Chi ² = 180.53, df = 5 (P < 0.00001); P = 97% Test for overall effect: Z = 2.46 (P = 0.0006) Total (95% CI) 1191 117 100.0% 0.58 [0.25, 0.91] -10 -5 0 5 10										+
Phadtare 2009 75.3 14.21 24 47.27 14.64 24 3.5% 1.91 [1.22, 2.60] Porter 2014 40.7 4.5 71 40.7 4.8 69 4.0% 0.00 [-0.33, 0.33] Pusponegoro 2015 16.95 3.178 39 16.88 2.575 36 3.9% 0.02 [-0.43, 0.48] RAUPACH 2009 31.9 7.2 72 31.7 7.5 71 4.0% 0.03 [-0.30, 0.35] Solomon 2004 4.88 2 17 4.42 1.08 12 3.5% 0.27 [-0.48, 1.01] Subramanian 2012 86.7 2 15 61.7 2 15 0.8% 12.16 [8.78, 15.54] Yeung 2012 42.7 10.5 43 41 11.6 35 3.9% 0.35 [0.05, 0.66] Heterogeneity: Tau ² = 0.41; Chi ² = 161.68, df = 20 (P < 0.00001); I ² = 88% Test for overall effect: Z = 2.29 (P = 0.02) 1.9.2 non-RCT Assadi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] BOWDISH 2003 79.08 12.68 56 78.51 9.44 56 4.0% 0.05 [0.32, 0.42] Chao 2012 12.7 4.4 111 11.2 4.5 56 4.0% 0.34 [0.01, 0.66] Farahman 2016 12.5 1.98 60 12.6 1.94 40 4.0% 0.05 [-0.10, 0.11] Portero 2013 24.4 6.2 71 21.2 5.4 43 4.0% 0.54 [0.15, 0.92] Taradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Subtotal (95% CI) 174° = 180.53, df = 5 (P < 0.00001); I ² = 97% Test for overall effect: Z = 2.45 (P = 0.01) Total (95% CI) 1191 1117 100.0% 0.58 [0.25, 0.91] $+10^{-5} 0^{-5} 10^{-5}$		17.23		61						+
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Heterogeneity: Tau ² = 0.41; Chi ² = 161.68, df = 20 (P < 0.00001); I ² = 88% Test for overall effect: $Z = 2.29$ (P = 0.02) 1.9.2 non-RCT Assadi 2003 20.24 0.83 41 18.05 1.86 40 3.8% 1.51 [1.02, 2.01] BOWDISH 2003 79.08 12.68 56 78.51 9.44 56 4.0% 0.05 [-0.32, 0.42] Chao 2012 12.7 4.4 111 11.2 4.5 56 4.0% 0.34 [0.01, 0.66] Farahman 2016 12.5 1.98 60 12.6 1.94 60 4.0% -0.05 [-0.41, 0.31] Portero 2013 24.4 6.2 71 21.2 5.4 43 4.0% 0.54 [0.15, 0.92] Taradi 2005 25.81 0.66 37 22.08 0.67 84 3.4% 5.56 [4.75, 6.37] Subtotal (95% Cl) 376 339 23.2% 1.27 [0.25, 2.28] Heterogeneity: Tau ² = 1.54; Chi ² = 180.53, df = 5 (P < 0.00001); I ² = 97% Test for overall effect: $Z = 2.45$ (P = 0.01) Total (95% Cl) 1191 1117 100.0% 0.58 [0.25, 0.91] -10 -5 0 5 10		12.1	10.0			11.0				•
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Figure S5 Subgroup analysis on study type of online vs. offline education on knowledge and skills acquisitions at the post-test levels.