## Supplement 1

Table 1: The modified Jadad scale.

Eight items	Answer	Score
Was the study described as randomized?	Yes	+1
	No	0
Was the method of randomization appropriate?	Yes	+1
	No	-1
	Not described	0
Was the study described as blinding? <sup>a</sup>	Yes	+1
	No	0
Was the method of blinding appropriate?	Yes	+1
	No	-1
	Not described	0
Was there a description of withdrawals and dropouts?	Yes	+1
	No	0
Was there a clear description of the inclusion/exclusion criteria?	Yes	+1
	No	0

Was the method used to assess adverse effects described?	Yes	+1
	No	0
Was the methods of statistical analysis described?	Yes	+1
	No	0

a: double-blind got 1 score, single-blind got 0.5 score.

Table 2: Modified Jadad scores of the included studies.

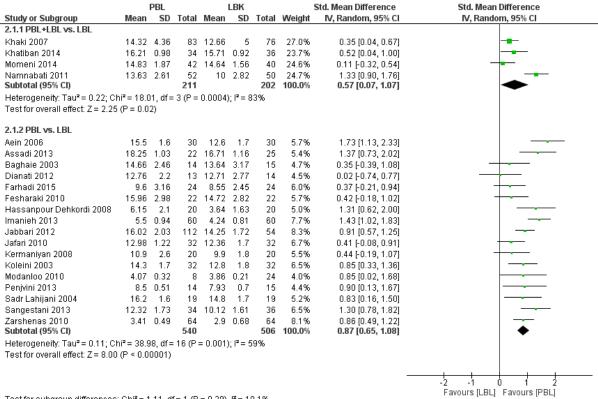
Correspondin g author	Was the research described as randomized?	Was the approachof randomizatio n appropriate?*	Was the research described as blinding?	Was the approach of blinding appropriate?	Was there a presentatio n of withdrawals and dropouts?#	Was there a presentation of the inclusion/exclusio n criteria?#	Was the approach used to assess adverse effects described?	Was the approach of statistical analysis described?	Tota l
Baghaie.M, 2003	1	0	0	0	1	1	1	1	5
Koleini.N, 2004	1	1	0	0	1	1	1	1	6
Sadr Lahijani M.S, 2004	0	0	0	0	1	1	0	1	3
Fereshteh aein, 2005	1	1	0	0	1	1	0	1	5
Hassanpour Dehkordi, 2006	1	1	0	0	1	1	0	1	5
A.A. Khaki, 2007	0	0	0	0	1	1	1	0	3
Kermanian.F, 2008	1	1	0	0	1	1	1	1	6
Khami.M, 2009	1	1	0	0	1	1	1	1	6

Moghimian.M, 2010	1	1	0	0	1	1	1	0	5
Namnabati.M, 2010	0	0	0	0	1	1	0	0	2
Modanloo.M, 2010	1	0	0	0	1	1	1	0	4
Momeni Danaei.Sh, 2010	0	0	0	0	1	1	0	1	3
MA Hajbaghery, 2012	1	0	0	0	1	1	1	0	4
Naghavi Behzad.M, 2012	0	0	0	0	1	1	1	1	4
Panjehpour.M, 2012	0	0	0	0	1	1	0	0	2
Penjvini.S, 2013	1	0	0	0	1	1	1	1	5
Khatiban.M, 2013	1	0	0	0	1	1	1	1	5
Assadi.S.N, 2013	1	0	0	0	1	1	1	1	5
Dehghani.S.M, 2013	1	1	0	0	1	1	1	1	6

Sangestani.G, 2014	1	0	0	0	1	1	1	1	5
Sadeghzadeh.M , 2014	1	1	0	0	1	1	0	0	3
Rezaie.M.J, 2014	0	0	0	0	1	1	1	1	4
Jahanbani.J, 2015	0	0	0	0	1	1	1	0	3

## **Supplement 2**

Figure 1: Subgroup analysis considering various learning method comparison



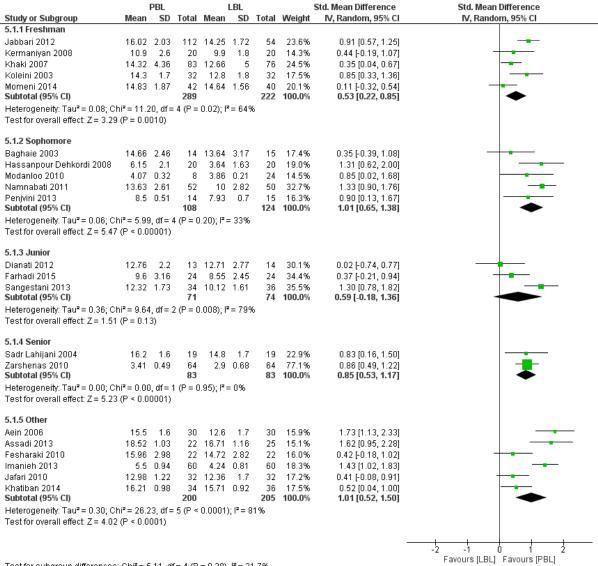
Test for subgroup differences:  $Chi^2 = 1.11$ , df = 1 (P = 0.29),  $I^2 = 10.1\%$ 

Figure 2: Subgroup analysis considering various discipline comparison

		PBL			LBL			Std. Mean Difference	Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
4.1.1 Nursing									
Aein 2006	15.5	1.6	30	12.6	1.7	30	10.4%	1.73 [1.13, 2.33]	
Baghaie 2003	14.66	2.46	14	13.64	3.17	15	8.9%	0.35 [-0.39, 1.08]	<del> </del>
Dianati 2012	12.76	2.2	13	12.71	2.77	14	8.7%	0.02 [-0.74, 0.77]	<del></del>
Fesharaki 2010	15.96	2.98	22	14.72	2.82	22	10.4%	0.42 [-0.18, 1.02]	<del> </del>
Hassanpour Dehkordi 2008	6.15	2.1	20	3.64	1.63	20	9.4%	1.31 [0.62, 2.00]	<del></del>
Khatiban 2014	16.21	0.98	34	15.71	0.92	36	11.8%	0.52 [0.04, 1.00]	<del></del>
Modanloo 2010	4.07	0.32	8	3.86	0.21	24	8.0%	0.85 [0.02, 1.68]	-
Namnabati 2011	13.63	2.61	52	10	2.82	50	12.4%	1.33 [0.90, 1.76]	<del></del>
Penjvini 2013	8.5	0.51	14	7.93	0.7	15	8.6%	0.90 [0.13, 1.67]	_ <del></del>
Sangestani 2013	12.32	1.73		10.12	1.61	36	11.3%	1.30 [0.78, 1.82]	
Subtotal (95% CI)			241			262	100.0%	0.90 [0.56, 1.24]	•
Heterogeneity: Tau² = 0.19; C	$hi^2 = 26.9$	96, df=	9 (P=	0.001);	I <sup>2</sup> = 67	%			
Test for overall effect: Z = 5.23	3 (P < 0.0	0001)							
4.1.2 Medicine									
lmanieh 2013	5.5	0.94	60	4.24	0.81	60	20.9%	1.43 [1.02, 1.83]	-
Kermaniyan 2008	10.9	2.6	20	9.9	1.8	20	17.3%	0.44 [-0.19, 1.07]	<del>  • </del>
Khaki 2007	14.32	4.36	83	12.66	5	76	22.1%	0.35 [0.04, 0.67]	<del></del>
Koleini 2003	14.3	1.7	32	12.8	1.8	32	19.2%	0.85 [0.33, 1.36]	_ <del>-</del>
Momeni 2014	14.83	1.87	42	14.64	1.56	40	20.4%	0.11 [-0.32, 0.54]	<del>- -</del> _
Subtotal (95% CI)			237			228	100.0%	0.64 [0.15, 1.12]	•
Heterogeneity: Tau <sup>2</sup> = 0.25; C	$hi^2 = 24.6$	35, df=	4 (P <	0.0001)	); l <sup>z</sup> = 8	4%			
Test for overall effect: Z = 2.56	6 (P = 0.0	1)							
4.1.3 Dentistry									
Farhadi 2015	9.6	3.16	24	8.55	2.45	24	19.0%	0.37 [-0.21, 0.94]	<del>  • -</del>
Jafari 2010	12.98	1.22	32	12.36	1.7	32	24.6%	0.41 [-0.08, 0.91]	<del>  •</del>
Sadr Lahijani 2004	16.2	1.6	19	14.8	1.7	19	14.3%	0.83 [0.16, 1.50]	<del></del>
Zarshenas 2010	3.41	0.49	64	2.9	0.68	64	42.1%	0.86 [0.49, 1.22]	
Subtotal (95% CI)			139			139	100.0%	0.65 [0.39, 0.91]	•
Heterogeneity: Tau <sup>2</sup> = 0.01; C Test for overall effect: Z = 4.91			3 (P = 0	1.34); l² =	= 10%				
		,							
4.1.4 Other	40.50	4.00		40.71	4.46	0.5	44.46	4 00 10 05 0 00	
Assadi 2013	18.52			16.71		25	41.4%	1.62 [0.95, 2.28]	
Jabbari 2012 Subtotal (95% CI)	16.02		134	14.25		54 <b>79</b>	58.6% <b>100.0</b> %	0.91 [0.57, 1.25] <b>1.20 [0.52, 1.88]</b>	-
Heterogeneity: Tau² = 0.18; C Test for overall effect: Z = 3.48		•	1 (P = 0	1.06); l² =	= 71%				
								-	-2 -1 0 1 2
Toot for outgroup differences						F0/			Favours [LBL] Favours [PBL]

Test for subgroup differences:  $\mathrm{Chi^2} = 3.21$ ,  $\mathrm{df} = 3$  (P = 0.36),  $\mathrm{I^2} = 6.5\%$ 

Figure 3: Subgroup analysis considering various grades comparison



Test for subgroup differences:  $Chi^2 = 5.11$ , df = 4 (P = 0.28),  $I^2 = 21.7\%$ 

Figure 4: Subgroup analysis considering various study subjects comparison

	T	heory		Lab	orato	y		Std. Mean Difference	Std. Mean Difference
Study or Subgroup	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI	IV, Random, 95% CI
3.1.1 Theory									
Aein 2006	15.5	1.6	30	12.6	1.7	30	5.0%	1.73 [1.13, 2.33]	
Assadi 2013	18.52	1.03	22	16.71	1.16	25	4.6%	1.62 [0.95, 2.28]	
Baghaie 2003	14.66	2.46	14	13.64	3.17	15	4.2%	0.35 [-0.39, 1.08]	<del> </del>
Dianati 2012	12.76	2.2	13	12.71	2.77	14	4.1%	0.02 [-0.74, 0.77]	<del></del>
Farhadi 2015	9.6	3.16	24	8.55	2.45	24	5.1%	0.37 [-0.21, 0.94]	<del>  • • • • • • • • • • • • • • • • • • •</del>
Fesharaki 2010	15.96	2.98	22	14.72	2.82	22	5.0%	0.42 [-0.18, 1.02]	+
Hassanpour Dehkordi 2008	6.15	2.1	20	3.64	1.63	20	4.4%	1.31 [0.62, 2.00]	
lmanieh 2013	5.5	0.94	60	4.24	0.81	60	6.2%	1.43 [1.02, 1.83]	
Jabbari 2012	16.02	2.03	112	14.25	1.72	54	6.6%	0.91 [0.57, 1.25]	<del></del>
Jafari 2010	12.98	1.22	32	12.36	1.7	32	5.6%	0.41 [-0.08, 0.91]	+
Kermaniyan 2008	10.9	2.6	20	9.9	1.8	20	4.8%	0.44 [-0.19, 1.07]	<del>  • • • • • • • • • • • • • • • • • • •</del>
Khaki 2007	14.32	4.36	83	12.66	5	76	6.7%	0.35 [0.04, 0.67]	<del></del>
Khatiban 2014	16.21	0.98	34	15.71	0.92	36	5.7%	0.52 [0.04, 1.00]	<del></del>
Koleini 2003	14.3	1.7	32	12.8	1.8	32	5.5%	0.85 [0.33, 1.36]	<del></del>
Modanloo 2010	4.07	0.32	8	3.86	0.21	24	3.7%	0.85 [0.02, 1.68]	<del></del>
Momeni 2014	14.83	1.87	42	14.64	1.56	40	6.0%	0.11 [-0.32, 0.54]	<del></del>
Namnabati 2011	13.63	2.61	52	10	2.82	50	6.0%	1.33 [0.90, 1.76]	
Sadr Lahijani 2004	16.2	1.6	19	14.8	1.7	19	4.6%	0.83 [0.16, 1.50]	<del></del>
Zarshenas 2010	3.41	0.49	64	2.9	0.68	64	6.4%	0.86 [0.49, 1.22]	
Subtotal (95% CI)			703			657	100.0%	0.77 [0.55, 1.00]	•
Heterogeneity: Tau <sup>2</sup> = 0.17; C	$hi^2 = 64.3$	31, df=	18 (P	< 0.000	01); l²:	= 72%			
Test for overall effect: Z = 6.84	4 (P < 0.0	0001)							
3.1.2 Laboratory									
Penjvini 2013	8.5	0.51	14	7.93	0.7	15	31.2%	0.90 [0.13, 1.67]	
Sangestani 2013	12.32	1.73		10.12	1.61	36	68.8%	1.30 [0.78, 1.82]	
Subtotal (95% CI)			48			51	100.0%	1.18 [0.75, 1.61]	•
Heterogeneity: Tau <sup>2</sup> = 0.00; C	$hi^2 = 0.73$	3, df = 1	1 (P = 0)	).39); l² :	= 0%				
Test for overall effect: Z = 5.38	6 (P < 0.0	0001)							
								-	
									-2 -1 0 1 2
T16				0.400	17 04				Favours [Laboratory] Favours [Theory]

Test for subgroup differences: Chi<sup>2</sup> = 2.65, df = 1 (P = 0.10), I<sup>2</sup> = 62.3%

## Supplement 3

Figure 1: The funnel plot for the included studies based on the various learning method comparison

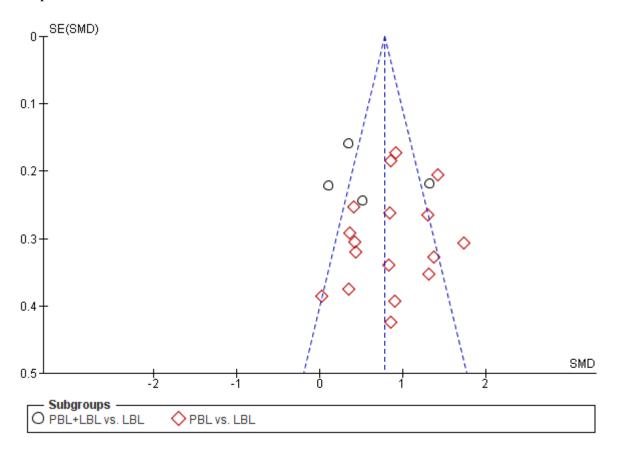


Figure 2: The funnel plot for the included studies based on the discipline comparison

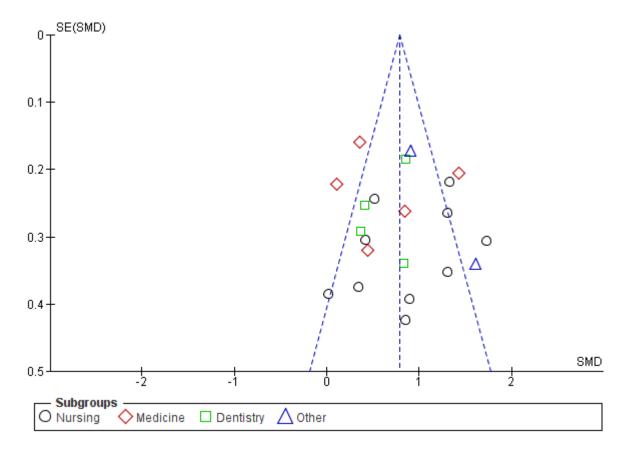


Figure 3: The funnel plot for the included studies based on the various grades comparison

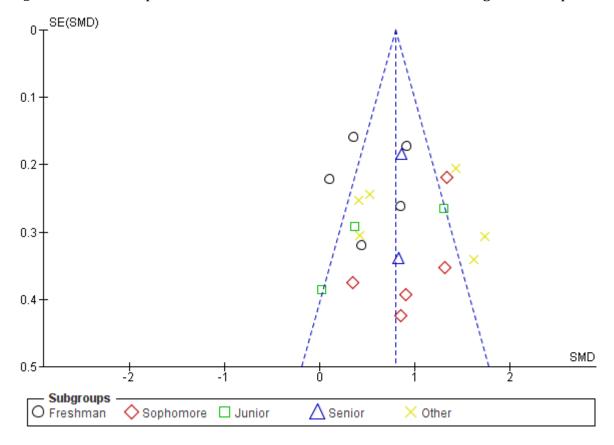


Figure 4: The funnel plot for the included studies based on the various study subjects comparison

